

|                                 |                                                                                   |               |
|---------------------------------|-----------------------------------------------------------------------------------|---------------|
| Numer raportu:<br>1(P000373413) |  | Strona 2 z 13 |
|---------------------------------|-----------------------------------------------------------------------------------|---------------|

## Spis treści

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Niniejszy raport może być powielany wyłącznie w całości bez dokonywania jakichkolwiek modyfikacji oraz za zgodą prawowitego właściciela. Wyniki testów podane w niniejszym raporcie odnoszą się wyłącznie do oferowanych i badanych próbek.

Badania oznaczone numerem IRN w niniejszym raporcie są objęte zakresem akredytacji (RvA L248), o ile nie wskazano inaczej. Niepewność pomiarowa w badaniach w kontekście normy ISO/IEC 17025.

W niektórych przypadkach raporty z badań mogą zawierać oprócz zmierzonych wartości liczbowych także określenie „wynik pomyślny” [„pass”] lub „wynik niepomyślny” [„fail”]. W tej ocenie brana jest pod uwagę zgodność z limitem specyfikacji określonym w normie, która ma zastosowanie do produktu. Pomiar spełnia wymóg, jeżeli prawdopodobieństwo, że mieści się w limicie wynosi co najmniej 50%.

Nie uwzględnia to niepewności pomiarowej związanej z metodą badawczą.

Wyraźnie stwierdza się, że w przypadku „wyniku pomyślnego” [„pass”] lub „wyniku niepomyślnego” [„fail”] wynik pomiaru jest korygowany w celu uwzględnienia niepewności pomiarowej i/lub odpowiednich warunków testowych dla wyniku pomiaru.

O ile nie zaznaczono inaczej, niepewność pomiaru i warunki są zgodne ze specyfikacją testu.

Niniejszy raport jest ważny tylko wyłącznie po podpisaniu przez osobę przeprowadzającą test i weryfikatora.

Wnioski dotyczące zgodności, np. ze standardowymi wymogami dotyczącymi produktu, nie wchodzą w zakres wymogów laboratoryjnych (RvA L248).

Informacje dostarczane przez klienta mogą wpływać na prawidłowość wyników.

W przypadku sporów dotyczących niniejszego raportu z badań prosimy o kontakt z firmą Kiwa Nederland B.V.

Wersja: 003.2

|                                 |                                                                                  |               |
|---------------------------------|----------------------------------------------------------------------------------|---------------|
| Numer raportu:<br>1(P000373413) |  | Strona 3 z 13 |
|---------------------------------|----------------------------------------------------------------------------------|---------------|

|                                                  |                                                                                                                                                                   |                             |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Numer raportu .....                              | 1(P000373413)                                                                                                                                                     |                             |
| Numer projektu .....                             | 1(P000373413)                                                                                                                                                     |                             |
| Data wydania.....                                | 21-01-2025                                                                                                                                                        |                             |
| Łączna liczba stron.....                         | 13 (bez załączników)                                                                                                                                              |                             |
| Laboratorium badawcze .....                      | KIWA Nederland B.V.                                                                                                                                               |                             |
| Adres badań/laboratorium...                      | Wilmersdorf 50, 7327 AC Apeldoorn, Holandia                                                                                                                       |                             |
| Nazwa wnioskującego .....                        | Samsung Electronics Air Conditioner                                                                                                                               |                             |
| Adres:                                           | Evert van de Beekstraat 310, 1118 CX SCHIPHOL, Holandia                                                                                                           |                             |
| Zakres .....                                     | Testowanie pompy ciepła typu powietrze-woda z powietrzem zewnętrznym jako źródłem ciepła w odniesieniu do wymagań wynikających z poniższych specyfikacji badania. |                             |
| Specyfikacja badania                             |                                                                                                                                                                   |                             |
| Normy.....                                       | EN 14825:2022<br>EN 14511:2022<br>Rozporządzenie (UE) 811/2013<br>Rozporządzenie (UE) 813/2013                                                                    |                             |
| Niestandardowa metoda badania:                   | N.d.                                                                                                                                                              |                             |
| Opis testowanego produktu:                       | Pompa ciepła typu powietrze-woda                                                                                                                                  |                             |
| Producent .....                                  | Samsung Electronics Air Conditioner                                                                                                                               |                             |
| Znak towarowy .....                              | Samsung                                                                                                                                                           |                             |
| Oznaczenie modelu/typu .....                     | AE080CXYDGK/EU+AE260CNWMEG/EU,<br>(wszystkie informacje znajdują się w rozdziale 3: Opis produktu(-ów))                                                           |                             |
| Numer testowanego produktu(-ów) .....            | 10659 i 10661                                                                                                                                                     |                             |
| Data otrzymania testowanego produktu:            | 30.07.2024 r.                                                                                                                                                     |                             |
| Okres badania .....                              | Od 13.09.2024 r. do 09.12.2024                                                                                                                                    |                             |
| Uwagi.....                                       | N.d.                                                                                                                                                              |                             |
| Podsumowanie .....                               | Spełnia wymagania określone w załączonych arkuszach testów i wyników.                                                                                             |                             |
| Badający(-a):<br>(imię i nazwisko + podpis) .... | Sandra Wiersma                                                                                                                                                    | <i>[podpis nieczytelny]</i> |
| Zatwierdził(-a) (imię i nazwisko + podpis).....  | Anne-Wim Juffer                                                                                                                                                   | <i>[podpis nieczytelny]</i> |

## 1 Historia raportu

|                      |                                                                                                                                                                                                       |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Numer raportu .....  | 1(P000373413)                                                                                                                                                                                         |
| Numer projektu ..... | 1(P000373413)                                                                                                                                                                                         |
| Autor .....          | Sandra Wiersma                                                                                                                                                                                        |
| Opis .....           | Wstępny raport<br>Test pompy ciepła monoblock typu powietrze-woda<br>AE080CXYDGK/EU+AE260CNWMEG/EU według norm europejskich<br>EN 14511 oraz EN 14825 dotyczących ogrzewania gospodarstw<br>domowych. |

## 2 Podsumowanie badania

Na żądanie Samsung Electronics Air Conditioner Europe B.V. produkty wymienione w opisie badanego produktu są testowane zgodnie ze specyfikacją badania (patrz strona 3 niniejszego raportu).

Przeprowadzone zostały poniższe badania:

- Badania sprawności grzewczej pompy wykonane według norm EN 14511 i EN 14825;

W przypadku tego projektu wszystkie testy zostały przeprowadzone w laboratorium testowym pomp ciepła firmy Kiwa w Apeldoorn w Niderlandach.

Do testów sprawności zastosowano następujące opcje projektowe zgodnie z normą EN 14825:

### Ogrzewanie

|                                                              |                                                                                                                                                                                                                                                   |            |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Zastosowanie                                                 | <input checked="" type="checkbox"/> Niska temperatura (35 °C)<br><input type="checkbox"/> temperatura pośrednia (45 °C)<br><input checked="" type="checkbox"/> średnia temperatura (55 °C)<br><input type="checkbox"/> wysoka temperatura (65 °C) |            |
| Klimat                                                       | <input checked="" type="checkbox"/> umiarkowany <input type="checkbox"/> ciepły <input type="checkbox"/> chłodny                                                                                                                                  |            |
| Tryb testowy                                                 | <input type="checkbox"/> stały przepływ <input checked="" type="checkbox"/> stała delta T                                                                                                                                                         |            |
| Temperatura wody na wylocie <sup>1</sup>                     | <input type="checkbox"/> stała <input checked="" type="checkbox"/> zmienna                                                                                                                                                                        |            |
|                                                              | Średnia LT                                                                                                                                                                                                                                        | Średnia MT |
| Temperatura obliczeniowa odniesienia (T <sub>designh</sub> ) | -10 [°C]                                                                                                                                                                                                                                          | -10 [°C]   |
| Temperatura dwuwartościowa (T <sub>biv</sub> )               | -7 [°C]                                                                                                                                                                                                                                           | -7 [°C]    |
| Temperatura graniczna pracy (TOL)                            | -10 [°C]                                                                                                                                                                                                                                          | -10 [°C]   |
| Minimalny współczynnik przepływu wody                        | 0,420 [m <sup>3</sup> /godz.]                                                                                                                                                                                                                     |            |

Biorąc pod uwagę informacje o produkcie (produktach), plan badań nie podlega żadnym specjalnym interpretacjom ani modyfikacjom.

### 3 Opis produktu(-ów)

|                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Opis urządzenia:</b>                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                            |
| AE080CXYDGK/EU+AE260CNWMEG/EU to pompa ciepła monoblock typu powietrze-woda o nominalnej mocy cieplnej 8,2568 kW w standardowych warunkach znamionowych A7/W35.<br>Pompa ciepła to urządzenie zewnętrzne wykorzystujące technologię inwerterową, w którym źródłem ciepła jest powietrze zewnętrzne. Pompa ciepła jest wyposażona w zintegrowaną pompę cyrkulacyjną. |                                                                                                                                                            |
| Numery seryjne urządzenia:                                                                                                                                                                                                                                                                                                                                          | ODU (Jedn. zewn.): AE080CXYDGK/EU - nr ser. 0ZEFPAFX100091N - nr kiwa 10661<br>IDU (Jedn. wewn.): AE260CNWMEG/EU - nr ser. 0YU4PAOWC00024E - nr kiwa 10659 |
| <b>Kluczowe komponenty / Specyfikacje</b>                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                            |
| <b>Typ</b>                                                                                                                                                                                                                                                                                                                                                          | AE080CXYDGK/EU + AE260CNWMEG/EU                                                                                                                            |
| <b>Zasilanie</b>                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                            |
| Napięcie znamionowe ODU / IDU                                                                                                                                                                                                                                                                                                                                       | 380 -415/220 -240 [V]                                                                                                                                      |
| Częstotliwość znamionowa                                                                                                                                                                                                                                                                                                                                            | 50 [Hz]                                                                                                                                                    |
| Znamionowy pobór mocy                                                                                                                                                                                                                                                                                                                                               | 1,63 [kW] (A7/W35)                                                                                                                                         |
| <b>Źródło ciepła</b>                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                            |
| Temperatura powietrza na wlocie                                                                                                                                                                                                                                                                                                                                     | -28 - +35 [°C]                                                                                                                                             |
| <b>Rozpraszacz ciepła</b>                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                            |
| Temperatura na wylocie                                                                                                                                                                                                                                                                                                                                              | +15-+75 [°C]                                                                                                                                               |
| Maks. ciśnienie robocze                                                                                                                                                                                                                                                                                                                                             | 0,3 MPa                                                                                                                                                    |
| <b>Czynnik chłodniczy</b>                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                            |
| Czynnik chłodniczy                                                                                                                                                                                                                                                                                                                                                  | R290                                                                                                                                                       |
| Standardowe napełnienie                                                                                                                                                                                                                                                                                                                                             | 870 [gr]                                                                                                                                                   |
| <b>Sprężarka</b>                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                            |
| Typ                                                                                                                                                                                                                                                                                                                                                                 | Rotacyjna                                                                                                                                                  |
| Producent                                                                                                                                                                                                                                                                                                                                                           | Samsung Electronics                                                                                                                                        |
| Model                                                                                                                                                                                                                                                                                                                                                               | UF5HC5260FEX                                                                                                                                               |
| <b>Skrapacz</b>                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                            |
| Typ                                                                                                                                                                                                                                                                                                                                                                 | Płytowy wymiennik ciepła                                                                                                                                   |
| Producent                                                                                                                                                                                                                                                                                                                                                           | Danfoss                                                                                                                                                    |
| Konstrukcja                                                                                                                                                                                                                                                                                                                                                         | B3-030-42                                                                                                                                                  |
| Średnica zewnętrzna i typ rury                                                                                                                                                                                                                                                                                                                                      | —                                                                                                                                                          |
| Całkowita długość rury                                                                                                                                                                                                                                                                                                                                              | —                                                                                                                                                          |
| Liczba rzędów                                                                                                                                                                                                                                                                                                                                                       | —                                                                                                                                                          |
| Skok rury                                                                                                                                                                                                                                                                                                                                                           | —                                                                                                                                                          |
| Liczba obiegów                                                                                                                                                                                                                                                                                                                                                      | —                                                                                                                                                          |
| <b>Parownik</b>                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                            |
| Typ                                                                                                                                                                                                                                                                                                                                                                 | Rurowy, żeberkowy                                                                                                                                          |
| Producent                                                                                                                                                                                                                                                                                                                                                           | Samsung Electronics                                                                                                                                        |
| Model                                                                                                                                                                                                                                                                                                                                                               | DB96-26524A                                                                                                                                                |
| Konstrukcja                                                                                                                                                                                                                                                                                                                                                         | 3Rzędyx38Przejdź                                                                                                                                           |
| Rozstaw żeber                                                                                                                                                                                                                                                                                                                                                       | 1,5 [mm]                                                                                                                                                   |
| Powierzchnia wymiennika ciepła                                                                                                                                                                                                                                                                                                                                      | 0,79 [m²]                                                                                                                                                  |
| Maks. dopuszczalne ciśnienie                                                                                                                                                                                                                                                                                                                                        | 3,3 [MPa]                                                                                                                                                  |
| Wymiary (dł. x szer. x wys.)                                                                                                                                                                                                                                                                                                                                        | 986x54x798 [mm]                                                                                                                                            |
| <b>Urządzenie rozprężne</b>                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                            |
| Producent                                                                                                                                                                                                                                                                                                                                                           | Sanhua                                                                                                                                                     |
| Typ                                                                                                                                                                                                                                                                                                                                                                 | Zawór z silnikiem krokowym                                                                                                                                 |
| Specyfikacja                                                                                                                                                                                                                                                                                                                                                        | DPF(O)-2.4C-03                                                                                                                                             |
| <b>Zbiornik magazynujący (urządzenia Combi)</b>                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                            |
| Producent                                                                                                                                                                                                                                                                                                                                                           | —                                                                                                                                                          |
| Typ                                                                                                                                                                                                                                                                                                                                                                 | —                                                                                                                                                          |
| Objętość                                                                                                                                                                                                                                                                                                                                                            | 254 [L]                                                                                                                                                    |
| <b>Pompa obiegowa</b>                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                            |
| Producent                                                                                                                                                                                                                                                                                                                                                           | Shinhoo                                                                                                                                                    |
| Model                                                                                                                                                                                                                                                                                                                                                               | GPA25-9H/130                                                                                                                                               |
| Typ                                                                                                                                                                                                                                                                                                                                                                 | Pompa o prędkości regulowanej czasem trwania impulsu                                                                                                       |
| <b>Wentylator</b>                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                            |
| Producent                                                                                                                                                                                                                                                                                                                                                           | SSCD                                                                                                                                                       |
| Typ                                                                                                                                                                                                                                                                                                                                                                 | Śmigłowy                                                                                                                                                   |
| Specyfikacja                                                                                                                                                                                                                                                                                                                                                        | 520 mm                                                                                                                                                     |

**SAMSUNG**

**POMPA TYPU POWIETRZE-WODA**

|                                     |            |                                                               |
|-------------------------------------|------------|---------------------------------------------------------------|
| NAZWA MODELU                        |            | AE260CNWMEG                                                   |
| KOD MODELU                          |            | AE260CNWMEG/EU                                                |
| MOC (CHŁODZENIE/GRZANIE)            |            | 7 50-14,00 kW/8,00-16,00 kW                                   |
| ZNAMIONOWE NAPIĘCIE I CZĘSTOTLIWOŚĆ |            | GŁÓWNE: 220 - 240 V~ 50 Hz                                    |
| PRĄD ZNAMIONOWY                     |            | 0,9 A                                                         |
| MAKSYMALNY PRĄD                     |            | GŁÓWNY: 22,7 A                                                |
| MAKSYMALNA MOC DOSTARCZANA          |            | GŁÓWNA: 5,20 kW                                               |
| MAKSYMALNE CIŚNIENIE WODY           |            | RURA: 0,3 MPa<br>ZBIORNIK: 1,0 MPa                            |
| OBJĘTOŚĆ ZBIORNIKA (Litry)          |            | 254                                                           |
| ZNAMIONOWE CIŚNIENIE ZBIORNIKA      |            | 0,7 MPa                                                       |
| MASA NETTO                          |            | 136,0 kg                                                      |
| WARUNEK ZNAMIONOWY                  | CHŁODZENIE | POWIETRZE (DB/WB): 35 °C/24 °C<br>WODA (WE / WY): 23°C / 18°C |
|                                     | OGRZEWANIE | POWIETRZE (DB/ WB): 7°C/6°C<br>WODA (WE / WY): 30°C / 35°C    |
| KLASA KLIMATYCZNA                   |            | T1                                                            |
| STOPIEŃ OCHRONY IP                  |            | IPX1                                                          |
| ROK PRODUKCJI                       |            | 2023.                                                         |
| NUMER SERYJNY                       |            | 0YU4PAOWC00024E                                               |

WYPRODUKOWANO W CHINACH



Samsung, Skr. pocztowa 12987, Dublin. IE  
lub: Yateley, GU46 6GG. WIELKA BRYTANIA

UE



30-072024 P000373413 10659

Samsung  
AE260CNWMEG

Rysunek 1: Tabliczka znamionowa jednostki wewnętrznej



POMPA TYPU POWIETRZE-WODA

|                                                    |                                                                   |                                                                |
|----------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------|
| NAZWA MODELU                                       | AE080CXYDGK                                                       |                                                                |
| KOD MODELU                                         | AE080CXYDGK/EU                                                    |                                                                |
| MOC (CHŁODZENIE/GRZANIE)                           | 8,00 kW/8,00kW                                                    |                                                                |
| ZNAMIONOWE NAPIĘCIE I CZĘSTOTLIWOŚĆ                | 380 -415 V 3N~ 50 Hz                                              |                                                                |
| PRĄD ZNAMIONOWY (CHŁODZENIE/GRZANIE)               | 3,22 A / 2,56 A                                                   |                                                                |
| MAKSYMALNY PRĄD                                    | 16,1 A                                                            |                                                                |
| ZNAMIONOWA MOC DOSTARCZANA (CHŁODZENIE/GRZANIE)    | 2,05 / 1,63 kW                                                    |                                                                |
| CIŚNIENIE CZYNNIKA CHŁODNICZEGO (WYSOKIE / NISKIE) | W: 3,3 MPa<br>N : 2,2 MPa                                         |                                                                |
| MAKSYMALNE CIŚNIENIE WODY                          | 0,3 MPa                                                           |                                                                |
| CZYNNIK CHŁODNICZY                                 | R-290<br>0,87 kg/0,003 iCO <sub>2e</sub>                          |                                                                |
| MASA NETTO                                         | 98 kg                                                             |                                                                |
| EER/COP                                            | 3,90/4,91                                                         |                                                                |
| WARUNEK ZNAMIONOWY                                 | CHŁODZENIE                                                        | OGRZEWANIE                                                     |
|                                                    | POWIETRZE (DB/WB):<br>35 °C/24 °C<br>WODA (WE / WY):<br>23°C/18°C | POWIETRZE (DB/WB):<br>7°C /6°C<br>WODA (WE / WY):<br>30°C/35°C |
| KLASA KLIMATYCZNA                                  | T1                                                                |                                                                |
| STOPIEŃ OCHRONY IP                                 | IPX4                                                              |                                                                |
| ROK PRODUKCJI                                      | 2024                                                              |                                                                |
| NUMER SERYJNY                                      | OZEFPAFX100091N                                                   |                                                                |

Zawiera fluorowane gazy cieplarniane  
Nr 501, Suhong East Road, Park Przemysłowy Suzhou, Prowincja Jiangsu, Chińska Republika Ludowa  
Samsung, Skr. pocztowa 12987, Dublin. IE lub Yatetey, GU46 6GG. Wielka Brytania  
WYPRODUKOWANO W CHINACH

Zaprojektowane przez Samsung



## 4 Ogrzewanie - Wyniki badania

### 4.1 AE080CXYDGK/EU+AE260CNWMEG/EU- warunek znamionowy znormalizowany

Podsumowanie najważniejszych wyników badań, w tym wszelkich korekt zastosowanych zgodnie z normą EN 14511, zostało przedstawione w tabelach poniżej.

*Tabela 1: Podsumowanie danych z testów ogrzewania dla znamionowych osiąggów standardowych i osiąggów zastosowania zgodnie z normą EN 14511*

| Warunek                            | Jednostka         | Osiągi stand. |       | Osiągi zast. |        |
|------------------------------------|-------------------|---------------|-------|--------------|--------|
|                                    |                   | A7W35         | A7W55 | A2W35        | A-7W35 |
| Częściowe obciążenie               | %                 | –             | –     | –            | –      |
| Częstotliwość sprężarki            | Hz                | 58            | 65    | 58           | 90     |
| Odszranianie                       | –                 | Nie           | Nie   | Tak          | Tak    |
| Liczba cykli odszr. podcz. analizy | –                 | 0             | 0     | 1            | 1      |
| Temperatura powietrza (DB)         | °C                | 7,00          | 7,00  | 2,01         | -7,00  |
| Temperatura powietrza (WB)         | °C                | 6,00          | 5,99  | 1,04         | -8,00  |
| Temperatura wody na wlocie         | °C                | 30X51         | 47,00 | 30,00        | 29,99  |
| Temperatura wody na wylocie        | °C                | 34,99         | 55,07 | 34,04        | 34,56  |
| Natężenie przepływu wody           | m <sup>3</sup> /h | 1,445         | 0,900 | 1,249        | 1,419  |
| Moc grzewcza                       | kW                | 8,257         | 8,267 | 5,775        | 7,440  |
| Efektywny pobór mocy               | kW                | 1673          | 2,695 | 1,549        | 2,712  |
| Współczynnik wydajności            | –                 | 4,936         | 3,068 | 3,728        | 2,743  |

### 4.2 AE080CXYDGK/EU+AE260CNWMEG/EU- Klimat umiarkowany

Podsumowanie najważniejszych wyników badań, w tym wszelkich korekt zastosowanych zgodnie z normami EN 14511 oraz EN 14825, zostało przedstawione w tabelach poniżej.

*Tabela 2: Podsumowanie danych z badań dotyczących ogrzewania dla zastosowań niskotemperaturowych w umiarkowanych warunkach klimatycznych*

| Niskotemperaturowa sprawność grzewcza |                   |        |       |       |        |         |         |
|---------------------------------------|-------------------|--------|-------|-------|--------|---------|---------|
| Warunek                               | Jednostka         | A      | B     | C     | D      | E (TOL) | F (BIV) |
|                                       |                   | A-7W34 | A2W30 | A7W27 | A12W24 | A-10W35 | A-7W34  |
| Częściowe obciążenie                  | %                 | 88     | 54    | 35    | 15     | 100     | 88      |
| Częstotliwość sprężarki               | Hz                | 90     | 35    | 19    | 15     | 95      | 90      |
| Odszranianie                          | –                 | Tak    | Nie   | Nie   | Nie    | Tak     | Tak     |
| Liczba cykli odszr. podcz. analizy    | –                 | 1      | 0     | 0     | 0      | 1       | 1       |
| Temperatura powietrza (DB)            | °C                | -7,00  | 2,01  | 7,00  | 12,00  | -9,98   | -7,00   |
| Temperatura powietrza (WB)            | °C                | -7,99  | 1,00  | 5,99  | 10,99  | -10,99  | -7,99   |
| Temperatura wody na wlocie            | °C                | 28,99  | 24,97 | 21,98 | 21,68  | 29,99   | 28,99   |
| Temperatura wody na wylocie           | °C                | 33,51  | 29,84 | 27,15 | 26,68  | 34,64   | 33,51   |
| Natężenie przepływu wody              | m <sup>3</sup> /h | 1,442  | 0,786 | 0,473 | 0,449  | 1,386   | 1,442   |
| Moc grzewcza                          | kW                | 7,480  | 4,383 | 2,792 | 2,565  | 7,390   | 7,480   |
| Efektywny pobór mocy                  | kW                | 2,680  | 0,934 | 0,395 | 0,296  | 2,943   | 2,680   |
| Współczynnik wydajności               | –                 | 2,791  | 4,695 | 7,073 | 8,661  | 2,511   | 2,791   |

Tabela 3: Podsumowanie danych z badań dla zastosowań średnitemperaturowych w umiarkowanych warunkach klimatycznych

| Średnitemperaturowa sprawność grzewcza |                   |        |       |       |        |         |         |
|----------------------------------------|-------------------|--------|-------|-------|--------|---------|---------|
| Warunek                                | Jednostka         | A      | B     | C     | D      | E (TOL) | F (BIV) |
|                                        |                   | A-7W52 | A2W42 | A7W36 | A12W30 | A-10W55 | A-7W52  |
| Częściowe obciążenie                   | %                 | 88     | 54    | 35    | 15     | 100     | 88      |
| Częstotliwość sprężarki                | Hz                | 95     | 36    | 20    | 15     | 95      | 95      |
| Odszranianie                           | –                 | Tak    | Nie   | Nie   | Nie    | Nie     | Tak     |
| Liczba cykli odszr. podcz. analizy     | –                 | 1      | 0     | 0     | 0      | 0       | 1       |
| Temperatura powietrza (DB)             | °C                | -7,01  | 2,00  | 7,00  | 12,00  | -10,00  | -7,01   |
| Temperatura powietrza (WB)             | °C                | -8,01  | 1,01  | 5,99  | 11,00  | -11,02  | -8,01   |
| Temperatura wody na wlocie             | °C                | 44,00  | 34,01 | 30,3  | 27,36  | 46,99   | 44,00   |
| Temperatura wody na wylocie            | °C                | 51,27  | 41,82 | 36,03 | 32,05  | 54,98   | 51,27   |
| Natężenie przepływu wody               | m <sup>3</sup> /h | 0,864  | 0,477 | 0,420 | 0,420  | 0,785   | 0,864   |
| Moc grzewcza                           | kW                | 7,159  | 4,275 | 2,742 | 2,242  | 7,139   | 7,159   |
| Efektywny pobór mocy                   | kW                | 3,400  | 1,175 | 0,550 | 0,348  | 3,719   | 3,400   |
| Współczynnik wydajności                | –                 | 2,105  | 3,638 | 4,987 | 6,448  | 1,920   | 2,105   |

W poniższej tabeli przedstawiono podsumowanie poboru energii dla różnych komponentów pompy ciepła, które stanowią część korekt poboru energii na potrzeby własne.

Tabela 4: Pobór mocy elektrycznej w trybie wyłączenia termostatu, czuwania, wyłączenia i włączonej grzałki karteru.

| Pobór mocy na potrzeby własne  |           |       |
|--------------------------------|-----------|-------|
|                                | Jednostka | Wynik |
| Tryb z wyłączonym termostatem  | kW        | 0,006 |
| Tryb czuwania                  | kW        | 0,006 |
| Tryb włączonej grzałki karteru | kW        | 0,000 |
| Tryb wyłączenia                | kW        | 0,006 |

Szczegółowe wyniki badań dla poszczególnych warunków można znaleźć w Załącznikach do niniejszego raportu.

## 5 Ogrzewanie - wyniki obliczeń

Wyniki testów przedstawione w rozdziale 4 są wykorzystywane do obliczania efektywności energetycznej zgodnie z normą EN 14825. Do obliczeń wykorzystywany jest arkusz kalkulacyjny dostępny na stronie internetowej HPKeymark (V7.1).

W poniższych tabelach przedstawiono podsumowanie najważniejszych wyników obliczeń.

Tabela 4: Wynik obliczeń dla zastosowania niskotemperaturowego i umiarkowanych warunków klimatycznych

| Wydajność energetyczna |      |       |           |          |
|------------------------|------|-------|-----------|----------|
| SCOP <sub>on</sub>     | SCOP | ns    | QHE (kWh) | Etykieta |
| 4,88                   | 4,88 | 192,3 | 3385      | A+++     |

Tabela 5: Wynik obliczeń dla zastosowania średnotemperaturowego i umiarkowanych warunków klimatycznych

| Wydajność energetyczna |      |       |           |            |
|------------------------|------|-------|-----------|------------|
| SCOP <sub>on</sub>     | SCOP | ns    | QHE (kWh) | Oznaczenie |
| 3,68                   | 3,68 | 144,4 | 4486      | A++        |

Podsumowanie klas efektywności energetycznej zgodnie z (UE) 811/2013 znajduje się w załącznikach do niniejszego raportu.

## 6 Użyty sprzęt

| System 6                                                   |                        |                                 |                                        |                 |
|------------------------------------------------------------|------------------------|---------------------------------|----------------------------------------|-----------------|
| Opis<br>Marka                                              | Typ                    | Zakres pracy                    | Wymagana<br>dokładność                 | Data kalibracji |
| <b>Temperatura<br/>zewnątrzna</b> ST<br>Instruments        | PT100                  | -20 - +50 °C                    | ±0,2 K                                 | Mar 2025        |
| <b>Zewnętrzna wilg.<br/>wzgl.</b><br>Vaisala               | HMT337                 | 66 - 90%RH                      | —                                      | Lip 2025        |
| <b>Temperatura<br/>wewnętrzna</b> ST<br>Instruments        | PT100                  | + 15-+35 °C                     | ±0,2 K                                 | Mar 2025        |
| Ciśnienie<br>atmosferyczne<br>Vaisala                      | PTB 110                | +850 -+1150 hPa                 | —                                      | Mar 2025        |
| <b>CO - temperatura<br/>zasilania</b><br>Tempcontrol       | PT8311/S               | +20 - +65 °C                    | ±0,15K                                 | Mar 2025        |
| <b>CO - temperatura<br/>powrotu</b><br>Tempcontrol         | PT8311/S               | +20 - +65 °C                    | ±0,15K                                 | Mar 2025        |
| <b>CO - niski przepływ</b><br>Siemens                      | Sitrans FM MAG<br>6000 | 0-1,5 m³/h                      | ± 1 %                                  | Mar 2025        |
| <b>CO-Wysoki<br/>przepływ</b><br>Siemens                   | Sitrans FM MAG<br>6000 | 1-4,5 m³/h                      | ± 1 %                                  | Mar 2025        |
| <b>CO — AP</b><br>Siemens                                  | Sitrans P DS III       | -100- +100 kPa                  | ± 1 kPa (< 20 kPa)<br>± 5 % (> 20 kPa) | Mar 2025        |
| <b>CWU - temperatura<br/>wody w<br/>kranie</b> Tempcontrol | PT8311/S               | + 10-+65 °C                     | ±0,2 K                                 | Mar 2025        |
| <b>CWU- temperatura<br/>zasilania</b><br>Tempcontrol       | PT8311/S               | +8-+12 °C                       | ±0,2 K                                 | Mar 2025        |
| <b>CWU- przepływ</b><br>Siemens                            | Sitrans FM MAG<br>6000 | 0-20 l/min                      | ±2 %                                   | Mar 2025        |
| <b>Licznik energii<br/>elektrycznej</b><br>Yokogawa        | WT333E                 | 220-240 V<br>0-16 A<br>0-20 kWh | ± 0,5 %<br>± 0,5 %<br>± 1 %            | Paź 2025        |

|                                 |                                                                                  |                |
|---------------------------------|----------------------------------------------------------------------------------|----------------|
| Numer raportu:<br>1(P000373413) |  | Strona 13 z 13 |
|---------------------------------|----------------------------------------------------------------------------------|----------------|

#### Załączniki

|              |                                                                                 |
|--------------|---------------------------------------------------------------------------------|
| Załącznik 1: | Podsumowanie klas efektywności energetycznej zgodnie z (UE) 811/2013 - 1 strona |
| Załącznik 2: | Wyniki testu - 31 stron                                                         |
| Załącznik 3: | Arkusze testów - 37 stron                                                       |

KONIEC RAPORTU Z BADANIA

## Obliczenia efektywności energetycznej - Klimat umiarkowany

| Dane produktu               |                                 |
|-----------------------------|---------------------------------|
| Producent                   | Samsung                         |
| Dane produktu               | AE080CXYDGK/EU + AE260CNWMEG/EU |
| Typ pompy ciepła            | zewnętrzna typu powietrze-woda  |
| Tryb pracy                  | odwracalny                      |
| Zastosowanie temperaturowe  | 35°C                            |
| Przepływ wody               | zmienny                         |
| Temperatura wody na wylocie | zmienny                         |
| Sterowanie mocą             | zmiennie                        |
| Podgrzewacz rezerwowy       | elektryczny                     |

| Dane warunków                                   |             |        |
|-------------------------------------------------|-------------|--------|
| Klimat                                          | umiarkowany |        |
| Temperatura obliczeniowa odniesienia (Tdesignh) | -10         | °C     |
| Prated (znamionowa)                             | 8           | kW     |
| Temperatura dwuwartościowa (Tbiv)               | -7          | °C     |
| Temperatura graniczna pracy (TOL)               | -10         | °C     |
| H <sub>he</sub>                                 | 2066        | godzin |
| Q <sub>h</sub>                                  | 16528       | kWh    |
| Wydajność na zapasowym paliwie kopalnym         | –           | %      |

|                        |       |       |                       |
|------------------------|-------|-------|-----------------------|
| Oblicz                 | Zeruj |       |                       |
| Wydajność energetyczna |       |       |                       |
| SCOPon                 | SCOP  | ns    | Q <sub>he</sub> (kWh) |
| 4,88                   | 4,88  | 192,3 | 3385                  |

| Dane użytkowe          |                            |                                         |                           |                                                        |                      |                              |                 |      |                    |
|------------------------|----------------------------|-----------------------------------------|---------------------------|--------------------------------------------------------|----------------------|------------------------------|-----------------|------|--------------------|
| Warunek                | Temperatura zewnętrzna T°C | Współczynnik obciążenia częściowego (%) | Obciążenie częściowe [kW] | Temperatura wody na wlocie / wylocie na potrzeby testu | Deklarowana moc (kW) | Deklarowany COP <sub>d</sub> | C <sub>dh</sub> | CR   | COP <sub>bin</sub> |
| A                      | -7                         | 88                                      | 7,08                      |                                                        | 7,48                 | 2,79                         | 0,900           | 1,00 | 2,79               |
| B                      | 2                          | 54                                      | 4,31                      |                                                        | 4,38                 | 4,70                         | 0,900           | 1,00 | 4,70               |
| C                      | 7                          | 35                                      | 2,77                      |                                                        | 2,79                 | 7,07                         | 0,900           | 1,00 | 7,07               |
| D                      | 12                         | 15                                      | 1,23                      |                                                        | 2,57                 | 8,66                         | 0,900           | 0,48 | 7,81               |
| E(TOL) lub E(Tdesignh) | -10                        | 100                                     | 8,00                      |                                                        | 7,39                 | 2,51                         | 0,900           | 1,00 | 2,51               |
| F(Tbiv)                | -7                         | 88                                      | 7,08                      |                                                        | 7,48                 | 2,79                         | 0,900           | 1,00 | 2,79               |

| Pobór mocy na potrzeby własne     |         |                                        |             |
|-----------------------------------|---------|----------------------------------------|-------------|
| Tryby pracy wyłącznie dla grzania |         | Tryby pracy dla jednostek odwracalnych |             |
|                                   | Godziny | Moc wejściowa (W)                      | P * h (kWh) |
| Termostat wyłączony               | 178     | 6                                      | 1           |
| Stan gotowości                    | 0       | 6                                      | 0           |
| Tryb wyłączenia                   | 3672    | 6                                      | 22          |
| Grzałka karteru                   | 3850    | 0                                      | 0           |

|                     |         |                   |             |
|---------------------|---------|-------------------|-------------|
|                     | Godziny | Moc wejściowa (W) | P * h (kWh) |
| Termostat wyłączony | 178     | 6                 | 1           |
| Stan gotowości      | 0       | 6                 | 0           |
| Tryb wyłączenia     | 0       | 6                 | 0           |
| Grzałka karteru     | 178     | 0                 | 0           |

| Obliczenia bloków |
|-------------------|
|-------------------|

# Obliczenia efektywności energetycznej - Klimat umiarkowany

| Warunek                           | Blok | Czujnik temp. zewn. | Godziny | Współczynnik obciążenia częściowego | Zapotrzebowanie na ciepło (kW) | Obciążenie cieplne pokryte przez pompę ciepła |                         | Podgrzewacz rezerwowy | Roczne zapotrzebowanie na ogrzewanie | Roczne zużycie energii |
|-----------------------------------|------|---------------------|---------|-------------------------------------|--------------------------------|-----------------------------------------------|-------------------------|-----------------------|--------------------------------------|------------------------|
|                                   | j    | Tj                  | hj      |                                     | Ph(tj)                         |                                               | COP <sub>bin</sub> (Tj) | elbu(Tj)              | hj*Ph(Tj)                            |                        |
|                                   | —    | °C                  | —       |                                     |                                |                                               |                         |                       |                                      |                        |
| Temperatura graniczna pracy (TOL) | 21   | -10                 | 1       | 100,00                              | 8,00                           | 7,39                                          | 2,51                    | 0,61                  | 8                                    | 4                      |
|                                   | 22   | -9                  | 25      | 96,15                               | 7,69                           | 7,29                                          | 2,60                    | 0,41                  | 192                                  | 80                     |
|                                   | 23   | -8                  | 23      | 92,31                               | 7,38                           | 7,18                                          | 2,70                    | 0,20                  | 170                                  | 66                     |
| Temperatura dwuwartościowa (Tbiv) | 24   | -7                  | 24      | 88,46                               | 7,08                           | 7,08                                          | 2,79                    | 0,00                  | 170                                  | 61                     |
|                                   | 25   | -6                  | 27      | 84,62                               | 6,77                           | 6,77                                          | 3,00                    | 0,00                  | 183                                  | 60,87                  |
|                                   | 26   | -5                  | 68      | 80,77                               | 6,46                           | 6,46                                          | 3,21                    | 0,00                  | 439                                  | 136,70                 |
|                                   | 27   | -4                  | 91      | 76,92                               | 6,15                           | 6,15                                          | 3,43                    | 0,00                  | 560                                  | 163,47                 |
|                                   | 28   | -3                  | 89      | 73,08                               | 5,85                           | 5,85                                          | 3,64                    | 0,00                  | 520                                  | 143,05                 |
|                                   | 29   | -2                  | 165     | 69,23                               | 5,54                           | 5,54                                          | 3,85                    | 0,00                  | 914                                  | 237,44                 |
|                                   | 30   | -1                  | 173     | 65,38                               | 5,23                           | 5,23                                          | 4,06                    | 0,00                  | 905                                  | 222,87                 |
|                                   | 31   | 0                   | 240     | 61,54                               | 4,92                           | 4,92                                          | 4,27                    | 0,00                  | 1182                                 | 276,58                 |
|                                   | 32   | 1                   | 280     | 57,69                               | 4,62                           | 4,62                                          | 4,48                    | 0,00                  | 1292                                 | 288,24                 |
| 2                                 | 33   | 2                   | 320     | 53,85                               | 4,31                           | 4,31                                          | 4,70                    | 0,00                  | 1378                                 | 294                    |
|                                   | 34   | 3                   | 357     | 50,00                               | 4,00                           | 4,00                                          | 5,17                    | 0,00                  | 1428,00                              | 276,18                 |
|                                   | 35   | 4                   | 356     | 46,15                               | 3,69                           | 3,69                                          | 5,65                    | 0,00                  | 1314,46                              | 232,80                 |
|                                   | 36   | 5                   | 303     | 42,31                               | 3,38                           | 3,38                                          | 6,12                    | 0,00                  | 1025,54                              | 167,52                 |
|                                   | 37   | 6                   | 330     | 38,46                               | 3,08                           | 3,08                                          | 6,60                    | 0,00                  | 1015,38                              | 153,91                 |
| 7                                 | 38   | 7                   | 326     | 34,62                               | 2,77                           | 2,77                                          | 7,07                    | 0,00                  | 903                                  | 128                    |
|                                   | 39   | 8                   | 348     | 30,77                               | 2,46                           | 2,73                                          | 7,22                    | 0,00                  | 857                                  | 119                    |
|                                   | 40   | 9                   | 335     | 26,92                               | 2,15                           | 2,69                                          | 7,37                    | 0,00                  | 722                                  | 98                     |
|                                   | 41   | 10                  | 315     | 23,08                               | 1,85                           | 2,65                                          | 7,52                    | 0,00                  | 582                                  | 77                     |
|                                   | 42   | 11                  | 215     | 19,23                               | 1,54                           | 2,61                                          | 7,67                    | 0,00                  | 331                                  | 43                     |
| 12                                | 43   | 12                  | 169     | 15,38                               | 1,23                           | 2,57                                          | 7,81                    | 0,00                  | 208                                  | 27                     |
|                                   | 44   | 13                  | 151     | 11,54                               | 0,92                           | 2,52                                          | 7,96                    | 0,00                  | 139                                  | 18                     |
|                                   | 45   | 14                  | 105     | 7,69                                | 0,62                           | 2,48                                          | 8,11                    | 0,00                  | 65                                   | 8                      |
|                                   | 46   | 15                  | 74      | 3,85                                | 0,31                           | 2,44                                          | 8,26                    | 0,00                  | 23                                   | 3                      |
| 4910                              |      |                     |         |                                     | 16525                          |                                               |                         |                       |                                      | 3383                   |

## Obliczenia efektywności energetycznej - Klimat umiarkowany

| Dane produktu               |                                 |
|-----------------------------|---------------------------------|
| Producent                   | Samsung                         |
| Dane produktu               | AE080CXYDGK/EU + AE260CNWMEG/EU |
| Typ pompy ciepła            | zewnętrzna typu powietrze-woda  |
| Tryb pracy                  | odwracalny                      |
| Zastosowanie temperaturowe  | 55°C                            |
| Przepływ wody               | zmienne                         |
| Temperatura wody na wylocie | zmienne                         |
| Sterowanie mocą             | zmienne                         |
| Podgrzewacz rezerwowowy     | elektryczny                     |

| Dane warunków                                                |             |        |
|--------------------------------------------------------------|-------------|--------|
| Klimat                                                       | umiarkowany |        |
| Temperatura obliczeniowa odniesienia (T <sub>designh</sub> ) | -10         | °C     |
| Prated (znamionowa)                                          | 8           | kW     |
| Temperatura dwuwartościowa (T <sub>biv</sub> )               | -7          | °C     |
| Temperatura graniczna pracy (TOL)                            | -10         | °C     |
| H <sub>he</sub>                                              | 2066        | godzin |
| Q <sub>h</sub>                                               | 16528       | kWh    |
| Wydajność na zapasowym paliwie kopalnym                      | –           | %      |

Oblicz                      Zeruj

| Wydajność energetyczna |      |       |                       |
|------------------------|------|-------|-----------------------|
| SCOPon                 | SCOP | ns    | Q <sub>he</sub> (kWh) |
| 3,68                   | 3,68 | 144,4 | 4486                  |

| Dane użytkowe                       |                            |                                         |                           |                                                        |                      |                              |                 |      |                    |
|-------------------------------------|----------------------------|-----------------------------------------|---------------------------|--------------------------------------------------------|----------------------|------------------------------|-----------------|------|--------------------|
| Warunek                             | Temperatura zewnętrzna T°C | Współczynnik obciążenia częściowego (%) | Obciążenie częściowe [kW] | Temperatura wody na wlocie / wylocie na potrzeby testu | Deklarowana moc (kW) | Deklarowany COP <sub>d</sub> | C <sub>dh</sub> | CR   | COP <sub>bin</sub> |
| A                                   | -7                         | 88                                      | 7,08                      |                                                        | 7,16                 | 2,11                         | 0,900           | 1,00 | 2,11               |
| B                                   | 2                          | 54                                      | 4,31                      |                                                        | 4,28                 | 3,64                         | 0,900           | 1,00 | 3,64               |
| C                                   | 7                          | 35                                      | 2,77                      |                                                        | 2,74                 | 4,99                         | 0,900           | 1,00 | 4,99               |
| D                                   | 12                         | 15                                      | 1,23                      |                                                        | 2,24                 | 6,45                         | 0,900           | 0,55 | 5,96               |
| E(TOL) lub E(T <sub>designh</sub> ) | -10                        | 100                                     | 8,00                      |                                                        | 7,14                 | 1,92                         | 0,900           | 1,00 | 1,92               |
| F (T <sub>biv</sub> )               | -7                         | 88                                      | 7,08                      |                                                        | 7,16                 | 2,11                         | 0,900           | 1,00 | 2,11               |

### Pobór mocy na potrzeby własne

Tryby pracy wyłącznie dla grzania

|                     | Godziny | Moc wejściowa (W) | P * h (kWh) |
|---------------------|---------|-------------------|-------------|
| Termostat wyłączony | 178     | 6                 | 1           |
| Stan gotowości      | 0       | 6                 | 0           |
| Tryb wyłączenia     | 3672    | 6                 | 22          |
| Grzałka karteru     | 3850    | 0                 | 0           |

Tryby pracy dla jednostek odwracalnych

|                     | Godziny | Moc wejściowa (W) | P * h (kWh) |
|---------------------|---------|-------------------|-------------|
| Termostat wyłączony | 178     | 6                 | 1           |
| Stan gotowości      | 0       | 6                 | 0           |
| Tryb wyłączenia     | 0       | 6                 | 0           |
| Grzałka karteru     | 178     | 0                 | 0           |

### Obliczenia bloków

## Obliczenia efektywności energetycznej - Klimat umiarkowany

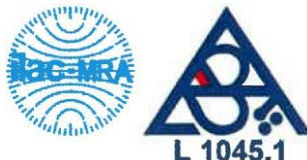
| Warunek                           | Blok | Czujnik temp. zewn. | Godziny | Współczynnik obciążenia częściowego | Zapotrzebowanie na ciepło (kW) | Obciążenie cieplne pokryte przez pompę ciepła |                         | Podgrzewacz rezerwowy | Roczne zapotrzebowanie na ogrzewanie | Roczne zużycie energii |
|-----------------------------------|------|---------------------|---------|-------------------------------------|--------------------------------|-----------------------------------------------|-------------------------|-----------------------|--------------------------------------|------------------------|
|                                   | j    | Tj                  | hj      |                                     | Ph(tj)                         |                                               | COP <sub>bin</sub> (Tj) | elbu(Tj)              | hj*Ph(Tj)                            |                        |
|                                   | –    | °C                  | –       |                                     |                                |                                               |                         |                       |                                      |                        |
| Temperatura graniczna pracy (TOL) | 21   | -10                 | 1       | 100,00                              | 8,00                           | 7,14                                          | 1,92                    | 0,86                  | 8                                    | 5                      |
|                                   | 22   | -9                  | 25      | 96,15                               | 7,69                           | 7,12                                          | 1,98                    | 0,57                  | 192                                  | 104                    |
|                                   | 23   | -8                  | 23      | 92,31                               | 7,38                           | 7,10                                          | 2,04                    | 0,29                  | 170                                  | 86                     |
| Temperatura dwuwartościowa (Tbiv) | 24   | -7                  | 24      | 88,46                               | 7,08                           | 7,08                                          | 2,11                    | 0,00                  | 170                                  | 81                     |
|                                   | 25   | -6                  | 27      | 84,62                               | 6,77                           | 6,77                                          | 2,28                    | 0,00                  | 183                                  | 80,33                  |
|                                   | 26   | -5                  | 68      | 80,77                               | 6,46                           | 6,46                                          | 2,45                    | 0,00                  | 439                                  | 179,66                 |
|                                   | 27   | -4                  | 91      | 76,92                               | 6,15                           | 6,15                                          | 2,62                    | 0,00                  | 560                                  | 214,07                 |
|                                   | 28   | -3                  | 89      | 73,08                               | 5,85                           | 5,85                                          | 2,79                    | 0,00                  | 520                                  | 186,74                 |
|                                   | 29   | -2                  | 165     | 69,23                               | 5,54                           | 5,54                                          | 2,96                    | 0,00                  | 914                                  | 309,08                 |
|                                   | 30   | -1                  | 173     | 65,38                               | 5,23                           | 5,23                                          | 3,13                    | 0,00                  | 905                                  | 289,39                 |
|                                   | 31   | 0                   | 240     | 61,54                               | 4,92                           | 4,92                                          | 3,30                    | 0,00                  | 1182                                 | 358,33                 |
|                                   | 32   | 1                   | 280     | 57,69                               | 4,62                           | 4,62                                          | 3,47                    | 0,00                  | 1292                                 | 372,67                 |
| 2                                 | 33   | 2                   | 320     | 53,85                               | 4,31                           | 4,31                                          | 3,64                    | 0,00                  | 1378                                 | 379                    |
|                                   | 34   | 3                   | 357     | 50,00                               | 4,00                           | 4,00                                          | 3,91                    | 0,00                  | 1428,00                              | 365,42                 |
|                                   | 35   | 4                   | 356     | 46,15                               | 3,69                           | 3,69                                          | 4,18                    | 0,00                  | 1314,46                              | 314,65                 |
|                                   | 36   | 5                   | 303     | 42,31                               | 3,38                           | 3,38                                          | 4,45                    | 0,00                  | 1025,54                              | 230,59                 |
|                                   | 37   | 6                   | 330     | 38,46                               | 3,08                           | 3,08                                          | 4,72                    | 0,00                  | 1015,38                              | 215,25                 |
| 7                                 | 38   | 7                   | 326     | 34,62                               | 2,77                           | 2,77                                          | 4,99                    | 0,00                  | 903                                  | 181                    |
|                                   | 39   | 8                   | 348     | 30,77                               | 2,46                           | 2,66                                          | 5,18                    | 0,00                  | 857                                  | 165                    |
|                                   | 40   | 9                   | 335     | 26,92                               | 2,15                           | 2,56                                          | 5,38                    | 0,00                  | 722                                  | 134                    |
|                                   | 41   | 10                  | 315     | 23,08                               | 1,85                           | 2,45                                          | 5,57                    | 0,00                  | 582                                  | 104                    |
|                                   | 42   | 11                  | 215     | 19,23                               | 1,54                           | 2,35                                          | 5,76                    | 0,00                  | 331                                  | 57                     |
| 12                                | 43   | 12                  | 169     | 15,38                               | 1,23                           | 2,24                                          | 5,96                    | 0,00                  | 208                                  | 35                     |
|                                   | 44   | 13                  | 151     | 11,54                               | 0,92                           | 2,14                                          | 6,15                    | 0,00                  | 139                                  | 23                     |
|                                   | 45   | 14                  | 105     | 7,69                                | 0,62                           | 2,03                                          | 6,35                    | 0,00                  | 65                                   | 10                     |
|                                   | 46   | 15                  | 74      | 3,85                                | 0,31                           | 1,93                                          | 6,54                    | 0,00                  | 23                                   | 3                      |
| 4910                              |      |                     |         |                                     |                                |                                               |                         |                       | 16525                                | 4485                   |



Laboratorium badawcze 1045.1 akredytowane przez Czeski Instytut Akredytacyjny na podstawie normy ČSN EN ISO/IEC 17025:2018

**Strojírenský zkušební ústav, s.p. Zkušební laboratoř**  
**(Technický Institut Badawczy, Przedsiębiorstwo Publiczne, Laboratorium Badawcze)**  
**Hudcova 424/56b, Medlánky, 621 00 Brno**

Strona 1 z 14



## **SPRAWOZDANIE Z BADAŃ**

### **39-17675/2/H**

**Produkt:** Jednostka zewnętrzna pompy ciepła powietrze-woda – monoblok

**Oznaczenie typu:** AE080CXYDGK/EU

**Klient:** Samsung Electronics Air Conditioning Europe B.V.  
Evert van de Beekstraat 310  
1118 CX Schiphol  
HOLANDIA

**Producent:** Samsung Electronics Air Conditioning Europe B.V.  
Evert van de Beekstraat 310  
1118 CX Schiphol  
HOLANDIA

**Data wystawienia sprawozdania:** 2024-07-23

**Rozdzielnik:** 1 egz. dla Klienta  
1 egz. dla Technicznego Instytutu Badawczego

Niniejszy dokument może być kopiowany w całości bez pisemnej zgody Technicznego Instytutu Badawczego. Kopiowanie częściowe wymaga uzyskania zgody. Wyniki badań i weryfikacji dotyczą tylko badanych produktów w postaci, w jakiej zostały otrzymane lub przedstawione. Laboratorium badawcze nie ponosi odpowiedzialności za zawarte w sprawozdaniu dane przekazane przez klienta.

SP-2021-000012\_1\_12

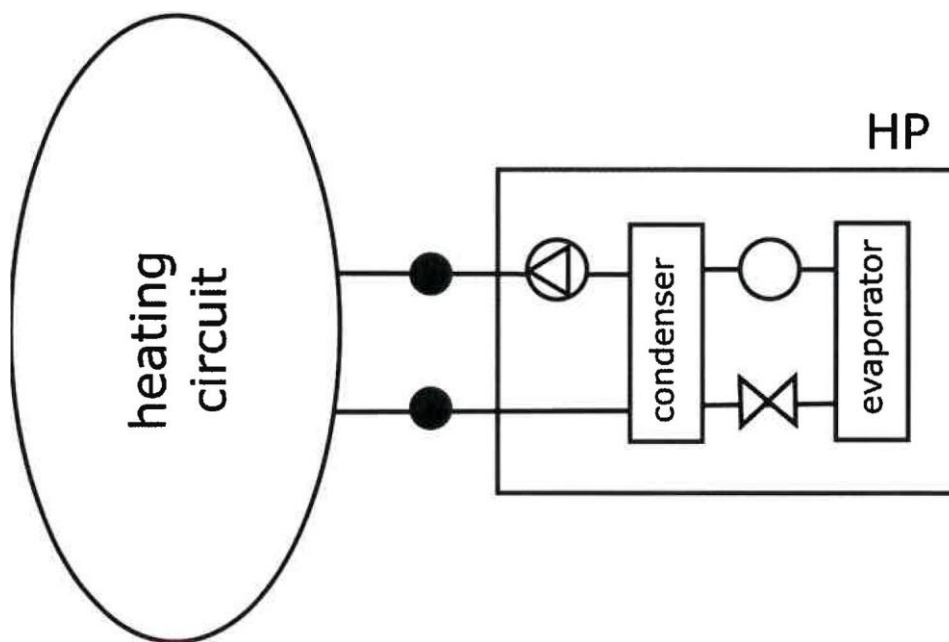
## I. Opis badanego produktu

Pompa ciepła **AE080CXYDGK/EU** dostarczona przez firmę **Samsung Electronics Air Conditioning Europe B.V.** jest konstrukcyjnie przystosowana do pracy w układzie powietrze-woda. Urządzenie jest wykonane w wersji monoblok do montażu na zewnątrz. Zastosowano czynnik chłodniczy R290 w ilości 0,87 kg. Zasilanie trójfazowe. Pompa ciepła może działać w trybie grzania i chłodzenia. Pompa ciepła pracuje ze zmiennym natężeniem przepływu.

Główne elementy jednostki zewnętrznej **AE080CXYDGK/EU**:

- Numer seryjny 0ZEFPWF900016F
- Kształt prostopadłościanu o wymiarach 1000 × 500 × 840 mm (S×G×W)
- Rama i obudowa wykonana z lakierowanych blach stalowych
- Parownik w kształcie litery L, 3 rzędowy, wymiary 1000 × 60 × 800 mm (S × G × W), rozstaw 1,6 mm
- Skraplacz płytowy 14DZJADB9626559A, wymiary 100 × 100 × 350 mm (S × G × W) wraz z izolacją
- Sprężarka Samsung UF5HC5260FEX
- Czynnik chłodniczy R290 (0,87 kg)
- Elektryczny zawór rozprężny Sanhua DPF(0)3 2G-03-SXK-12
- 4-drogowy zawór zwrotny SHF-11H-45D1-SS1
- Akumulator czynnika chłodniczego
- Wentylator osiowy  $\varnothing = 52$  cm z silnikiem SCD FMDC531SSJ
- Czujniki ciśnienia
- Czujniki temperatury
- Rury czynnika chłodzącego
- Zawór odpowietrzający

Schemat:



|                 |                |
|-----------------|----------------|
| heating circuit | obieg grzewczy |
| condenser       | skraplacz      |
| evaporator      | parownik       |

Dokumentacja fotograficzna:



Pompa ciepła AE080CXYDGK/EU – jednostka zewnętrzna  
- Widok z przodu -



Pompa ciepła AE080CXYDGK/EU – jednostka  
zewnętrzna  
- Widok z tyłu -



Pompa ciepła AE080CXYDGK/EU – jednostka  
zewnętrzna  
- Etykieta znamionowa sprężarki -

| SAMSUNG                                                                                                                                                                                                                                                               |  |                                                                                                 |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------|--|
| AIR TO WATER HEAT PUMP                                                                                                                                                                                                                                                |  |                                                                                                 |  |
| MODEL NAME / MODELE / NOMBRE DEL MODELO /<br>MODELLO / MODELO / MODELLBEZEICHNUNG                                                                                                                                                                                     |  | AE080CXYDGK                                                                                     |  |
| MODEL CODE                                                                                                                                                                                                                                                            |  | AE080CXYDGK/EU                                                                                  |  |
| CAPACITY (COOL/HEAT) / CAPACITE (REFROID/CHAUD) /<br>CAPACIDAD (FRIO/CALOR) / CAPACITA (FRESCO/CALDO) /<br>CAPACIDADE (FRIJO/CALOR) / LEISTUNG (KUEHLEN/HEIZEN)                                                                                                       |  | 8.00 kW / 8.00 kW                                                                               |  |
| RATED VOLTAGE & FREQUENCY /<br>TENSION & FREQUENCE /<br>TENSION Y TENSION NOMINALES /<br>TENSIONE E FREQUENZA NOMINALI /<br>FRECUENCIA Y TENSIO NOMINAL /<br>NENNSPANNUNG UND FREQUENZ                                                                                |  | 380-415 V 3N~ 50 Hz                                                                             |  |
| RATED CURRENT (COOL/HEAT) /<br>CURRENT NOMINAL (REFROID/CHAUD) /<br>CORRIENTE NOMINAL (FRIJO/CALOR) /<br>CORRENTE NOMINALE (FRESCO/CALDO) /<br>CORRENTE NOMINAL (FRIJO/CALOR) /<br>NENNSTROM (KUEHLEN/HEIZEN)                                                         |  | 3.22 A / 2.56 A                                                                                 |  |
| MAX CURRENT / MAX CORRIENTE / MAXIMO ACTUAL /<br>MAX CORRENTE / CORRENTE MAX / MAX STROM                                                                                                                                                                              |  | 16.1 A                                                                                          |  |
| RATED POWER INPUT (COOL/HEAT) /<br>PUISSANCE NOMINALE (REFROID/CHAUD) /<br>POTENCIA NOMINAL DE ENTRADA (FRIJO/CALOR) /<br>POTENZA ASSORBITA NOMINALE (FRESCO/CALDO) /<br>ENTRADA DE POTENCIA NOMINAL (FRIJO/CALOR) /<br>NENNLEISTUNG (KUEHLEN/HEIZEN)                 |  | 2.05 kW / 1.63 kW                                                                               |  |
| REFRIGERANT PRESSURE (HIGH / LOW) /<br>PRESSION DU FLUIDE REFRIGERANT (ELEVEE / FAIBLE) /<br>PRESSION DEL REFRIGERANTE (ALTO / BAJO) /<br>PRESSIONE DEL REFRIGERANTE (ALTA / BASSA) /<br>PRESSÃO DO REFRIGERANTE (ALTA / BAIXA) /<br>KÄLTMITTELDRUCK (HOCH / NIEDRIG) |  | H: 3.3 MPa<br>L: 2.2 MPa                                                                        |  |
| MAXIMUM WATER PRESSURE / PRESSION MAXIMALE DE L'EAU /<br>PRESION MAXIMA DEL AGUA / PRESSION MAXIMALE AQUELA /<br>PRESIÃO MÁXIMA DE ÁGUA / MAXIMALE WASSERDRUCK                                                                                                        |  | 0.3 MPa                                                                                         |  |
| REFRIGERANT / REFRIGERANTE / REFRIGERANTE /<br>REFRIGERANTE / REFRIGERANTE / KÄLTMITTEL                                                                                                                                                                               |  | R-290 0.87 kg / 0.003 tCO <sub>2</sub> e                                                        |  |
| NET WEIGHT / PONDUS NET / PESO NETO / PESO NETTO /<br>PESO LÍQUIDO / NETTOWICHT                                                                                                                                                                                       |  | 96 kg                                                                                           |  |
| SEER / COP                                                                                                                                                                                                                                                            |  | 3.90 / 4.91                                                                                     |  |
| RATED CONDITION / CONDITION NOMINALE /<br>CONDICIONES NOMINALES / CONDIZIONI NOMINALI /<br>CONDICÃO NOMINAL / NENNBEREICHUNG                                                                                                                                          |  | AIR DB / WB:<br>35°C / 24°C<br>WATER (OUT):<br>30°C / 35°C                                      |  |
| CLIMATE CLASS / CLASSE CLIMATIQUE /<br>CLASIFICACIÓN CLIMÁTICA / CLASSE CLIMATICA /<br>CLASSE CLIMÁTICA / KLIMA KLASSE                                                                                                                                                |  | T1                                                                                              |  |
| IP NUMBER / HOMERIP / HOMERIP /<br>NUMERO IP / HOMERIP / IP NUMBER                                                                                                                                                                                                    |  | IP20                                                                                            |  |
| PRODUCTION YEAR / ANNÉE DE PRODUCTION /<br>AÑO DE PRODUCCIÓN / ANNO DI FABBRICAZIONE /<br>AÑO DE FABRICO / PRODUCTIONSJAHR                                                                                                                                            |  | 2023                                                                                            |  |
| AE080CXYDGK/EU                                                                                                                                                                                                                                                        |  |                                                                                                 |  |
| SERIAL<br>NUMBER                                                                                                                                                                                                                                                      |  |            |  |
| S/N: BZEPPAFW9000116F 2023.                                                                                                                                                                                                                                           |  |                                                                                                 |  |
| Contains fluorinated greenhouse gases.                                                                                                                                                                                                                                |  |                                                                                                 |  |
| No. 501, Subang East Road, Suzhou Industrial Park, Jiangsu Province, P.R. China                                                                                                                                                                                       |  |                                                                                                 |  |
| Samsung, PO Box 12987, Dublin 12 or Yateley, GU46 6GG, UK                                                                                                                                                                                                             |  |                                                                                                 |  |
| MADE IN CHINA                                                                                                                                                                                                                                                         |  |                                                                                                 |  |
|  <b>CE 1155</b>                                                                                                                                                                  |  |  <b>A3</b> |  |
|  <b>UK 0120</b>                                                                                                                                                                  |  |                                                                                                 |  |

Pompa ciepła AE080CXYDGK/EU – jednostka  
zewnętrzna  
- Etykieta znamionowa -



Pompa ciepła **AE080CXYDGK/EU** – jednostka zewnętrzna  
- Bez pokrywy -

## **II. Badana próbka**

| Nr ew. SZU        | Nazwa produktu        | Data przedłożenia |
|-------------------|-----------------------|-------------------|
| 1212.24.39808.002 | <b>AE080CXYDGK/EU</b> | 2024-04-05        |
| 1212.24.40030.001 |                       | 2024-05-13        |

Oględziny, badania i weryfikacja przeprowadził inż. Ondrej Bilkovic na stacji badawczej SZU. Badania przeprowadzono przy użyciu aparatury pomiarowo-badawczej z ważnym świadectwem wzorcowania.

### III. Urządzenia badawcze i pomiarowe:

| Lp. | Opis                                             | Numer inwentarzowy                        |
|-----|--------------------------------------------------|-------------------------------------------|
| 1.  | Licznik energii elektrycznej                     | E2.1                                      |
| 2.  | Watomierz cyfrowy                                | 1.2.2 ENERGIE ANALYZATOR_2                |
| 3.  | Przepływomierz Krohne Optiflux                   | 8.1.2 TECH K2 V DN15<br>8.1.3 TECHK2VDN25 |
| 4.  | Barometr                                         | 2.4 MAR18_1_PB                            |
| 5.  | Manometr różnicowy                               | 3.2 MAR18_2_dP                            |
| 6.  | Termometry                                       | 3.4 MAR18_T                               |
| 7.  | Termohydrometr 608-H1                            | 117043                                    |
| 8.  | Taśma miernicza                                  | ME 475                                    |
| 9.  | Analizator wielofunkcyjny SINUS SoundBook MK2    | 000-000-000-875/1                         |
| 10. | Para mikrofonów G.R.A.S. 40 AK, deflektor wiatru | 000-000-000-875/2                         |
| 11. | Kalibrator G.R.A.S. 42AG                         | 000-000-000-875/3                         |

### IV. Metody, wyniki badań i weryfikacje

| Lp.                              | Cel badania:                                 | Wymóg  | Metoda badania      | Dokumentacja    | Ocena / weryfikacja* badania |
|----------------------------------|----------------------------------------------|--------|---------------------|-----------------|------------------------------|
| 1.                               | Obliczanie poziomu mocy akustycznej          | Art. 9 | ČSN ISO 9614-2:1997 | Strona Lp. 7-13 | +                            |
| 2.                               | Pomiary akustyczne – poziom mocy akustycznej | Art. 8 | ČSN EN 12102-1:2023 | Strona Lp. 6-13 | +                            |
| *) Ocena / deklaracja zgodności: |                                              |        |                     |                 |                              |
| +..... Wymóg spełniony           |                                              |        | 0..... Nie dotyczy  |                 |                              |
| -..... Wymóg niespełniony        |                                              |        | x..... Nie oceniano |                 |                              |

#### Uwaga:

Podane rozszerzone niepewności pomiaru oblicza się jako iloczyn niepewności pomiaru i współczynnika rozszerzenia  $k=2$ , odpowiadającemu pewności pokrycia wynoszącej 95% w zakresie klasyfikacji standardowej.

W przypadku przedstawienia oświadczenia o zgodności, [obowiązuje] reguła decyzyjna na podstawie ILAC-G8:09/2019, art.4.2.1 – zastosowanie ma binarne stwierdzenie zgodności w przypadku zasady opartej na prostej akceptacji.

|                                            |                                                                    |
|--------------------------------------------|--------------------------------------------------------------------|
| <b>Cel badania:</b>                        | Urządzenia grzewczo-chłodnicze                                     |
| <b>Dokładna nazwa procedury badawczej:</b> | <b>2.136* – Pomiar charakterystyki hałasu</b>                      |
| <b>Metoda badania:</b>                     | <b>ČSN EN 12102-1:2023; CSN ISO 9614-2:1997</b>                    |
| <b>Badana próbka:</b>                      | Pompa ciepła powietrze-woda <b>AE080CXDYGK/EU</b>                  |
| <b>Stosowane urządzenia pomiarowe:</b>     | zob. rozdział III                                                  |
| <b>Miejsce przeprowadzenia badania:</b>    | Techniczny Instytut Badawczy, Hudcova 424/56b, 621 00 Brno, Czechy |

**Niepewność pomiaru:**

| <b>Wielkości pomiarowe</b>                                                                                                                                                                                                       | <b>Jednostka</b>     | <b>Niepewność pomiaru</b>                                                                          | <b>Ocena</b>    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------|-----------------|
| <b>Ciecz</b>                                                                                                                                                                                                                     |                      |                                                                                                    |                 |
| - różnica temperatur (dT)                                                                                                                                                                                                        | [K]                  | $\pm 0.15K$                                                                                        | spełniony       |
| - temperatura wlot/wylot                                                                                                                                                                                                         | [°C]                 | $\pm 0.15K$                                                                                        | spełniony       |
| - objętościowe natężenie przepływu                                                                                                                                                                                               | [m <sup>3</sup> /s]  | $\pm 1 \%$                                                                                         | spełniony       |
| - statyczna różnica ciśnień                                                                                                                                                                                                      | [kPa]                | $\pm 1 \text{ kPa } (\Delta p \leq 20 \text{ kPa})$ lub $\pm 5 \%$ ( $\Delta p > 20 \text{ kPa}$ ) | spełniony       |
| <b>Powietrze</b>                                                                                                                                                                                                                 |                      |                                                                                                    |                 |
| - temperatura termometru suchego                                                                                                                                                                                                 | [°C]                 | $\pm 0,2 \text{ K}$                                                                                | spełniony       |
| - temperatura termometru mokrego                                                                                                                                                                                                 | [°C]                 | $\pm 0.4K$                                                                                         | spełniony       |
| - objętościowe natężenie przepływu                                                                                                                                                                                               | [m <sup>3</sup> /s]  | $\pm 5\%$                                                                                          | nie zastosowano |
| - statyczna różnica ciśnień                                                                                                                                                                                                      | [Pa]                 | $\pm 5 \text{ Pa } (\Delta p \leq 100 \text{ Pa})$ lub $\pm 5 \%$ ( $\Delta p > 100 \text{ Pa}$ )  | nie zastosowano |
| <b>Czynnik chłodniczy</b>                                                                                                                                                                                                        |                      |                                                                                                    |                 |
| - ciśnienie na wylocie sprężarki                                                                                                                                                                                                 | [kPa]                | $\pm 1 \%$                                                                                         | nie zastosowano |
| - temperatura                                                                                                                                                                                                                    | [°C]                 | $\pm 0,5K$                                                                                         | nie zastosowano |
| <b>Stężenie (objętościowo)</b>                                                                                                                                                                                                   |                      |                                                                                                    |                 |
| - czynnik wymiany ciepła                                                                                                                                                                                                         | [%]                  | $\pm 2$                                                                                            | nie zastosowano |
| <b>Wielkości elektryczne</b>                                                                                                                                                                                                     |                      |                                                                                                    |                 |
| - moc elektryczna                                                                                                                                                                                                                | [W]                  | $\pm 1 \%$                                                                                         | spełniony       |
| - napięcie                                                                                                                                                                                                                       | [V]                  | $\pm 0,5 \%$                                                                                       | spełniony       |
| - prąd                                                                                                                                                                                                                           | [A]                  | $\pm 0,5 \%$                                                                                       | spełniony       |
| - energia elektryczna                                                                                                                                                                                                            | [kWh]                | $\pm 1 \%$                                                                                         | nie zastosowano |
| <b>Prędkość obrotowa sprężarki</b>                                                                                                                                                                                               | [min <sup>-1</sup> ] | $\pm 0,5 \%$                                                                                       | nie zastosowano |
| Wydajność grzewczą lub chłodniczą mierzoną po stronie cieczy określa się przy maksymalnej niepewności wynoszącej 5%, niezależnie od poszczególnych niepewności pomiaru włącznie z niepewnościami dotyczącymi właściwości cieczy. |                      |                                                                                                    | spełniony       |

**Uwaga:**

Uwaga do skróconego oznaczenia: np. A7/W35

A (powietrze) 7 (temperatura powietrza źródłowego na wlocie w °C) / W (woda), 55 (temperatura wody grzewczej na wylocie w °C)

### a) Powierzchnia pomiarowa

Badane próbki były otoczone powierzchnią pomiarową o kształcie sześcianu usytuowaną w odległości  $d$  [m].

| <b>Badana próbka: pompa ciepła powietrze-woda AE080CXYDGK/EU</b> |           |                   |       |
|------------------------------------------------------------------|-----------|-------------------|-------|
| Odległość od badanej próbki                                      | $d$       | [m]               | 0,20  |
| Wysokość powierzchni pomiarowej                                  | $h$       | [m]               | 1,05  |
| Szerokość powierzchni pomiarowej                                 | $w$       | [m]               | 1,40  |
| Głębokość powierzchni pomiarowej                                 | $l$       | [m]               | 0,90  |
| Całkowita powierzchnia pomiarowa                                 | $S$       | [m <sup>2</sup> ] | 6,09  |
| Minimalny czas pomiaru danej powierzchni                         | $\dot{M}$ | [s]               | 90,00 |

Szkic powierzchni pomiarowej (nie w skali):

Pompa ciepła powietrze-woda **AE080CXYDGK/EU**  
- Jednostka zewnętrzna -

|                       |               |                       |      |
|-----------------------|---------------|-----------------------|------|
| 1,05                  | 1,40          | 1,05                  |      |
|                       | II.<br>(Tył)  |                       |      |
| III.<br>(Lewa strona) | V.<br>(Góra)  | IV.<br>(Prawa strona) | 0,90 |
|                       | I.<br>(Przód) |                       |      |

**b) Środowisko akustyczne**

Badane urządzenie umieszczono w komorze klimatycznej (o wymiarach podanych poniżej). Przeprowadzono badania akustyczne komory, które potwierdziły jej zgodność z wymaganiami normy ČSN EN ISO 3745:2012 dotyczącymi komór półbezodbiowych. Hałas tła był stabilny i głównym źródłem hałasu była klimatyzacja komory klimatycznej, która była nastawiona na niższą moc lub chwilowo wyłączona celem uzyskania odpowiedniego stosunku sygnału do szumu tła. Badane urządzenie umieszczono w miejscu odsuniętym od środka komory, w odpowiedniej odległości od otaczających ścian, oraz obracano o ok.  $5 \pm 10^\circ$ . Dołożono starań, aby zapewnić niski przepływ powietrza przy powierzchni pomiarowej poprzez korygowanie odległości pomiarowej i pozycji.

| <b>Komora klimatyczno-akustyczna</b><br>(odpowiada polu swobodnemu nad płaszczyzną odbijającą dźwięk) |       |     |      |
|-------------------------------------------------------------------------------------------------------|-------|-----|------|
| Szerokość pomieszczenia badawczego                                                                    | $l_2$ | [m] | 3,75 |
| Długość pomieszczenia badawczego                                                                      | $l_2$ | [m] | 4,50 |
| Wysokość pomieszczenia badawczego                                                                     | $l_3$ | [m] | 4,25 |

**c) Dane pomiarowe i obliczeniowe – informacje ogólne:**

|                                                                            |           |                |                                                      |
|----------------------------------------------------------------------------|-----------|----------------|------------------------------------------------------|
| Badana próbka                                                              |           |                | Pompa ciepła powietrze-woda<br><b>AE080CXYDGK/EU</b> |
| Wartości pomiarowe są zgodne z normą<br>ČSN EN 12102-1:2023                |           |                | TAK                                                  |
| Wartości pomiarowe są zgodne z normą<br>ČSN EN ISO 9614-2:1997             |           |                | TAK                                                  |
| Tryb pracy                                                                 |           |                | Ogrzewanie                                           |
| Specyfikacja warunków oceny                                                |           |                | A7/W55*                                              |
| Rodzaj regulacji mocy pompy ciepła                                         |           |                | Falownik                                             |
| Nastawy prędkości sprężarki                                                |           |                | 20 Hz                                                |
| Nastawy prędkości wentylatora                                              |           |                | AUTO                                                 |
| Data badania (RRRR-MM-DD)                                                  |           |                | 2024-06-18                                           |
| Temperatura odniesienia powietrza                                          | $t_{amb}$ | [°C]           | 7,0                                                  |
| Wilgotność względna powietrza                                              | $RH$      | [%]            | 86,7                                                 |
| Ciśnienie otoczenia                                                        | $P_{amb}$ | [hPa]          | 981,5                                                |
| Całkowity poziom mocy akustycznej (liniowy)                                | $LW$      | [dB]           | 63,8 + 1,5                                           |
| <b>Całkowity poziom mocy akustycznej<br/>skorygowany charakterystyką A</b> | $L_{WA}$  | <b>[dB(A)]</b> | <b>52,0 ± 1,5</b>                                    |
| <b>Klasa dokładności</b>                                                   |           |                | <b>Techniczna<br/>(klasa 2)</b>                      |

\* Uwaga do skróconego oznaczenia: tzn. A7/W55

A (woda) 7 (temperatura cieczy źródłowej na wlocie w °C) / W (woda), 55 (temperatura wody grzewczej na wylocie w °C)

**1A) Wyniki pomiarów – pasma oktawowe**

|                                                                                                                                        |                                 |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Pompa ciepła powietrze-woda <b>AE080CXYDGK/EU</b><br>Jednostka zewnętrzna przy A7/W55; sprężarka przy 20 Hz; wentylator z nastawą AUTO | <b>Techniczna<br/>(klasa 2)</b> |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|

| $f_m$<br>[Hz]        | Kryterium 1 |          |                | Kryterium 2 |                  | Kryterium 3                  | Wszystkie kryteria spełnione ? | Lw<br>[dB]  | LWA<br>[dB(A)] | U<br>[dB]   | Ocena           |
|----------------------|-------------|----------|----------------|-------------|------------------|------------------------------|--------------------------------|-------------|----------------|-------------|-----------------|
|                      | $L_d$       | $F_{pl}$ | $L_d > F_{pl}$ | $F_{+/-}$   | $F_{+/-} \leq 3$ | $L_{W(1)} - L_{W(2)} \leq S$ |                                |             |                |             |                 |
| 125                  | 20,7        | 3,2      | TAK            | 0,0         | TAK              | TAK                          | TAK                            | 63,3        | 49,3           | ±3,0        | wynik pozytywny |
| 250                  | 21,3        | 3,2      | TAK            | 0,0         | TAK              | TAK                          | TAK                            | 50,5        | 42,7           | ±2,0        | c               |
| 500                  | 22,4        | 3,0      | TAK            | 0,0         | TAK              | TAK                          | TAK                            | 49,9        | 45,8           | ±1,5        | c               |
| 1000                 | 21,5        | 3,9      | TAK            | 0,0         | TAK              | TAK                          | TAK                            | 41,7        | 41,5           | + 1,5       | c               |
| 2000                 | 21,7        | 12,5     | TAK            | 3,0         | TAK              | TAK                          | TAK                            | 30,7        | 31,8           | ±1,5        | c               |
| 4000                 | 20,8        | 20,0     | TAK            | 3,0         | TAK              | TAK                          | TAK                            | 22,9        | 23,9           | ±1,5        | c               |
| 8000 <sup>**) </sup> | 20,8        | 15,6     | TAK            | 3,0         | TAK              | NIE                          | NIE                            | 14,4        | 14,3           | ±2,5        | nc              |
| <b>Razem</b>         |             |          |                |             |                  |                              |                                | <b>63,8</b> | <b>52,0</b>    | <b>±1.5</b> |                 |

<sup>\*\*) Ze względu na ograniczenia metody natężenia dźwięku mierzono tylko częstotliwość 6300 Hz.</sup>

**Legenda:**

wynik pozytywny Pasma częstotliwości uwzględnione w tym opisie nie są istotne dla obliczenia skorygowanego charakterystyką A całkowitego poziomu mocy akustycznej LWA. Wymagana klasa dokładności jest spełniona w tym paśmie.

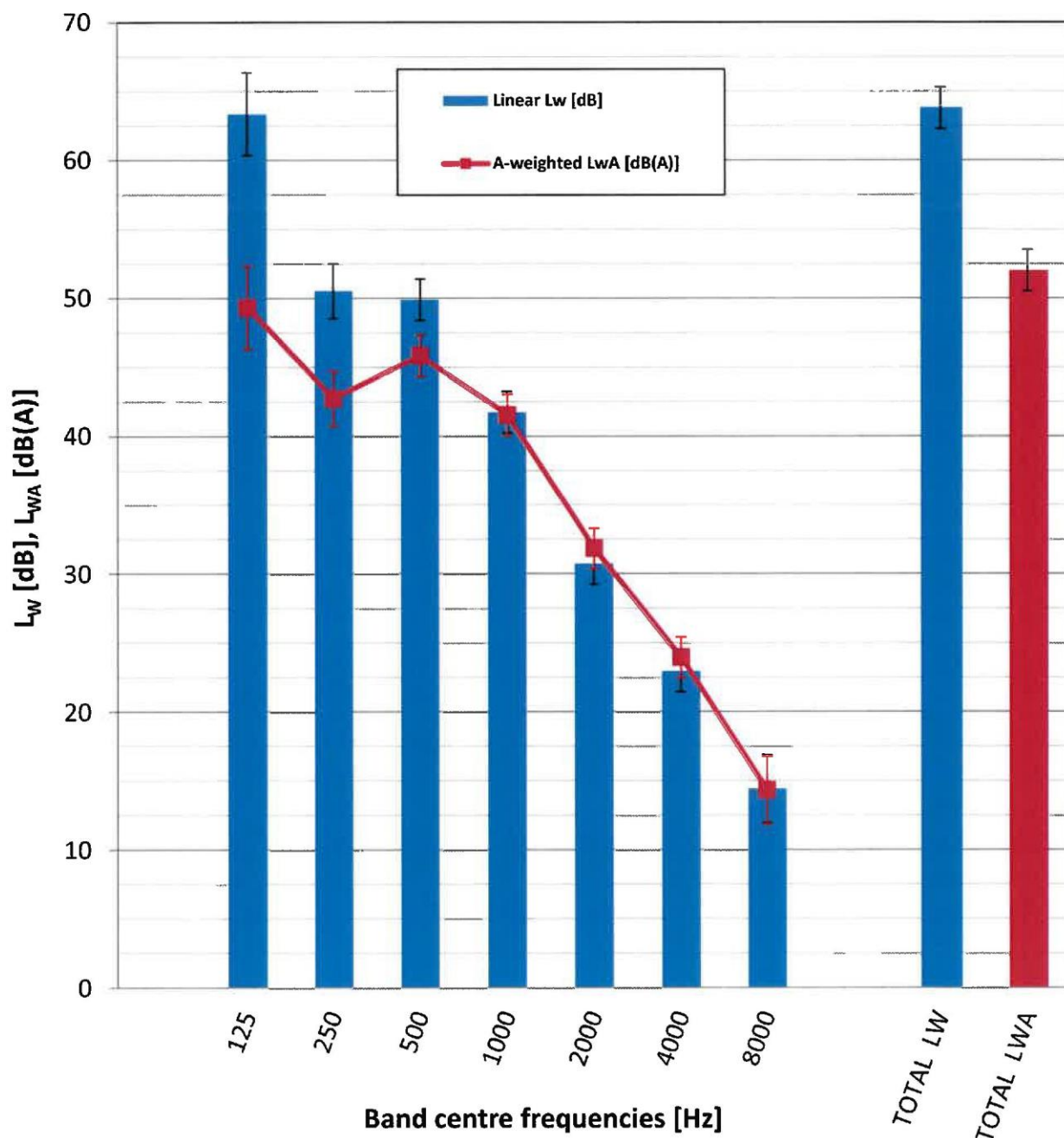
wynik negatywny Pasma częstotliwości uwzględnione w tym opisie nie są istotne dla obliczenia skorygowanego charakterystyką A całkowitego poziomu mocy akustycznej LWA. Wymagana klasa dokładności nie jest spełniona w tym paśmie.

c Pasma częstotliwości uwzględnione w tym opisie nie są istotne dla obliczenia całkowitego poziomu mocy akustycznej skorygowanego charakterystyką A (LWA). Te pasma nie są oceniane przy obliczaniu LWA.

nc Pasma częstotliwości uwzględnione w tym opisie nie są istotne dla obliczenia całkowitego poziomu mocy akustycznej skorygowanego charakterystyką A (LWA). Te pasma nie są oceniane przy obliczaniu LWA.

**Spektrum poziomu mocy akustycznej  $L_w$  – pasma oktawowo**

|                                                                                                                                        |                                 |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Pompa ciepła powietrze-woda <b>AE080CXYDGK/EU</b><br>Jednostka zewnętrzna przy A7/W55; sprężarka przy 20 Hz; wentylator z nastawą AUTO | <b>Techniczna<br/>(klasa 2)</b> |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|



|                              |                                                                        |
|------------------------------|------------------------------------------------------------------------|
| Linear $L_w$ [dB]            | Liniowy $L_w$ [dB]                                                     |
| A-weighted $L_{WA}$ [dB(A)]  | Poziom mocy akustycznej $L_{WA}$ skorygowany charakterystyką A [dB(A)] |
| Band centre frequencies [Hz] | Częstotliwości środka pasma [Hz]                                       |
| TOTAL $L_w$                  | $L_w$ OGÓŁEM                                                           |
| TOTAL $L_{WA}$               | $L_{WA}$ OGÓŁEM                                                        |

**1B) Wyniki pomiarów – pasma jednej trzeciej oktawy**

|                                                                                                                                        |                                 |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Pompa ciepła powietrze-woda <b>AE080CXYDGK/EU</b><br>Jednostka zewnętrzna przy A7/W55; sprężarka przy 20 Hz; wentylator z nastawą AUTO | <b>Techniczna<br/>(klasa 2)</b> |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|

| $f_m$<br>[Hz] | <b>Kryterium 1</b> |            |                | <b>Kryterium 2</b> |                  | <b>Kryterium 3</b>           | <b>Wszystkie kryteria spełnione ?</b> | <b>L<sub>w</sub></b><br>[dB] | <b>L<sub>WA</sub></b><br>[dB(A)] | <b>U</b><br>[dB] | <b>Ocena</b>                            |
|---------------|--------------------|------------|----------------|--------------------|------------------|------------------------------|---------------------------------------|------------------------------|----------------------------------|------------------|-----------------------------------------|
|               | $L_d$              | $F_{pl}$   | $L_d > F_{pl}$ | $F_{+/-}$          | $F_{+/-} \leq 3$ | $L_{W(1)} - L_{W(2)} \leq s$ |                                       |                              |                                  |                  |                                         |
| 100           | 20,7               | 5,4        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 48,4                         | 29,3                             | ±3,0             | c<br>wynik pozytywny<br>wynik pozytywny |
| 125           | 20,7               | 3,2        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 57,0                         | 40,9                             | ±3,0             |                                         |
| <b>160</b>    | <b>21,0</b>        | <b>1,9</b> | <b>TAK</b>     | <b>0,0</b>         | <b>TAK</b>       | <b>TAK</b>                   | <b>TAK</b>                            | <b>62,0</b>                  | <b>48,6</b>                      | <b>±3,0</b>      |                                         |
| 200           | 21,2               | 3,0        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 44,9                         | 34,0                             | ±2,0             | c<br>c<br>wynik pozytywny               |
| 250           | 21,3               | 3,2        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 43,4                         | 34,8                             | ±2,0             |                                         |
| 315           | 21,8               | 2,7        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 47,8                         | 41,2                             | ±2,0             |                                         |
| 400           | 22,0               | 3,4        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 48,6                         | 43,8                             | ±1,5             | wynik pozytywny<br>c<br>wynik pozytywny |
| 500           | 22,4               | 3,0        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 40,4                         | 37,2                             | ±1,5             |                                         |
| 630           | 22,6               | 3,3        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 41,5                         | 39,6                             | ±1,5             |                                         |
| 800           | 23,1               | 5,1        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 37,7                         | 36,9                             | ±1,5             | c<br>c<br>c                             |
| 1000          | 21,5               | 3,9        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 38,3                         | 38,3                             | ±1,5             |                                         |
| 1250          | 22,8               | 3,6        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 33,5                         | 34,1                             | ±1,5             |                                         |
| 1600          | 23,1               | 4,3        | TAK            | 0,0                | TAK              | TAK                          | TAK                                   | 28,8                         | 29,8                             | ±1,5             | c<br>c<br>c                             |
| 2000          | 21,7               | 12,5       | TAK            | 3,0                | TAK              | TAK                          | TAK                                   | 20,6                         | 21,8                             | ±1,5             |                                         |
| 2500          | 20,4               | 20,0       | TAK            | 2,8                | TAK              | TAK                          | TAK                                   | 25,0                         | 26,3                             | ±1,5             |                                         |
| 3150          | 20,6               | 18,9       | TAK            | 3,0                | TAK              | TAK                          | TAK                                   | 21,3                         | 22,5                             | ±1,5             | c<br>c<br>nc                            |
| 4000          | 20,8               | 20,0       | TAK            | 3,0                | TAK              | TAK                          | TAK                                   | 8,1                          | 9,1                              | ±1,5             |                                         |
| 5000          | 20,6               | 6,9        | TAK            | 0,0                | TAK              | NIE                          | NIE                                   | 17,6                         | 18,1                             | ±1,5             |                                         |
| 6300          | 20,8               | 15,6       | TAK            | 3,0                | TAK              | NIE                          | NIE                                   | 9,7                          | 9,6                              | ±2,5             | nc                                      |
| Suma          |                    |            |                |                    |                  |                              |                                       | 63,8                         | <b>52,0</b>                      | <b>±1,5</b>      |                                         |

**Legenda:**

wynik pozytywny      Pasma częstotliwości uwzględnione w tym opisie nie są istotne dla obliczenia skorygowanego charakterystyką A całkowitego poziomu mocy akustycznej L<sub>WA</sub>. Wymagana klasa dokładności jest spełniona w tym paśmie.

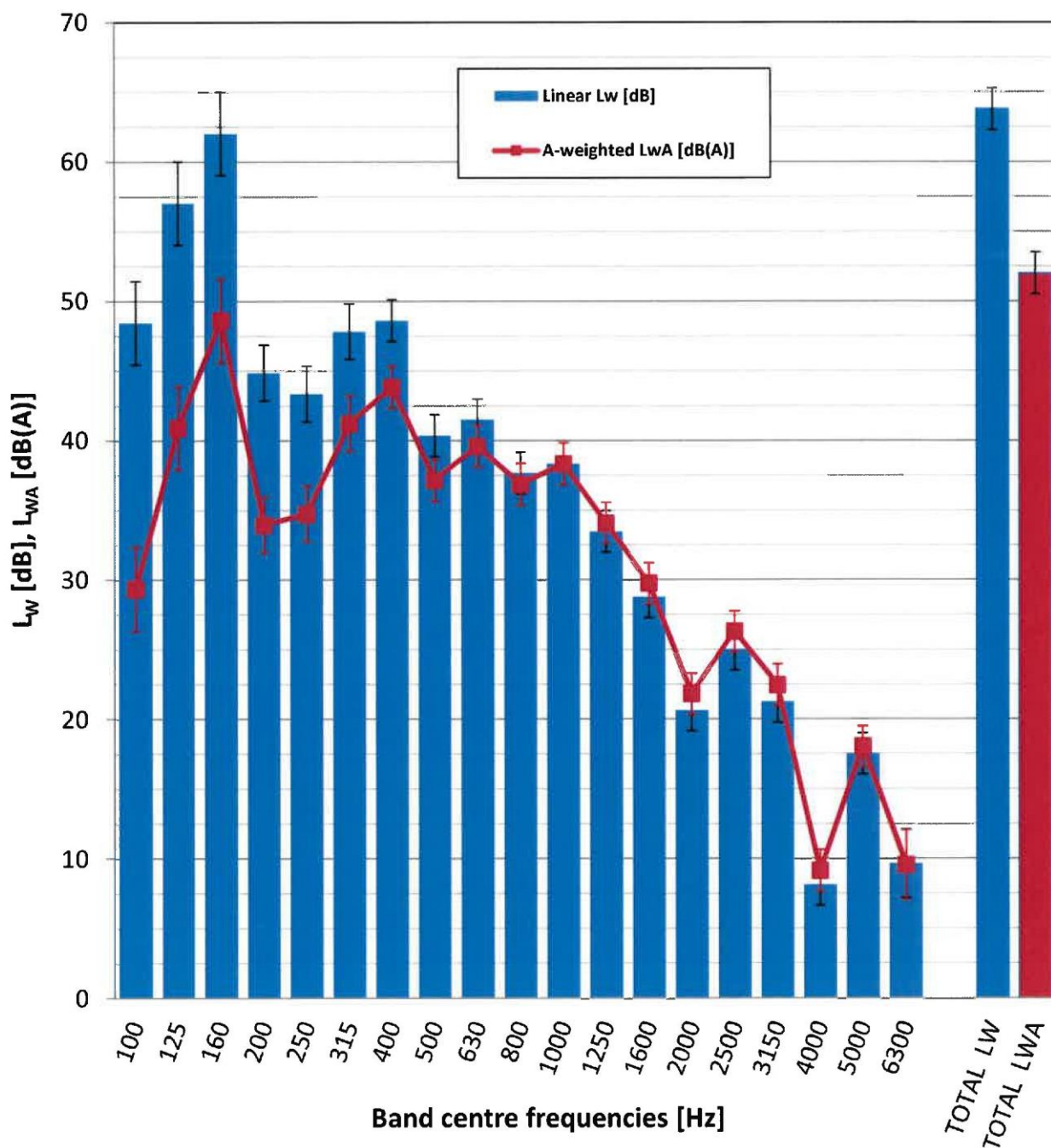
wynik negatywny      Pasma częstotliwości uwzględnione w tym opisie nie są istotne dla obliczenia skorygowanego charakterystyką A całkowitego poziomu mocy akustycznej L<sub>WA</sub>. Wymagana klasa dokładności nie jest spełniona w tym paśmie.

c      Pasma częstotliwości uwzględnione w tym opisie nie są istotne dla obliczenia całkowitego poziomu mocy akustycznej skorygowanego charakterystyką A (L<sub>WA</sub>). Te pasma nie są oceniane przy obliczaniu L<sub>WA</sub>.

nc      Pasma częstotliwości uwzględnione w tym opisie nie są istotne dla obliczenia całkowitego poziomu mocy akustycznej skorygowanego charakterystyką A (L<sub>WA</sub>). Te pasma nie są oceniane przy obliczaniu L<sub>WA</sub>.

**Spektrum poziomu mocy akustycznej  $L_w$  – pasma jednej trzeciej oktawy**

|                                                                                                                                        |                                 |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Pompa ciepła powietrze-woda <b>AE080CXYDGK/EU</b><br>Jednostka zewnętrzna przy A7/W55; sprężarka przy 20 Hz; wentylator z nastawą AUTO | <b>Techniczna<br/>(klasa 2)</b> |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|



|                                      |                          |       |            |         |                      |
|--------------------------------------|--------------------------|-------|------------|---------|----------------------|
| Badający:                            | Inż. Ondřej Bilkovič     | Data: | 2024-07-23 | Podpis: | [podpis nieczytelny] |
| Zweryfikował(a)<br>i zatwierdził(a): | Dr inż. Antonín Kolbábek | Data: | 2024-07-23 | Podpis: | [podpis nieczytelny] |

## **V. Wykaz dokumentów związanych**

- Zlecenie z dn. 2024-04-04 (zlecenie nr B-81950, otrzymane 2024-04-04)
- Umowa B-81950/39
- ČSN EN 12102-1:2023 – Klimatyzatory, agregaty chłodzące ciecz, pompy ciepła, ziębiarki do procesów przemysłowych i osuszacze ze sprężarkami o napędzie elektrycznym – Wyznaczanie poziomu mocy akustycznej – Część 1: Klimatyzatory, agregaty chłodzące ciecz, pompy ciepła, do ogrzewania i chłodzenia pomieszczeń, osuszacze i ziębiarki do procesów przemysłowych
- ČSN ISO 9614-2:1997 – Akustyka – Wyznaczanie poziomów mocy akustycznej źródeł hałasu na podstawie natężenia dźwięku – Część 2: Pomiar przez skanowanie
- ČSN EN 14511-2:2023 – Klimatyzatory, agregaty chłodzące ciecz i pompy ciepła do ogrzewania i chłodzenia pomieszczeń oraz ziębiarki do procesów przemysłowych, ze sprężarkami o napędzie elektrycznym – Część 2: Warunki badań
- ČSN EN 14511-3:2023 – Klimatyzatory, agregaty chłodzące ciecz i pompy ciepła do ogrzewania i chłodzenia pomieszczeń oraz ziębiarki do procesów przemysłowych, ze sprężarkami o napędzie elektrycznym – Część 3: Metody badań
- ČSN EN 14511-2:2023 – Klimatyzatory, agregaty chłodzące ciecz i pompy ciepła do ogrzewania i chłodzenia pomieszczeń oraz ziębiarki do procesów przemysłowych, ze sprężarkami o napędzie elektrycznym – Część 4: Wymagania
- ČSN EN 14825:2023 - Klimatyzatory, agregaty chłodzące ciecz i pompy ciepła ze sprężarkami o napędzie elektrycznym, do ogrzewania i chłodzenia pomieszczeń, chłodzenia przemysłowego i technologicznego – Badanie i ocena w warunkach częściowego obciążenia oraz obliczanie wydajności sezonowej
- Podstawa zadania SZU nr 39-17675
- Plik rejestru pomiarów 39-17675-H.zip

Sprawozdanie z badań  
sporządził(a):

**Inż. Ondřej Bilkovič**  
Inżynier ds. badań

*[podpis nieczytelny]*

Pieczęć okrągła, zapis w otoku:  
Akredytowane Laboratorium  
Badawcze Nr 1045.1  
STROJÍRENSKÝ ZKUŠEBNÍ  
ÚSTAV, s.p.]

Sprawozdanie z badań  
zatwierdził(a):

**Dr inż. Antonín Kolbábek**  
Kierownik Działu Urządzeń Hydraulicznych i  
Ciśnieniowych

- Koniec sprawozdania z badań –

OŚWIADCZENIE

Producent **SAMSUNG Electronics Air Conditioner Europe B.V.** oświadcza, iż pompy ciepła powietrze/woda typ monoblok oznaczone:

- 1) AE050CXYBEK/EU  
Oznaczenie/typ/identyfikator modelu
- 2) AE080CXYBEK/EU  
Oznaczenie/typ/identyfikator modelu
- 3) AE080CXYBGK/EU  
Oznaczenie/typ/identyfikator modelu
- 4) AE050CXYDEK/EU + AE200CNWMEG/EU  
Oznaczenie/typ/identyfikator modelu
- 5) AE080CXYDEK/EU + AE200CNWMEG/EU  
Oznaczenie/typ/identyfikator modelu
- 6) AE080CXYDEK/EU + AE260CNWMEG/EU  
Oznaczenie/typ/identyfikator modelu
- 7) AE080CXYDGK/EU + AE260CNWMGG/EU  
Oznaczenie/typ/identyfikator modelu
- 8) AE050CXYDEK/EU + MIM-E03EN  
Oznaczenie/typ/identyfikator modelu
- 9) AE080CXYDEK/EU + MIM-E03EN  
Oznaczenie/typ/identyfikator modelu
- 10) AE080CXYDGK/EU + MIM-E03EN  
Oznaczenie/typ/identyfikator modelu
- 11) AE050CXYDEK/EU + AE200DNWMPK/EU  
Oznaczenie/typ/identyfikator modelu
- 12) AE050CXYDEK/EU + AE200DNXMPK/EU  
Oznaczenie/typ/identyfikator modelu
- 13) AE050CXYDEK/EU + AE160DNYMPK/EU  
Oznaczenie/typ/identyfikator modelu
- 14) AE050CXYDEK/EU + AE160DNZMPK/EU  
Oznaczenie/typ/identyfikator modelu
- 15) AE050CXYDEK/EU + MIM-E03FN  
Oznaczenie/typ/identyfikator modelu
- 16) AE080CXYDEK/EU + AE200DNWMPK/EU  
Oznaczenie/typ/identyfikator modelu
- 17) AE080CXYDEK/EU + AE200DNXMPK/EU  
Oznaczenie/typ/identyfikator modelu
- 18) AE080CXYDEK/EU + AE160DNYMPK/EU  
Oznaczenie/typ/identyfikator modelu
- 19) AE080CXYDEK/EU + AE160DNZMPK/EU  
Oznaczenie/typ/identyfikator modelu
- 20) AE080CXYDEK/EU + MIM-E03FN  
Oznaczenie/typ/identyfikator modelu

21) AE080CXYDGK/EU + AE200DNWMPK/EU

Oznaczenie/typ/identyfikator modelu

22) AE080CXYDGK/EU + AE200DNXMPK/EU

Oznaczenie/typ/identyfikator modelu

23) AE080CXYDGK/EU + AE160DNYMPK/EU

Oznaczenie/typ/identyfikator modelu

24) AE080CXYDGK/EU + AE160DNZMPK/EU

Oznaczenie/typ/identyfikator modelu

25) AE080CXYDGK/EU + MIM-E03FN

Oznaczenie/typ/identyfikator modelu

Należą do jednego podtypu w danym typoszeregu i spełniają łącznie następujące warunki:

- identyczna konstrukcja obiegu chłodniczego, ten sam czynnik chłodniczy/roboczy;
- ten sam producent, typ i liczba sprężarek;
- ten sam typ elementu rozprężnego;
- ten sam typ skraplacza;
- ten sam typ parownika;
- ten sam typ procesu odszraniania;
- ten sam sterownik i zasada sterowania wydajnością;
- ten sam producent, typ i liczba wentylatorów parownika (w przypadku powietrznych pomp ciepła) i zasada sterowania wydajnością (stała, zmienna lub stopniowana regulacja prędkości obrotowej);
- urządzenia z i bez zaworu czterodrogowego nie mogą być zaliczone do tego samego typoszeregu.

Schiphol

12 February 2025

Miejscowość, data

DocuSigned by:  


BC28176AE6384A0  
Podpis osoby upoważnionej

Wim Vangeenberghe

CEO

## **LEGENDA – OZNACZENIA URZĄDZEŃ**

### **Jednostki zewnętrzne:**

AE050CXYDEK/EU – jednostka zewnętrzna o mocy 5kW, wersja zasilania 1-fazowa

AE080CXYDEK/EU – jednostka zewnętrzna o mocy 8kW, wersja zasilania 1-fazowa

AE080CXYDGK/EU – jednostka zewnętrzna o mocy 8kW, wersja zasilania 3-fazowa

AE050CXYBEK/EU – jednostka zewnętrzna o mocy 5kW, z wbudowaną pompą, wersja zasilania 1-fazowa

AE080CXYBEK/EU – jednostka zewnętrzna o mocy 8kW, z wbudowaną pompą, wersja zasilania 1-fazowa

AE080CXYBGK/EU – jednostka zewnętrzna o mocy 8kW, z wbudowaną pompą, wersja zasilania 3-fazowa

### **Jednostki wewnętrzne:**

AE200CNWMEG/EU – jednostka wewnętrzna (moduł hydrauliczny z wbudowanym podgrzewaczem wody o pojemności 200l), wersja zasilania 1-fazowa

AE260CNWMEG/EU – jednostka wewnętrzna (moduł hydrauliczny z wbudowanym podgrzewaczem wody o pojemności 260l), wersja zasilania 1-fazowa

AE260CNWMGG/EU – jednostka wewnętrzna (moduł hydrauliczny z wbudowanym podgrzewaczem wody o pojemności 260l), wersja zasilania 3-fazowa

AE200DNWMPK /EU – jednostka wewnętrzna (moduł hydrauliczny z wbudowanym podgrzewaczem wody o pojemności 200l), obsługa jednego obiegu grzewczego, wersja zasilania 1-fazowa i 3-fazowa

AE200DNXMPK /EU – jednostka wewnętrzna (moduł hydrauliczny z wbudowanym podgrzewaczem wody o pojemności 200l), obsługa dwóch obiegów grzewczych, wersja zasilania 1-fazowa i 3-fazowa

AE160DNYMPK /EU – jednostka wewnętrzna (moduł hydrauliczny wiszący bez wbudowanego podgrzewacza wody), obsługa jednego obiegu grzewczego, wersja zasilania 1-fazowa i 3-fazowa

AE160DNZMPK /EU – jednostka wewnętrzna (moduł hydrauliczny wiszący bez wbudowanego podgrzewacza wody), obsługa dwóch obiegów grzewczych, wersja zasilania 1-fazowa i 3-fazowa

MIM-E03EN – samodzielny zestaw sterujący (płyta sterująca ze starszą wersją sterownika)

MIM-E03FN – samodzielny zestaw sterujący (płyta sterująca z nowym sterownikiem)

# Test Report Heatpump



**Samsung Electronics Air Conditioner Europe B.V.**  
**Evert van de Beekstraat 310**  
**1118 CX SCHIPHOL**  
**The Netherlands**  
**Report Number: 1(P000373413)**



KIWA Nederland B.V.

**Partner  
for  
Progress**

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This report may only be duplicated as a complete set without any modifications and with permission of the legitimate owner. The test results in this report are exclusively related to the samples offered and tested.

Tests marked in this report with the IRN number are part of the accreditation scope (RvA L248) unless stated differently. Measurement uncertainty of testing in the context of ISO/IEC 17025.

Test reports can, in some cases, contain besides the numeric measured values also the qualification "pass" or "fail". In this assessment, compliance with the specification limit from the applicable product standard is used. The measurement complies with the requirement if the probability of its being within the limit is at least 50%.

This does not take into account the measurement uncertainty associated with the test method.

It is explicitly stated that in the case of a "pass" or "fail", the measured result is corrected for the measurement uncertainty and/or the relevant test conditions for the measured result.

Unless otherwise noted the measurement uncertainty and conditions are as specified in the test specifications.

This report is only valid when signed by the test person and reviewer.

Conclusions for compliance with e.g. product standard requirements are not part of the lab scope (RvA L248).

In case when information is supplied by the customer it is possible that it can affect the validity of results.

In case of dispute regarding this test report please contact Kiwa Nederland B.V.

Version: 003.2

|                                 |                                                                                   |              |
|---------------------------------|-----------------------------------------------------------------------------------|--------------|
| Report Number:<br>1(P000373413) |  | Page 3 of 13 |
|---------------------------------|-----------------------------------------------------------------------------------|--------------|

|                                         |                                                                                                                                                         |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report number.</b> .....             | 1(P000373413)                                                                                                                                           |
| <b>Project number.</b> .....            | 1(P000373413)                                                                                                                                           |
| Date of issue.....                      | 21-01-2025                                                                                                                                              |
| Total number of pages.....              | 13 (excluding appendices)                                                                                                                               |
| <b>Testing laboratory</b> .....         | KIWA Nederland B.V.                                                                                                                                     |
| Testing location/address.....           | Wilmersdorf 50, 7327 AC Apeldoorn, The Netherlands                                                                                                      |
| Applicant's name .....                  | Samsung Electronics Air Conditioner                                                                                                                     |
| Address .....                           | Evert van de Beekstraat 310, 1118 CX SCHIPHOL, The Netherlands                                                                                          |
| <b>Scope</b> .....                      | Testing of Air-to-Water heat pump with outdoor air as a heat source regarding the requirements as derived from the below mentioned Test specifications. |
| <b>Test specifications</b>              |                                                                                                                                                         |
| Standards .....                         | EN 14825:2022<br>EN 14511:2022<br>(EU) no 811/2013<br>(EU) no 813/2013                                                                                  |
| Non-standard test method..              | N.A.                                                                                                                                                    |
| <b>Test item description</b> .....      | Air-to-Water Heat Pump                                                                                                                                  |
| Manufacturer .....                      | Samsung Electronics Air Conditioner                                                                                                                     |
| Trade Mark .....                        | Samsung                                                                                                                                                 |
| Model/Type reference.....               | AE080CXYDGK/EU+AE260CNWMEG/EU,<br>(a full overview can be found in chapter 3: Description of the product(s))                                            |
| Test item number(s) .....               | 10659 and 10661                                                                                                                                         |
| Date receipt of test item(s) .          | 30-07-2024                                                                                                                                              |
| Date(s) of testing .....                | 13-09-2024 to 09-12-2024                                                                                                                                |
| <b>Remarks</b> .....                    | N.A.                                                                                                                                                    |
| <b>Summary</b> .....                    | Complies with the requirements as far as identified in the attached test- and result sheets.                                                            |
| Tested by<br>(name + signature) .....   | Sandra Wiersma<br>                                                 |
| Approved by<br>(name + signature) ..... | Anne-Wim Juffer<br>                                                 |

## 1 Report history

|                      |                                                                                                                                                                                   |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Report number..... : | 1(P000373413)                                                                                                                                                                     |
| Project number ..... | 1(P000373413)                                                                                                                                                                     |
| Author. .... :       | Sandra Wiersma                                                                                                                                                                    |
| Description..... :   | Initial report<br>Testing the Monoblock Air-to-Water heat pump<br>AE080CXYDGK/EU+AE260CNWMEG/EU according to the<br>European standards EN 14511 and EN 14825 on domestic heating. |

## 2 Summary of testing

On request of Samsung Electronics Air Conditioner Europe B.V. the items as mentioned under Test item description are tested according to the Test specifications (see page 3 of this report).

The following tests are carried out :

- Heating tests according to EN 14511 and EN 14825;

For this project, all testing has been performed in the heat pump test laboratory of Kiwa in Apeldoorn, the Netherlands.

For the heating tests testing the following design choices according to the EN 14825 have been applied:

| Heating                               |                                                                                                                                                                                                                                                 |            |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Application                           | <input checked="" type="checkbox"/> low temperature (35 °C)<br><input type="checkbox"/> intermediate temperature (45 °C)<br><input checked="" type="checkbox"/> medium temperature (55 °C)<br><input type="checkbox"/> high temperature (65 °C) |            |
| Climate                               | <input checked="" type="checkbox"/> average <input type="checkbox"/> warmer <input type="checkbox"/> colder                                                                                                                                     |            |
| Test modus                            | <input type="checkbox"/> fixed flow <input checked="" type="checkbox"/> fixed delta T                                                                                                                                                           |            |
| Water outlet temperature <sup>1</sup> | <input type="checkbox"/> fixed <input checked="" type="checkbox"/> variable                                                                                                                                                                     |            |
|                                       | Average LT                                                                                                                                                                                                                                      | Average MT |
| T <sub>designh</sub>                  | -10 [°C]                                                                                                                                                                                                                                        | -10 [°C]   |
| T <sub>biv</sub>                      | -7 [°C]                                                                                                                                                                                                                                         | -7 [°C]    |
| TOL                                   | -10 [°C]                                                                                                                                                                                                                                        | -10 [°C]   |
| Minimum water flow rate               | 0.420 [m³/h]                                                                                                                                                                                                                                    |            |

Based on the product(s) information the test plan is not subject to any special interpretations or modifications.

### 3 Description of the product(s)

|                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Appliance description:</b>                                                                                                                                                                                                                                                                                                   |                                                                                                                                     |
| <p>The AE080CXYDGK/EU+AE260CNWMEG/EU is a monoblock air-to-water heat pump with a nominal heat output of 8.2568 kW at A7/W35 standard rating conditions.</p> <p>The heat pump is an outdoor device with inverter technology with outdoor air as heat source. The heat pump is equipped with an integrated circulation pump.</p> |                                                                                                                                     |
| <b>Device serial numbers :</b>                                                                                                                                                                                                                                                                                                  | <p>ODU: AE080CXYDGK/EU – s/n 0ZEFPAFX100091N – kiwa no. 10661</p> <p>IDU: AE260CNWMEG/EU – s/n 0YU4PAOWC00024E – kiwa no. 10659</p> |
| <b>Key Components / Specifications</b>                                                                                                                                                                                                                                                                                          |                                                                                                                                     |
| <b>Type</b>                                                                                                                                                                                                                                                                                                                     | AE080CXYDGK/EU + AE260CNWMEG/EU                                                                                                     |
| <b>Power Supply</b>                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |
| Rated voltage ODU / IDU                                                                                                                                                                                                                                                                                                         | 380 ~ 415 / 220 ~ 240 [V]                                                                                                           |
| Rated frequency                                                                                                                                                                                                                                                                                                                 | 50 [Hz]                                                                                                                             |
| Rated power input                                                                                                                                                                                                                                                                                                               | 1.63 [kW] (A7/W35)                                                                                                                  |
| <b>Heat Source</b>                                                                                                                                                                                                                                                                                                              |                                                                                                                                     |
| Air inlet temperature                                                                                                                                                                                                                                                                                                           | -28 – +35 [°C]                                                                                                                      |
| <b>Heat Sink</b>                                                                                                                                                                                                                                                                                                                |                                                                                                                                     |
| Outlet temperature                                                                                                                                                                                                                                                                                                              | +15 – +75 [°C]                                                                                                                      |
| Max. working pressure                                                                                                                                                                                                                                                                                                           | 0.3 MPa                                                                                                                             |
| <b>Refrigerant</b>                                                                                                                                                                                                                                                                                                              |                                                                                                                                     |
| Refrigerant                                                                                                                                                                                                                                                                                                                     | R290                                                                                                                                |
| Standard filling                                                                                                                                                                                                                                                                                                                | 870 [gr]                                                                                                                            |
| <b>Compressor</b>                                                                                                                                                                                                                                                                                                               |                                                                                                                                     |
| Type                                                                                                                                                                                                                                                                                                                            | Rotary                                                                                                                              |
| Manufacturer                                                                                                                                                                                                                                                                                                                    | Samsung Electronics                                                                                                                 |
| Model                                                                                                                                                                                                                                                                                                                           | UF5HC5260FEX                                                                                                                        |
| <b>Condenser</b>                                                                                                                                                                                                                                                                                                                |                                                                                                                                     |
| Type                                                                                                                                                                                                                                                                                                                            | PHE                                                                                                                                 |
| Manufacturer                                                                                                                                                                                                                                                                                                                    | Danfoss                                                                                                                             |
| Construction                                                                                                                                                                                                                                                                                                                    | B3-030-42                                                                                                                           |
| Tube outside diameter and type                                                                                                                                                                                                                                                                                                  | -                                                                                                                                   |
| Tube total length                                                                                                                                                                                                                                                                                                               | 50                                                                                                                                  |
| Number of rows                                                                                                                                                                                                                                                                                                                  | -                                                                                                                                   |
| Tube Pitch                                                                                                                                                                                                                                                                                                                      | -                                                                                                                                   |
| Number of circuits                                                                                                                                                                                                                                                                                                              | -                                                                                                                                   |
| <b>Evaporator</b>                                                                                                                                                                                                                                                                                                               |                                                                                                                                     |
| Type                                                                                                                                                                                                                                                                                                                            | Fin & Tube                                                                                                                          |
| Manufacturer                                                                                                                                                                                                                                                                                                                    | Samsung Electronics                                                                                                                 |
| Model                                                                                                                                                                                                                                                                                                                           | DB96-26524A                                                                                                                         |
| Construction                                                                                                                                                                                                                                                                                                                    | 3Rowx38Pass                                                                                                                         |
| Fin spacing                                                                                                                                                                                                                                                                                                                     | 1,5 [mm]                                                                                                                            |
| Heat exchanger area                                                                                                                                                                                                                                                                                                             | 0,79 [m <sup>2</sup> ]                                                                                                              |
| Max permissible pressure                                                                                                                                                                                                                                                                                                        | 3.3 [MPa]                                                                                                                           |
| Dimensions (l x b x h)                                                                                                                                                                                                                                                                                                          | 986x54x798 [mm]                                                                                                                     |
| <b>Expansion device</b>                                                                                                                                                                                                                                                                                                         |                                                                                                                                     |
| Manufacturer                                                                                                                                                                                                                                                                                                                    | Sanhua                                                                                                                              |
| Type                                                                                                                                                                                                                                                                                                                            | Step Motor Valve                                                                                                                    |
| Specification                                                                                                                                                                                                                                                                                                                   | DPF(O)-2.4C-03                                                                                                                      |
| <b>Storage tank (Combi appliances)</b>                                                                                                                                                                                                                                                                                          |                                                                                                                                     |
| Manufacturer                                                                                                                                                                                                                                                                                                                    | -                                                                                                                                   |
| Type                                                                                                                                                                                                                                                                                                                            | -                                                                                                                                   |
| Volume                                                                                                                                                                                                                                                                                                                          | 254 [L]                                                                                                                             |
| <b>Circulation pump</b>                                                                                                                                                                                                                                                                                                         |                                                                                                                                     |
| Manufacturer                                                                                                                                                                                                                                                                                                                    | Shinhoo                                                                                                                             |
| Model                                                                                                                                                                                                                                                                                                                           | GPA25-9H/130                                                                                                                        |
| Type                                                                                                                                                                                                                                                                                                                            | PWM Pump                                                                                                                            |
| <b>Fan</b>                                                                                                                                                                                                                                                                                                                      |                                                                                                                                     |
| Manufacturer                                                                                                                                                                                                                                                                                                                    | SSCD                                                                                                                                |
| Type                                                                                                                                                                                                                                                                                                                            | Propeller                                                                                                                           |
| Specification                                                                                                                                                                                                                                                                                                                   | 520mm                                                                                                                               |

**SAMSUNG**

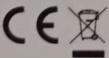
**AIR TO WATER HEAT PUMP**

|                                                                                                                                                                                     |                                  |                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------|
| MODEL NAME / MODÈLE / NOMBRE DEL MODELO /<br>MODELLO / MODELO / MODELLBEZEICHNUNG                                                                                                   | AE260CNWMEG                      |                                                             |
| MODEL CODE                                                                                                                                                                          | AE260CNWMEG/EU                   |                                                             |
| CAPACITY (COOL/HEAT) / CAPACITE (FROID/CHAUD) /<br>CAPACIDAD (FRIO/CALOR) / CAPACITA (FRESCO/CALDO) /<br>CAPACIDADE (FRIO/CALOR) / LEISTUNG (KÜHLEN/HEIZEN)                         | 7.50-14.00 kW / 8.00-16.00 kW    |                                                             |
| RATED VOLTAGE & FREQUENCY / TENSION &<br>FRÉQUENCE / FRECUENCIA Y TENSION NOMINALES /<br>TENSIONE E FREQUENZA NOMINALI / FREQUENCIA /<br>TENSÃO NOMINAL / NENNSPANNUNG UND FREQUENZ | MAIN : 220 - 240 V~ 50 Hz        |                                                             |
| RATED CURRENT / COURANT NOMINAL /<br>CORRIENTE NOMINAL / CORRENTE NOMINALE /<br>CORRENTE NOMINAL / NENNSTROM                                                                        | 0.9 A                            |                                                             |
| MAX CURRENT / MAX CORRIENTE / MÁXIMO ACTUAL /<br>MAX CORRENTE / CORRENTE MAX / MAX STROM                                                                                            | MAIN : 22.7 A                    |                                                             |
| MAX INPUT POWER / PUISSANCE D'ENTREE MAXIMAL /<br>ENTRADA MÁXIMA DE CORRIENTE / MASSIMA<br>POTENZA IN INGRESSO / POTENCIA DE ENTRADA<br>MÁXIMA / MAX. EINGANGSLEISTUNG              | MAIN : 5.20 kW                   |                                                             |
| MAXIMUM WATER PRESSURE / PRESSION MAXIMALE<br>DE L'EAU / PRESIÓN MÁXIMA DEL AGUA / PRESSIONE<br>MASSIMA LATO ACQUA / PRESSÃO MÁXIMA DE ÁGUA /<br>MAXIMALER WASSERDRUCK              | PIPE : 0.3 MPa<br>TANK : 1.0 MPa |                                                             |
| TANK VOLUME (Liter) / VOLUME DU RÉSERVOIR (Litres) /<br>VOLUMEN DEL DEPOSITO (litros) / VOLUME SERBATOIO<br>(litri) / VOLUME DO TANQUE (Litros) / TANKVOLUMEN (Liter)               | 254                              |                                                             |
| TANK RATED PRESSURE / PRESSION NOMINALE DU<br>RÉSERVOIR / PRESIÓN NOMINAL DEL DEPÓSITO /<br>PRESSIONE NOMINALE SERBATOIO /<br>PRESSÃO NOMINAL DO TANQUE / TANK-NENNDRUCK            | 0.7 MPa                          |                                                             |
| NET WEIGHT / POIDS NET / PESO NETO /<br>PESO NETTO / PESO LÍQUIDO / NETTOGEWICHT                                                                                                    | 136.0 kg                         |                                                             |
| RATED CONDITION / CONDITION NOMINALE /<br>CONDICIONES NOMINALES / CONDIZIONI<br>NOMINALI / CONDIÇÃO NOMINAL /<br>NENNBEDINGUNG                                                      | COOL                             | AIR (DB / WB): 35°C / 24°C<br>WATER (IN / OUT): 23°C / 18°C |
|                                                                                                                                                                                     | HEAT                             | AIR (DB / WB): 7°C / 6°C<br>WATER (IN / OUT): 30°C / 35°C   |
| CLIMATE CLASS / CLASSE ÉNERGÉTIQUE /<br>CLASIFICACIÓN CLIMÁTICA / CLASSE CLIMATICA /<br>CLASSE CLIMÁTICA / KLIMA KLASSE                                                             | T1                               |                                                             |
| IP NUMBER / NOMBRE IP / NÚMERO DE IP /<br>NUMERO IP / NÚMERO IP / IP NUMBER                                                                                                         | IPX1                             |                                                             |
| PRODUCTION YEAR / ANNÉE DE PRODUCTION /<br>AÑO DE PRODUCCIÓN / ANNO DI FABBRICAZIONE /<br>ANO DE FABRICO / PRODUKTIONSJAHR                                                          | 2023.                            |                                                             |
| SERIAL NUMBER                                                                                                                                                                       | QYU4PAOWC00024E                  |                                                             |

MADE IN CHINA



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Samsung, PO Box 12987, Dublin, IE  
or: Yateley, GU46 6GG, UK

MODEL : AE260CNWMEG/EU



S/N : QYU4PAOWC00024E 2023.

30-07-2024 P000373413 10659

Samsung

AE260CNWMEG

Figure 1: Type plate of the indoor unit

**SAMSUNG**  
**AIR TO WATER HEAT PUMP**

30-07-2024 P000373413 10661

Samsung  
AE080CXYDGK

|                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                      |      |      |                               |                             |                                  |                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-------------------------------|-----------------------------|----------------------------------|----------------------------------|
| MODEL NAME / MODÈLE / NOMBRE DEL MODELO /<br>MODELLO / MODELO / MODELLBEZEICHNUNG                                                                                                                                                                                     | AE080CXYDGK                                                                                                                                                                                                                          |      |      |                               |                             |                                  |                                  |
| MODEL CODE                                                                                                                                                                                                                                                            | AE080CXYDGK/EU                                                                                                                                                                                                                       |      |      |                               |                             |                                  |                                  |
| CAPACITY (COOL/HEAT) / CAPACITÉ (FROID/CHAUD) /<br>CAPACIDAD (FRIO/CALOR) / CAPACITÀ (FRESCO/CALDO) /<br>CAPACIDADE (FRIO/CALOR) / LEISTUNG (KÜHLEN/HEIZEN)                                                                                                           | 8.00 kW / 8.00 kW                                                                                                                                                                                                                    |      |      |                               |                             |                                  |                                  |
| RATED VOLTAGE & FREQUENCY /<br>TENSION & FRÉQUENCE /<br>FRECUENCIA Y TENSION NOMINALES /<br>TENSIONE E FREQUENZA NOMINALI /<br>FREQUÊNCIA/TENSÃO NOMINAL /<br>NENNSPANNUNG UND FREQUENZ                                                                               | 380 - 415 V 3N~ 50 Hz                                                                                                                                                                                                                |      |      |                               |                             |                                  |                                  |
| RATED CURRENT (COOL/HEAT) /<br>COURANT NOMINAL (FROID/CHAUD) /<br>CORRIENTE NOMINAL (FRIO/CALOR) /<br>CORRENTE NOMINALE (FRESCO/CALDO) /<br>CORRENTE NOMINAL (FRIO/CALOR) /<br>NENNSTROM (KÜHLEN/HEIZEN)                                                              | 3.22 A / 2.56 A                                                                                                                                                                                                                      |      |      |                               |                             |                                  |                                  |
| MAX CURRENT / MAX CORRIENTE / MÁXIMO ACTUAL /<br>MAX CORRENTE / CORRENTE MAX / MAX STROM                                                                                                                                                                              | 16.1 A                                                                                                                                                                                                                               |      |      |                               |                             |                                  |                                  |
| RATED POWER INPUT (COOL/HEAT) /<br>PUISSANCE NOMINALE (FROID/CHAUD) /<br>POTENCIA NOMINAL DE ENTRADA (FRIO/CALOR) /<br>POTENZA ASSORBITA NOMINALE (FRESCO/CALDO) /<br>ENTRADA DE POTÊNCIA NOMINAL (FRIO/CALOR) /<br>NENNLEISTUNG (KÜHLEN/HEIZEN)                      | 2.05 kW / 1.63 kW                                                                                                                                                                                                                    |      |      |                               |                             |                                  |                                  |
| REFRIGERANT PRESSURE (HIGH / LOW) /<br>PRESSION DU FLUIDE FRIGORIGÈNE (ÉLEVÉE / FAIBLE) /<br>PRESION DEL REFRIGERANTE (ALTO / BAJO) /<br>PRESSIONE DEL REFRIGERANTE (ALTA / BASSA) /<br>PRESSÃO DO REFRIGERANTE (ALTA / BAIXA) /<br>KÄLTEMITTELDRUCK (HOCH / NIEDRIG) | H : 3.3 MPa<br>L : 2.2 MPa                                                                                                                                                                                                           |      |      |                               |                             |                                  |                                  |
| MAXIMUM WATER PRESSURE / PRESSION MAXIMALE DE L'EAU /<br>PRESION MÁXIMA DEL AGUA / PRESSIONE MASSIMALE ACQUA /<br>PRESSÃO MÁXIMA DE ÁGUA / MAXIMALER WASSERDRUCK                                                                                                      | 0.3 MPa                                                                                                                                                                                                                              |      |      |                               |                             |                                  |                                  |
| REFRIGERANT / RÉFRIGÉRANT / REFRIGERANTE /<br>REFRIGERANTE / REFRIGERANTE / KÄLTEMITTEL                                                                                                                                                                               | R-290<br>0.87 kg / 0.003 tCO <sub>2</sub> e                                                                                                                                                                                          |      |      |                               |                             |                                  |                                  |
| NET WEIGHT / POIDS NET / PESO NETO / PESO NETTO /<br>PESO LÍQUIDO / NETTGEWICHT                                                                                                                                                                                       | 98 kg                                                                                                                                                                                                                                |      |      |                               |                             |                                  |                                  |
| EER / COP                                                                                                                                                                                                                                                             | 3.90 / 4.91                                                                                                                                                                                                                          |      |      |                               |                             |                                  |                                  |
| RATED CONDITION / CONDITION NOMINALE /<br>CONDICIONES NOMINALES / CONDIZIONI NOMINALI /<br>CONDIÇÃO NOMINAL / NENNBEDINGUNG                                                                                                                                           | <table><tr><td>COOL</td><td>HEAT</td></tr><tr><td>AIR (DB / WB):<br/>35°C / 24°C</td><td>AIR (DB / WB):<br/>7°C / 6°C</td></tr><tr><td>WATER (IN / OUT):<br/>23°C / 18°C</td><td>WATER (IN / OUT):<br/>30°C / 35°C</td></tr></table> | COOL | HEAT | AIR (DB / WB):<br>35°C / 24°C | AIR (DB / WB):<br>7°C / 6°C | WATER (IN / OUT):<br>23°C / 18°C | WATER (IN / OUT):<br>30°C / 35°C |
| COOL                                                                                                                                                                                                                                                                  | HEAT                                                                                                                                                                                                                                 |      |      |                               |                             |                                  |                                  |
| AIR (DB / WB):<br>35°C / 24°C                                                                                                                                                                                                                                         | AIR (DB / WB):<br>7°C / 6°C                                                                                                                                                                                                          |      |      |                               |                             |                                  |                                  |
| WATER (IN / OUT):<br>23°C / 18°C                                                                                                                                                                                                                                      | WATER (IN / OUT):<br>30°C / 35°C                                                                                                                                                                                                     |      |      |                               |                             |                                  |                                  |
| CLIMATE CLASS / CLASSE ÉNERGÉTIQUE /<br>CLASIFICACIÓN CLIMÁTICA / CLASSE CLIMATICA /<br>CLASSE CLIMÁTICA / KLIMA KLASSE                                                                                                                                               | T1                                                                                                                                                                                                                                   |      |      |                               |                             |                                  |                                  |
| IP NUMBER / NOMBRE IP / NÚMERO DE IP /<br>NUMERO IP / NUMERO IP / IP NUMBER                                                                                                                                                                                           | IPX4                                                                                                                                                                                                                                 |      |      |                               |                             |                                  |                                  |
| PRODUCTION YEAR / ANNÉE DE PRODUCTION /<br>AÑO DE PRODUCCIÓN / ANNO DI FABBRICAZIONE /<br>AÑO DE FABRICO / PRODUKTIONSJAHR                                                                                                                                            | 2024.                                                                                                                                                                                                                                |      |      |                               |                             |                                  |                                  |
| SERIAL NUMBER                                                                                                                                                                                                                                                         | QZEFPAFX100091N                                                                                                                                                                                                                      |      |      |                               |                             |                                  |                                  |

Contains fluorinated greenhouse gases  
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**CE 1155**  
**UK CA 0120**  
EU

MODEL : AE080CXYDGK/EU



S/N : QZEFPAFX100091N 2024.

Figure 2: Type plate of the outdoor unit

## 4 Heating - Test results

### 4.1 AE080CXYDGK/EU+AE260CNWMEG/EU – Standard rating condition

In the table below a summary of the most important test results is given, including all corrections as applicable as per EN 14511.

Table 1: Summary of heating test data for standard- and application rating conditions as per EN 14511

| Condition                  | Unit | Std Rating<br>A7W35 | Std Rating<br>A7W55 | Appl Rating<br>A2W35 | Appl Rating<br>A-7W35 |
|----------------------------|------|---------------------|---------------------|----------------------|-----------------------|
| Part load                  | %    | -                   | -                   | -                    | -                     |
| Compressor frequency       | Hz   | 58                  | 65                  | 58                   | 90                    |
| Defrosts                   | -    | No                  | No                  | Yes                  | Yes                   |
| # Defrosts in analysis     | -    | 0                   | 0                   | 1                    | 1                     |
| Air temperature (DB)       | °C   | 7.00                | 7.00                | 2.01                 | -7.00                 |
| Air temperature (WB)       | °C   | 6.00                | 5.99                | 1.04                 | -8.00                 |
| Inlet water temperature    | °C   | 30.01               | 47.00               | 30.00                | 29.99                 |
| Outlet water temperature   | °C   | 34.99               | 55.07               | 34.04                | 34.56                 |
| Water flow rate            | m³/h | 1.445               | 0.900               | 1.249                | 1.419                 |
| Heating capacity           | kW   | 8.257               | 8.267               | 5.775                | 7.440                 |
| Effective power input      | kW   | 1.673               | 2.695               | 1.549                | 2.712                 |
| Coefficient of performance | -    | 4.936               | 3.068               | 3.728                | 2.743                 |

### 4.2 AE080CXYDGK/EU+AE260CNWMEG/EU – Average climate

In the table(s) on next page(s) a summary of the most important test results is given, including all corrections as applicable as per EN 14511 and EN 14825.

Table 2: Summary of heating test data for Low Temperature Application and Average Climate condition

| Heating Performance Low Temperature Application |      |        |       |       |        |            |            |
|-------------------------------------------------|------|--------|-------|-------|--------|------------|------------|
| Condition                                       | Unit | A      | B     | C     | D      | E<br>(TOL) | F<br>(BIV) |
|                                                 |      | A-7W34 | A2W30 | A7W27 | A12W24 | A-10W35    | A-7W34     |
| Part load                                       | %    | 88     | 54    | 35    | 15     | 100        | 88         |
| Compressor frequency                            | Hz   | 90     | 35    | 19    | 15     | 95         | 90         |
| Defrosts                                        | -    | Yes    | No    | No    | No     | Yes        | Yes        |
| # Defrosts in analysis                          | -    | 1      | 0     | 0     | 0      | 1          | 1          |
| Air temperature (DB)                            | °C   | -7.00  | 2.01  | 7.00  | 12.00  | -9.98      | -7.00      |
| Air temperature (WB)                            | °C   | -7.99  | 1.00  | 5.99  | 10.99  | -10.99     | -7.99      |
| Inlet water temperature                         | °C   | 28.99  | 24.97 | 21.98 | 21.68  | 29.99      | 28.99      |
| Outlet water temperature                        | °C   | 33.51  | 29.84 | 27.15 | 26.68  | 34.64      | 33.51      |
| Water flow rate                                 | m³/h | 1.442  | 0.786 | 0.473 | 0.449  | 1.386      | 1.442      |
| Heating capacity                                | kW   | 7.480  | 4.383 | 2.792 | 2.565  | 7.390      | 7.480      |
| Effective power input                           | kW   | 2.680  | 0.934 | 0.395 | 0.296  | 2.943      | 2.680      |
| Coefficient of performance                      | -    | 2.791  | 4.695 | 7.073 | 8.661  | 2.511      | 2.791      |

Table 3: Summary of heating test data for Medium Temperature Application and Average Climate condition

| Heating Performance Medium Temperature Application |                   |        |       |       |        |            |            |
|----------------------------------------------------|-------------------|--------|-------|-------|--------|------------|------------|
| Condition                                          | Unit              | A      | B     | C     | D      | E<br>(TOL) | F<br>(BIV) |
|                                                    |                   | A-7W52 | A2W42 | A7W36 | A12W30 | A-10W55    | A-7W52     |
| Part load                                          | %                 | 88     | 54    | 35    | 15     | 100        | 88         |
| Compressor frequency                               | Hz                | 95     | 36    | 20    | 15     | 95         | 95         |
| Defrosts                                           | -                 | Yes    | No    | No    | No     | No         | Yes        |
| # Defrosts in analysis                             | -                 | 1      | 0     | 0     | 0      | 0          | 1          |
| Air temperature (DB)                               | °C                | -7.01  | 2.00  | 7.00  | 12.00  | -10.00     | -7.01      |
| Air temperature (WB)                               | °C                | -8.01  | 1.01  | 5.99  | 11.00  | -11.02     | -8.01      |
| Inlet water temperature                            | °C                | 44.00  | 34.01 | 30.3  | 27.36  | 46.99      | 44.00      |
| Outlet water temperature                           | °C                | 51.27  | 41.82 | 36.03 | 32.05  | 54.98      | 51.27      |
| Water flow rate                                    | m <sup>3</sup> /h | 0.864  | 0.477 | 0.420 | 0.420  | 0.785      | 0.864      |
| Heating capacity                                   | kW                | 7.159  | 4.275 | 2.742 | 2.242  | 7.139      | 7.159      |
| Effective power input                              | kW                | 3.400  | 1.175 | 0.550 | 0.348  | 3.719      | 3.400      |
| Coefficient of performance                         | -                 | 2.105  | 3.638 | 4.987 | 6.448  | 1.920      | 2.105      |

In the table below a summary of the energy consumption for the various components of the heat pump which are part of the corrections for the Auxiliary energy consumption is given.

Table 4: Result of electric power consumption for thermostat off, standby, off and crankcase heater mode

| Auxiliary Energy      |      |        |
|-----------------------|------|--------|
|                       | Unit | Result |
| Thermostat-off mode   | kW   | 0.006  |
| Standby mode          | kW   | 0.006  |
| Crankcase heater mode | kW   | 0.000  |
| Off mode              | kW   | 0.006  |

Detailed test results per condition can be found in the Appendices of this report.

## 5 Heating - Calculation results

The test results as shown in Chapter 4 are used for a calculation of the energy efficiency as described in EN 14825. For the calculations the spreadsheet is used that is available on the HPKeymark website (V7.1).

In the tables below a summary of the most important results of the calculations is given.

Table 4: Calculation result for Low Temperature Application and Average Climate condition

| Energy Efficiency  |      |          |           |       |
|--------------------|------|----------|-----------|-------|
| SCOP <sub>on</sub> | SCOP | $\eta_s$ | QHE (kWh) | Label |
| 4.88               | 4.88 | 192.3    | 3385      | A+++  |

Table 5: Calculation result for Medium Temperature Application and Average Climate condition

| Energy Efficiency  |      |          |           |       |
|--------------------|------|----------|-----------|-------|
| SCOP <sub>on</sub> | SCOP | $\eta_s$ | QHE (kWh) | Label |
| 3.68               | 3.68 | 144.4    | 4486      | A++   |

A summary of the energy efficiency classes as per (EU) 811/2013 is given in the Appendices of this report.

## 6 Used equipment

| System 6                                        |                     |                                 |                                        |                      |
|-------------------------------------------------|---------------------|---------------------------------|----------------------------------------|----------------------|
| <i>Description</i><br>Brand                     | Type                | Working range                   | Required accuracy                      | Calibration due date |
| <b>Outdoor temperature</b><br>ST Instruments    | PT100               | -20 - +50 °C                    | ± 0,2 K                                | Mar 2025             |
| <b>RH Outdoor</b><br>Vaisala                    | HMT337              | 66 - 90%RH                      | --                                     | Jul 2025             |
| <b>Indoor temperature</b><br>ST Instruments     | PT100               | +15 - +35 °C                    | ± 0,2 K                                | Mar 2025             |
| <b>Atmospheric pressure</b><br>Vaisala          | PTB 110             | +850 - +1150 hPa                | --                                     | Mar 2025             |
| <b>CH – supply temperature</b><br>Tempcontrol   | PT8311/S            | +20 - +65 °C                    | ± 0,15 K                               | Mar 2025             |
| <b>CH – return temperature</b><br>Tempcontrol   | PT8311/S            | +20 - +65 °C                    | ± 0,15 K                               | Mar 2025             |
| <b>CH – low flow</b><br>Siemens                 | Sitrans FM MAG 6000 | 0 – 1,5 m³/h                    | ± 1 %                                  | Mar 2025             |
| <b>CH – High flow</b><br>Siemens                | Sitrans FM MAG 6000 | 1 – 4,5 m³/h                    | ± 1 %                                  | Mar 2025             |
| <b>CH – ΔP</b><br>Siemens                       | Sitrans P DS III    | -100 - +100 kPa                 | ± 1 kPa (≤ 20 kPa)<br>± 5 % (> 20 kPa) | Mar 2025             |
| <b>DHW – tapping temperature</b><br>Tempcontrol | PT8311/S            | +10 - +65 °C                    | ± 0,2 K                                | Mar 2025             |
| <b>DHW – supply temperature</b><br>Tempcontrol  | PT8311/S            | +8 - +12 °C                     | ± 0,2 K                                | Mar 2025             |
| <b>DHW – flow</b><br>Siemens                    | Sitrans FM MAG 6000 | 0 – 20 l/min                    | ± 2 %                                  | Mar 2025             |
| <b>Electrical power meter</b><br>Yokogawa       | WT333E              | 220-240 V<br>0-16 A<br>0-20 kWh | ± 0,5 %<br>± 0,5 %<br>± 1 %            | Oct 2025             |

Appendices

|             |                                                                        |
|-------------|------------------------------------------------------------------------|
| Appendix 1: | Summary of the Energy Efficiency classes as per (EU) 811/2013 – 1 page |
| Appendix 2: | Test Results – 31 pages                                                |
| Appendix 3: | Test sheets – 37 pages                                                 |

END OF TEST REPORT

## Appendix 1: Summary of the Energy Efficiency classes as per (EU) 811/2013

Table A1.1: Seasonal energy efficiency classes for space heating with exception of low temperature application

| Seasonal efficiency class | Seasonal energy efficiency $\eta_s$ in % |
|---------------------------|------------------------------------------|
| <b>A<sup>+++</sup></b>    | $\eta_s \geq 150$                        |
| <b>A<sup>++</sup></b>     | $125 \leq \eta_s < 150$                  |
| <b>A<sup>+</sup></b>      | $98 \leq \eta_s < 125$                   |
| <b>A</b>                  | $90 \leq \eta_s < 98$                    |
| <b>B</b>                  | $82 \leq \eta_s < 90$                    |
| <b>C</b>                  | $75 \leq \eta_s < 82$                    |
| <b>D</b>                  | $36 \leq \eta_s < 75$                    |
| <b>E</b>                  | $34 \leq \eta_s < 36$                    |
| <b>F</b>                  | $30 \leq \eta_s < 34$                    |
| <b>G</b>                  | $\eta_s < 30$                            |

Table A1.2: Seasonal energy efficiency classes for space heating for low temperature application

| Seasonal efficiency class | Seasonal energy efficiency $\eta_s$ in % |
|---------------------------|------------------------------------------|
| <b>A<sup>+++</sup></b>    | $\eta_s \geq 175$                        |
| <b>A<sup>++</sup></b>     | $150 \leq \eta_s < 175$                  |
| <b>A<sup>+</sup></b>      | $123 \leq \eta_s < 150$                  |
| <b>A</b>                  | $115 \leq \eta_s < 123$                  |
| <b>B</b>                  | $107 \leq \eta_s < 115$                  |
| <b>C</b>                  | $100 \leq \eta_s < 107$                  |
| <b>D</b>                  | $61 \leq \eta_s < 100$                   |
| <b>E</b>                  | $59 \leq \eta_s < 61$                    |
| <b>F</b>                  | $55 \leq \eta_s < 59$                    |
| <b>G</b>                  | $\eta_s < 55$                            |

Table A1.3: Seasonal energy efficiency classes for domestic hot water per capacity profile

|                        | XS                       | S                        | M                          | L                          | XL                         | XXL                        |
|------------------------|--------------------------|--------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <b>A<sup>+++</sup></b> | $\eta_{wh} \geq 69$      | $\eta_{wh} \geq 90$      | $\eta_{wh} \geq 163$       | $\eta_{wh} \geq 188$       | $\eta_{wh} \geq 200$       | $\eta_{wh} \geq 213$       |
| <b>A<sup>++</sup></b>  | $61 \leq \eta_{wh} < 69$ | $72 \leq \eta_{wh} < 90$ | $130 \leq \eta_{wh} < 163$ | $150 \leq \eta_{wh} < 188$ | $160 \leq \eta_{wh} < 200$ | $170 \leq \eta_{wh} < 213$ |
| <b>A<sup>+</sup></b>   | $53 \leq \eta_{wh} < 61$ | $55 \leq \eta_{wh} < 72$ | $100 \leq \eta_{wh} < 130$ | $115 \leq \eta_{wh} < 150$ | $123 \leq \eta_{wh} < 160$ | $131 \leq \eta_{wh} < 170$ |
| <b>A</b>               | $38 \leq \eta_{wh} < 53$ | $38 \leq \eta_{wh} < 55$ | $65 \leq \eta_{wh} < 100$  | $75 \leq \eta_{wh} < 115$  | $80 \leq \eta_{wh} < 123$  | $85 \leq \eta_{wh} < 131$  |
| <b>B</b>               | $35 \leq \eta_{wh} < 38$ | $35 \leq \eta_{wh} < 38$ | $39 \leq \eta_{wh} < 65$   | $50 \leq \eta_{wh} < 75$   | $55 \leq \eta_{wh} < 80$   | $60 \leq \eta_{wh} < 85$   |
| <b>C</b>               | $32 \leq \eta_{wh} < 35$ | $32 \leq \eta_{wh} < 35$ | $36 \leq \eta_{wh} < 39$   | $37 \leq \eta_{wh} < 50$   | $38 \leq \eta_{wh} < 55$   | $40 \leq \eta_{wh} < 60$   |
| <b>D</b>               | $29 \leq \eta_{wh} < 32$ | $29 \leq \eta_{wh} < 32$ | $33 \leq \eta_{wh} < 36$   | $34 \leq \eta_{wh} < 37$   | $35 \leq \eta_{wh} < 38$   | $36 \leq \eta_{wh} < 40$   |
| <b>E</b>               | $26 \leq \eta_{wh} < 29$ | $26 \leq \eta_{wh} < 29$ | $30 \leq \eta_{wh} < 33$   | $30 \leq \eta_{wh} < 34$   | $30 \leq \eta_{wh} < 35$   | $32 \leq \eta_{wh} < 36$   |
| <b>F</b>               | $23 \leq \eta_{wh} < 26$ | $23 \leq \eta_{wh} < 26$ | $27 \leq \eta_{wh} < 30$   | $27 \leq \eta_{wh} < 30$   | $27 \leq \eta_{wh} < 30$   | $28 \leq \eta_{wh} < 32$   |
| <b>G</b>               | $\eta_{wh} < 23$         | $\eta_{wh} < 23$         | $\eta_{wh} < 27$           | $\eta_{wh} < 27$           | $\eta_{wh} < 27$           | $\eta_{wh} < 28$           |

## Appendix 2 – Test Reports

# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_Std. R.\_A7W35.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14511**

**Application: Low Temperature (35°C)**

**Condition : Std. R. - A7W35**

**Climate : Average**

**Load : N.A.**

**Flowrate : Variable**

**Compressor Frequency: 58**

**Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 9/13/2024 9/13/2024  
Start time : 9.46 14.20  
Elapsed time : 71:07:18 1:10:29  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 20.5          | 20.5      | 20.6      | °C     |
| Patm  | Atmosferic pressure | 1023.2        | 1023      | 1023.3    | mbar   |

## Room

|        |                                           |       |       |       |    |
|--------|-------------------------------------------|-------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 7.00  | 6.86  | 7.09  | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 6.00  | 5.82  | 6.13  | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 86.80 | 85.8  | 87.9  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.01 | 19.97 | 20.07 | °C |
|        |                                           |       |       |       |    |
| 6Taux1 | Temperature after evaporator Room 6       | 2.50  | 2.3   | 2.6   | °C |

## Hydronic circuit

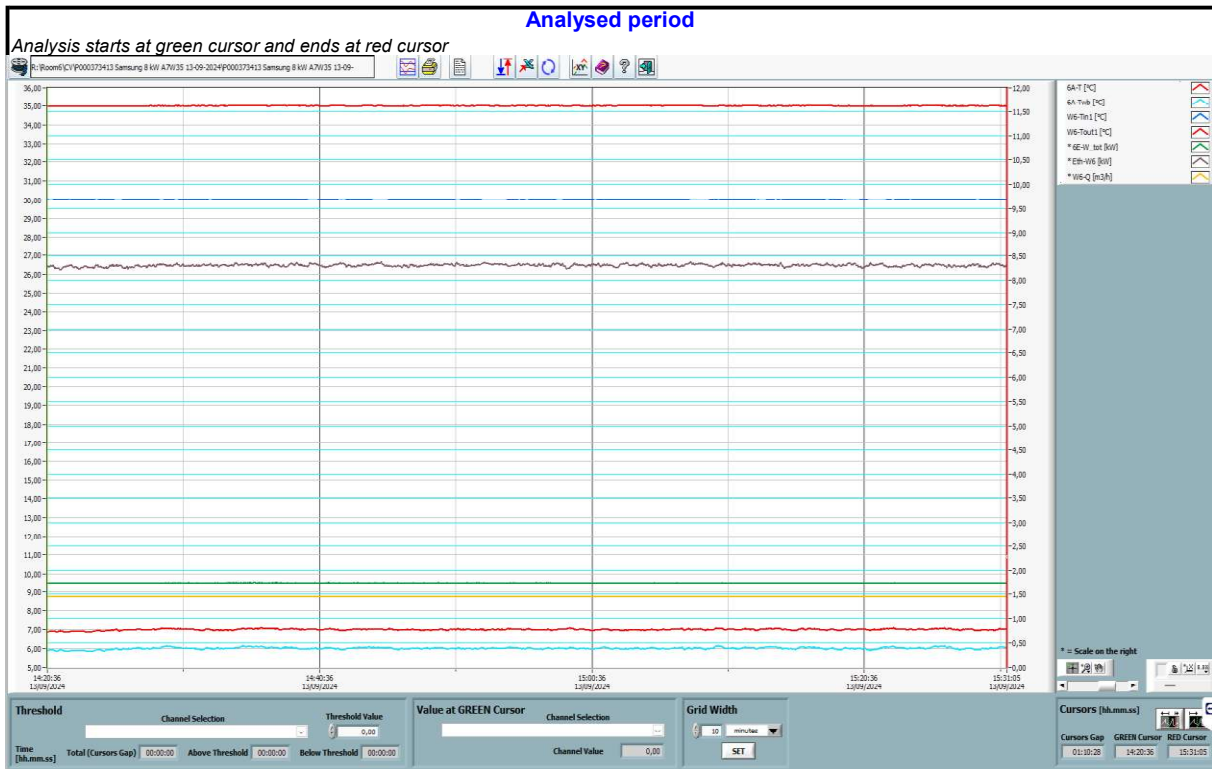
|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 1.445 | 1.44  | 1.452 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 4.98  | 4.93  | 5.02  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 30.01 | 29.98 | 30.04 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 34.99 | 34.95 | 35.02 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 54.76 | 53.05 | 56.58 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 8.306 | 8.208 | 8.39  | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 229.9 | 230.1 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 2.54  | 2.47  | 2.59  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.538 | 0.521 | 0.552 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.922 | 0.916 | 0.927 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.3 | 229.2 | 229.4 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 3.12  | 3.04  | 3.19  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.673 | 0.656 | 0.688 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.942 | 0.937 | 0.947 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.9 | 229.8 | 229.9 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 2.51  | 2.44  | 2.57  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.533 | 0.516 | 0.547 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.922 | 0.915 | 0.928 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 229.6 | 229.8 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 2.72  | 2.7   | 2.73  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 1.744 | 1.733 | 1.75  | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.93  | 0.928 | 0.931 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00040 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 54760   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 22.0    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.309   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 71.2    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 49.2    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                       |        |                 |
|-----------------------------------------------------------------------------|---------------------------------------|----------|-----------------------|--------|-----------------|
|                                                                             |                                       | Measured | Applied correction(s) |        | Corrected       |
|                                                                             |                                       |          | Air                   | Water  |                 |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                       |        | Std. R. - A7W35 |
| Load                                                                        |                                       |          |                       |        | N.A.            |
| Compressor frequency                                                        |                                       |          |                       |        | 58 Hz           |
| Defrosts ( Yes / No )                                                       |                                       |          |                       |        | No              |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                       |        | 0               |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                       |        | 7.00 °C         |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                       |        | 6.00 °C         |
| Inlet water temperature                                                     |                                       |          |                       |        | 30.01 °C        |
| Outlet water temperature                                                    |                                       |          |                       |        | 34.99 °C        |
| Water flow rate                                                             |                                       | 1.445    |                       |        | 1.445 m3/h      |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 8.3060   |                       | 0.0492 | 8.2568 kW       |
| 6E-W tot                                                                    | Total Power - Unit 6                  | 1.7440   |                       | 0.0712 | 1.6728 kW       |
| COP-W6                                                                      | Coefficient of Performance            | 4.763    |                       |        | 4.936 --        |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HMTA\_Std. R.\_A7W55.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14511**

**Application: Medium Temperature (55°C)**

**Condition : Std. R. - A7W55**

**Climate : Average**

**Load : N.A.**

**Flowrate : Variable**

**Compressor Frequency: 65**

**Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/1/2024 10/1/2024  
Start time : 13.21 14.45  
Elapsed time : 2:34:38 1:10:22  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 19.7          | 19.7      | 19.8      | °C     |
| Patm  | Atmosferic pressure | 1004          | 1003.9    | 1004.2    | mbar   |

## Room

|        |                                           |       |       |      |    |
|--------|-------------------------------------------|-------|-------|------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 7.00  | 6.92  | 7.09 | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 5.99  | 5.88  | 6.14 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 86.90 | 86.1  | 87.7 | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00 | 19.91 | 20.1 | °C |
|        |                                           |       |       |      |    |
| 6Taux1 | Temperature after evaporator Room 6       | 3.00  | 2.9   | 3.1  | °C |

## Hydronic circuit

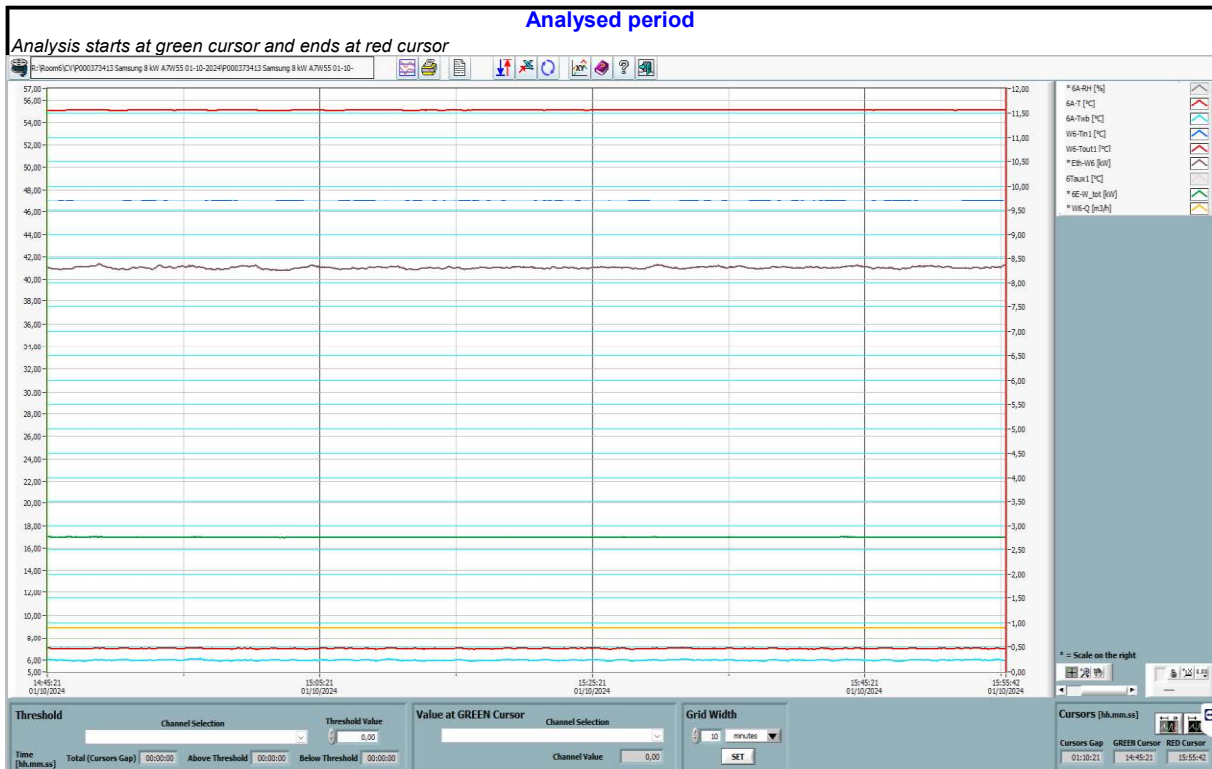
|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.9   | 0.898 | 0.901 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 8.07  | 8.01  | 8.13  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 47    | 46.94 | 47.04 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 55.07 | 55.01 | 55.11 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 75.87 | 73.37 | 78.02 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 8.312 | 8.25  | 8.383 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 229.7 | 230.2 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 4.08  | 4.01  | 4.15  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.883 | 0.866 | 0.9   | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.94  | 0.937 | 0.944 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.3 | 229   | 229.5 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 4.56  | 4.48  | 4.63  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.999 | 0.98  | 1.016 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.956 | 0.953 | 0.958 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 229.6 | 230.1 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 4.06  | 3.98  | 4.12  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.877 | 0.859 | 0.893 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.94  | 0.936 | 0.944 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 229.4 | 229.9 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 4.23  | 4.22  | 4.25  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 2.759 | 2.747 | 2.769 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.946 | 0.945 | 0.947 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00025 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 75870   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 19.0    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.294   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 64.4    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 45.4    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                              |        |                 |
|-----------------------------------------------------------------------------|---------------------------------------|----------|------------------------------|--------|-----------------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air | Water  | Corrected       |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                              |        | Std. R. - A7W55 |
| Load                                                                        |                                       |          |                              |        | N.A.            |
| Compressor frequency                                                        |                                       |          |                              |        | 65 Hz           |
| Defrosts ( Yes / No )                                                       |                                       |          |                              |        | No              |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                              |        | 0               |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | 7.00 °C         |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | 5.99 °C         |
| Inlet water temperature                                                     |                                       |          |                              |        | 47.00 °C        |
| Outlet water temperature                                                    |                                       |          |                              |        | 55.07 °C        |
| Water flow rate                                                             |                                       | 0.900    |                              |        | 0.900 m3/h      |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 8.3120   |                              | 0.0454 | 8.2666 kW       |
| 6E-W tot                                                                    | Total Power - Unit 6                  | 2.7590   |                              | 0.0644 | 2.6946 kW       |
| COP-W6                                                                      | Coefficient of Performance            | 3.013    |                              |        | 3.068 --        |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_Appl R.\_A2W35.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14511**

**Application: Low Temperature (35°C)**

**Condition : Appl R. - A2W35**

**Climate : Average**

**Load : -- %**

**Flowrate : Variable**

**Compressor Frequency: 58 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/2/2024 10/2/2024  
Start time : 8.48 12.16  
Elapsed time : 5:22:38 1:37:08  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description          | Average value | Min value | Max value | [unit] |
|-------|----------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory     | 19.5          | 19.5      | 19.6      | °C     |
| Patm  | Atmospheric pressure | 1010.4        | 1010.1    | 1010.6    | mbar   |

## Room

|        |                                           |       |       |      |    |
|--------|-------------------------------------------|-------|-------|------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 2.01  | 1.61  | 2.92 | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 1.04  | 0.01  | 2.78 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 84.40 | 72.9  | 98.7 | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00 | 19.79 | 20.1 | °C |
|        |                                           |       |       |      |    |
| 6Taux1 | Temperature after evaporator Room 6       | -2.60 | -6.6  | 21.6 | °C |

## Hydronic circuit

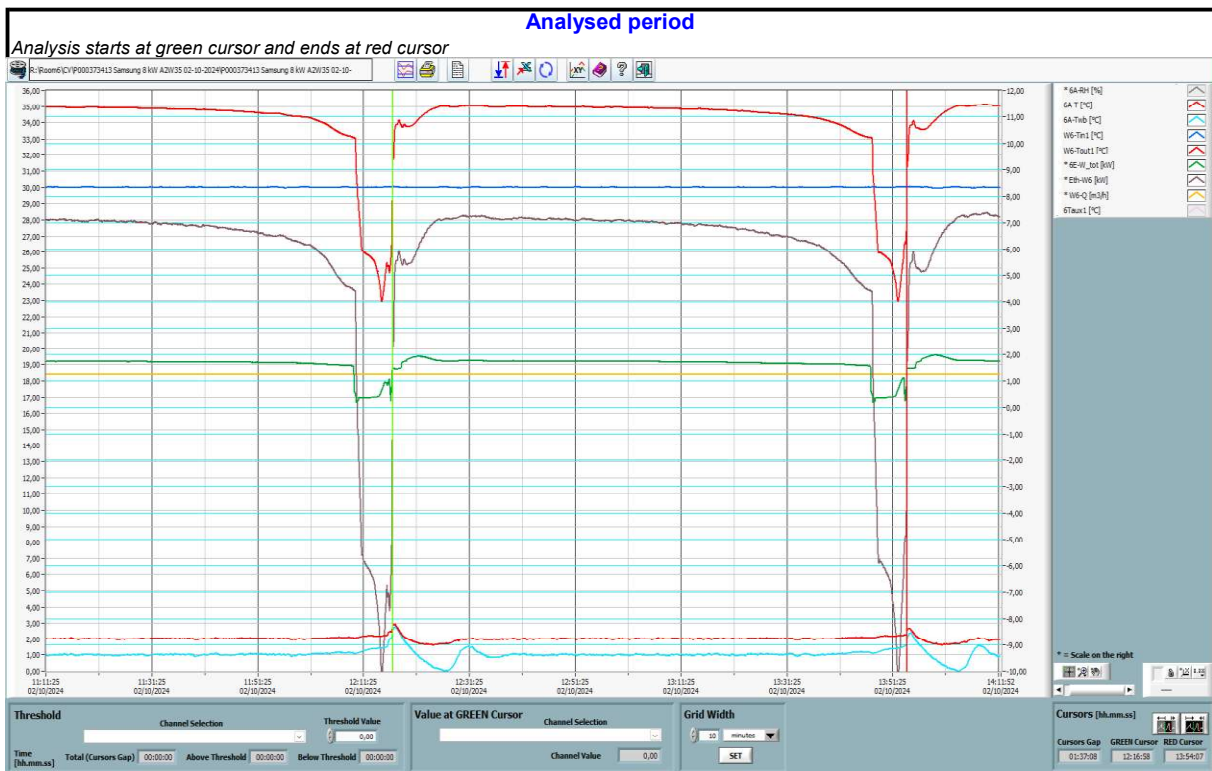
|          |                                                  |       |         |       |      |
|----------|--------------------------------------------------|-------|---------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 1.249 | 1.243   | 1.257 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 4.04  | -7.12   | 5.05  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 30    | 29.96   | 30.05 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 34.04 | 22.91   | 35.05 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 63.01 | 60.85   | 64.89 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 5.824 | -10.289 | 7.285 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 227.8 | 232.1 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 2.36  | 0.34  | 2.85  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.499 | 0.029 | 0.61  | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.907 | 0.372 | 0.93  |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.3 | 227.2 | 231.8 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 2.91  | 0.92  | 3.4   | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.626 | 0.127 | 0.738 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.931 | 0.6   | 0.951 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 227.7 | 231.5 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 2.34  | 0.34  | 2.82  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.494 | 0.028 | 0.604 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.907 | 0.363 | 0.932 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 228.8 | 230.9 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 2.54  | 0.53  | 2.98  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 1.62  | 0.184 | 1.917 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.916 | 0.501 | 0.935 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00035 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 63010   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 21.9    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.308   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 70.9    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 49.0    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                              |        |                 |
|-----------------------------------------------------------------------------|---------------------------------------|----------|------------------------------|--------|-----------------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air | Water  | Corrected       |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                              |        | Appl R. - A2W35 |
| Load                                                                        |                                       |          |                              |        | -- %            |
| Compressor frequency                                                        |                                       |          |                              |        | 58 Hz           |
| Defrosts ( Yes / No )                                                       |                                       |          |                              |        | Yes             |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                              |        | 1               |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | 2.01 °C         |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | 1.04 °C         |
| Inlet water temperature                                                     |                                       |          |                              |        | 30.00 °C        |
| Outlet water temperature                                                    |                                       |          |                              |        | 34.04 °C        |
| Water flow rate                                                             |                                       | 1.249    |                              |        | 1.249 m3/h      |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 5.8240   |                              | 0.0490 | 5.7750 kW       |
| 6E-W_tot                                                                    | Total Power - Unit 6                  | 1.6200   |                              | 0.0709 | 1.5491 kW       |
| COP-W6                                                                      | Coefficient of Performance            | 3.595    |                              |        | 3.728 --        |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_Appl R.\_A-7W35.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14511**

**Application: Low Temperature (35°C)**

**Condition : Appl R. - A-7W35**

**Climate : Average**

**Load : -- %**

**Flowrate : Variable**

**Compressor Frequency: 90 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/3/2024 10/3/2024  
Start time : 9.44 15.19  
Elapsed time : 8:29:58 2:06:05  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 19.9          | 19.7      | 20        | °C     |
| Patm  | Atmosferic pressure | 1018.1        | 1017.9    | 1018.4    | mbar   |

## Room

|        |                                           |        |       |       |    |
|--------|-------------------------------------------|--------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | -7.00  | -7.79 | -5.49 | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | -8.00  | -9.29 | -5.77 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 72.80  | 56.8  | 96.4  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00  | 19.78 | 20.05 | °C |
| 6Taux1 | Temperature after evaporator Room 6       | -10.30 | -11.4 | 17.5  | °C |

## Hydronic circuit

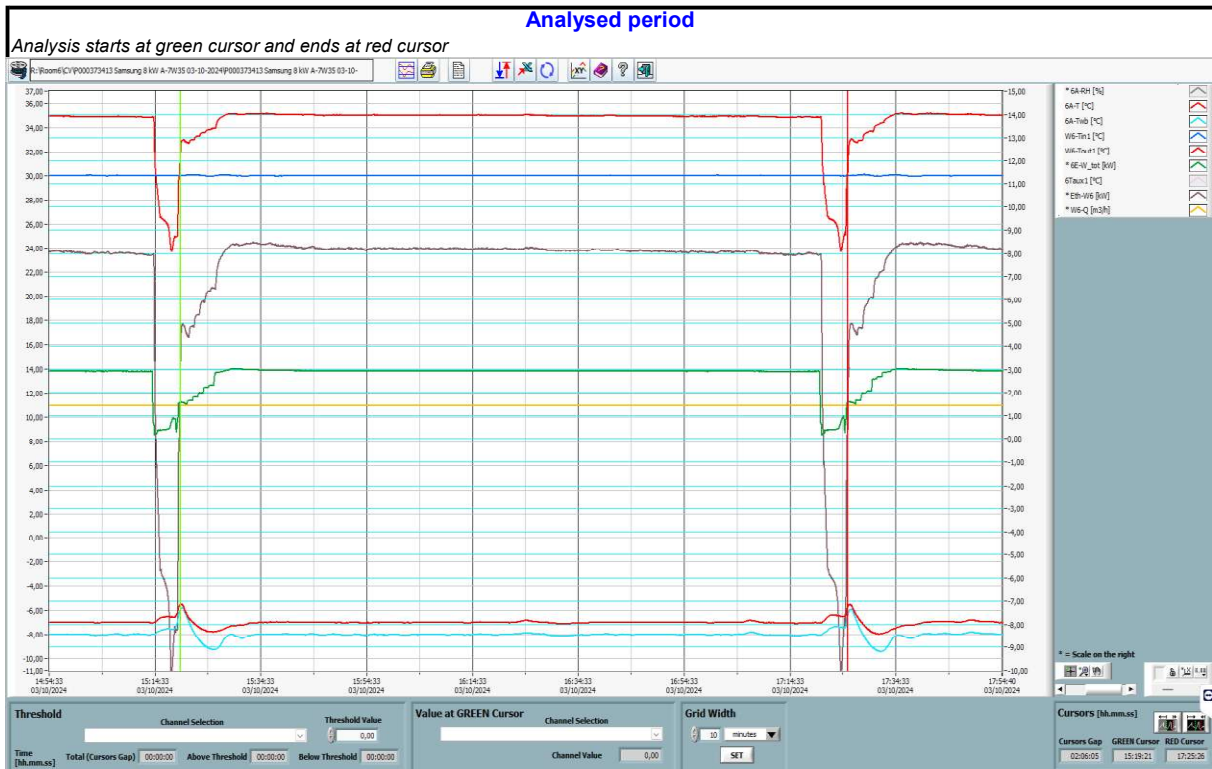
|          |                                                  |       |         |       |      |
|----------|--------------------------------------------------|-------|---------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 1.419 | 1.412   | 1.427 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 4.57  | -6.24   | 5.18  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 29.99 | 29.93   | 30.06 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 34.56 | 23.71   | 35.15 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 55.79 | 53.7    | 58.08 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 7.489 | -10.234 | 8.498 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 228.1 | 232.1 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 4.03  | 0.29  | 4.57  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.856 | 0.02  | 0.982 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.915 | 0.292 | 0.935 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.2 | 227.2 | 231.8 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 4.98  | 0.96  | 5.56  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 1.081 | 0.126 | 1.212 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.942 | 0.571 | 0.958 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.9 | 228.9 | 232.1 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 4     | 0.3   | 4.54  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.847 | 0.019 | 0.972 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.914 | 0.272 | 0.935 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 228.7 | 231.4 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 4.33  | 0.52  | 4.7   | A  |
| 6E-W_tot | Total Power - Unit 6                     | 2.783 | 0.164 | 3.027 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.925 | 0.461 | 0.937 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00039 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 55790   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 22.0    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.309   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 71.2    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 49.2    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                              |        |                  |
|-----------------------------------------------------------------------------|---------------------------------------|----------|------------------------------|--------|------------------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air | Water  | Corrected        |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                              |        | Appl R. - A-7W35 |
| Load                                                                        |                                       |          |                              |        | -- %             |
| Compressor frequency                                                        |                                       |          |                              |        | 90 Hz            |
| Defrosts ( Yes / No )                                                       |                                       |          |                              |        | Yes              |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                              |        | 1                |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | -7.00 °C         |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | -8.00 °C         |
| Inlet water temperature                                                     |                                       |          |                              |        | 29.99 °C         |
| Outlet water temperature                                                    |                                       |          |                              |        | 34.56 °C         |
| Water flow rate                                                             |                                       | 1.419    |                              |        | 1.419 m3/h       |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 7.4890   |                              | 0.0492 | 7.4398 kW        |
| 6E-W tot                                                                    | Total Power - Unit 6                  | 2.7830   |                              | 0.0712 | 2.7118 kW        |
| COP-W6                                                                      | Coefficient of Performance            | 2.691    |                              |        | 2.743 --         |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_AF (Tbiv)\_A-7W34.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Low Temperature (35°C)**

**Condition : AF (Tbiv) - A-7W34**

**Climate : Average**

**Load : 88 %**

**Flowrate : Variable**

**Compressor Frequency: 90 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/3/2024 10/3/2024  
Start time : 9.44 19.26  
Elapsed time : 12:10:38 2:06:05  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 19.2          | 18.7      | 19.5      | °C     |
| Patm  | Atmosferic pressure | 1019.2        | 1018.7    | 1019.6    | mbar   |

## Room

|        |                                           |        |       |       |    |
|--------|-------------------------------------------|--------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | -7.00  | -8.43 | -5.22 | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | -7.99  | -9.66 | -5.53 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 72.90  | 56.7  | 96.6  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00  | 19.75 | 20.09 | °C |
|        |                                           |        |       |       |    |
| 6Taux1 | Temperature after evaporator Room 6       | -10.30 | -12.2 | 19.4  | °C |

## Hydronic circuit

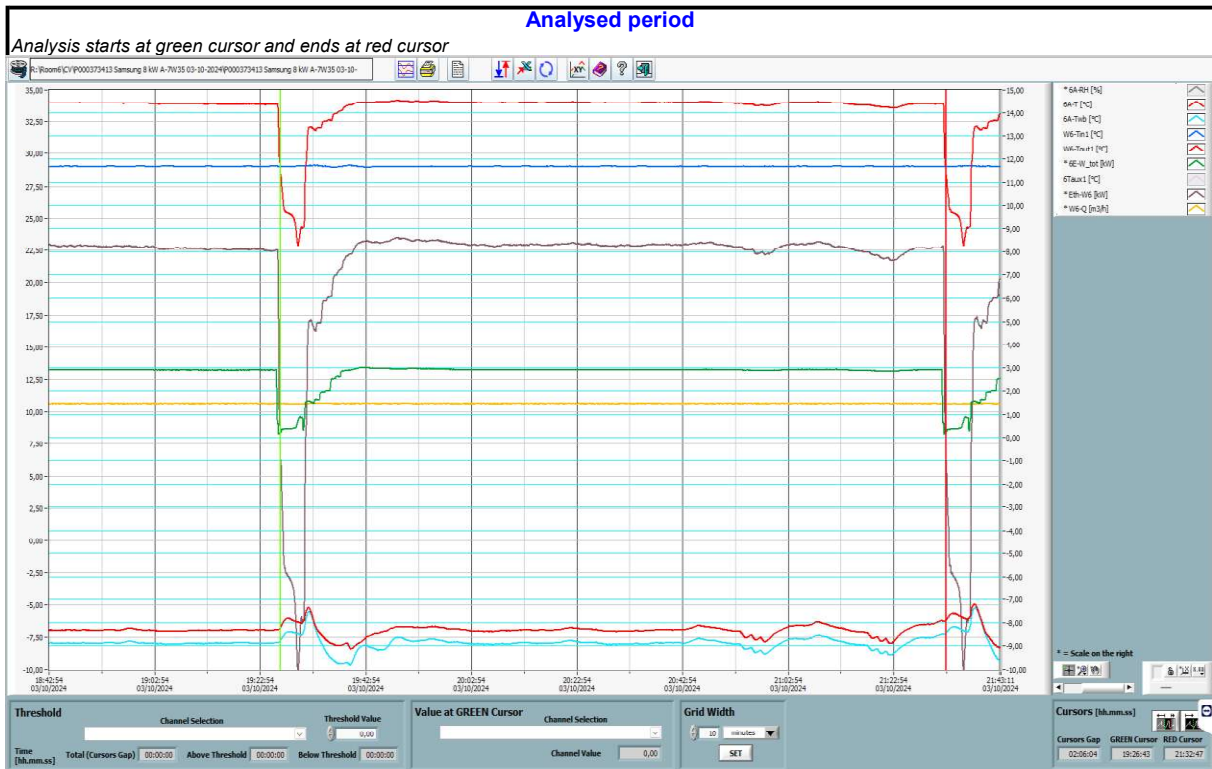
|          |                                                  |       |         |       |      |
|----------|--------------------------------------------------|-------|---------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 1.442 | 1.436   | 1.45  | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 4.52  | -6.15   | 5.18  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 28.99 | 28.92   | 29.07 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 33.51 | 22.87   | 34.16 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 54.56 | 52.54   | 56.86 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 7.529 | -10.252 | 8.619 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 227.4 | 232   | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 3.98  | 0.32  | 4.54  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.845 | 0.025 | 0.972 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.915 | 0.349 | 0.935 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.2 | 226.8 | 231.4 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 4.93  | 0.97  | 5.51  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 1.07  | 0.131 | 1.202 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.941 | 0.587 | 0.958 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.9 | 227.5 | 232.2 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 3.95  | 0.32  | 4.49  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.836 | 0.024 | 0.963 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.913 | 0.328 | 0.935 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 228.4 | 230.9 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 4.28  | 0.54  | 4.66  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 2.751 | 0.181 | 2.995 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.925 | 0.488 | 0.938 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00040 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 54560   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 21.9    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.308   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 70.9    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 49.0    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                                         |                           |      |
|-----------------------------------------------------------------------------|---------------------------------------|----------|-----------------------------------------|---------------------------|------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air      Water | Corrected                 |      |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                                         | <b>AF (Tbiv) - A-7W34</b> |      |
| Load                                                                        |                                       |          |                                         | <b>88</b>                 | %    |
| Compressor frequency                                                        |                                       |          |                                         | <b>90</b>                 | Hz   |
| Defrosts ( Yes / No )                                                       |                                       |          |                                         | <b>Yes</b>                |      |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                                         | <b>1</b>                  |      |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                                         | <b>-7.00</b>              | °C   |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                                         | <b>-7.99</b>              | °C   |
| Inlet water temperature                                                     |                                       |          |                                         | <b>28.99</b>              | °C   |
| Outlet water temperature                                                    |                                       |          |                                         | <b>33.51</b>              | °C   |
| Water flow rate                                                             |                                       | 1.442    |                                         | <b>1.442</b>              | m3/h |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 7.5290   | 0.0490                                  | <b>7.4800</b>             | kW   |
| 6E-W_tot                                                                    | Total Power - Unit 6                  | 2.7510   | 0.0709                                  | <b>2.6801</b>             | kW   |
| COP-W6                                                                      | Coefficient of Performance            | 2.737    |                                         | <b>2.791</b>              | --   |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_B\_A2W30.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Low Temperature (35°C)**

**Condition : B - A2W30**

**Climate : Average**

**Load : 54 %**

**Flowrate : Variable**

**Compressor Frequency: 35 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/2/2024 10/2/2024  
Start time : 14.28 16.38  
Elapsed time : 4:41:38 1:10:32  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 19.7          | 19.5      | 19.9      | °C     |
| Patm  | Atmosferic pressure | 1011.9        | 1011.7    | 1012.2    | mbar   |

## Room

|        |                                           |       |       |       |    |
|--------|-------------------------------------------|-------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 2.01  | 1.97  | 2.05  | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 1.00  | 0.94  | 1.05  | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 83.90 | 83.4  | 84.2  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 19.99 | 19.93 | 20.05 | °C |
|        |                                           |       |       |       |    |
| 6Taux1 | Temperature after evaporator Room 6       | -0.70 | -1.3  | -0.3  | °C |

## Hydronic circuit

|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.786 | 0.785 | 0.787 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 4.87  | 4.64  | 5.05  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 24.97 | 24.86 | 25.06 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 29.84 | 29.61 | 29.96 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 78.79 | 76.67 | 80.79 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 4.426 | 4.215 | 4.585 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 227   | 232.9 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 1.34  | 1.28  | 1.39  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.264 | 0.247 | 0.278 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.856 | 0.845 | 0.867 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.3 | 226.2 | 232.5 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 2.47  | 2.39  | 2.54  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.469 | 0.448 | 0.486 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.827 | 0.818 | 0.835 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 226.8 | 232.9 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 1.33  | 1.26  | 1.38  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.261 | 0.244 | 0.276 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.857 | 0.842 | 0.87  |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 227.1 | 232   | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 1.71  | 1.67  | 1.75  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 0.994 | 0.961 | 1.023 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.842 | 0.835 | 0.849 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

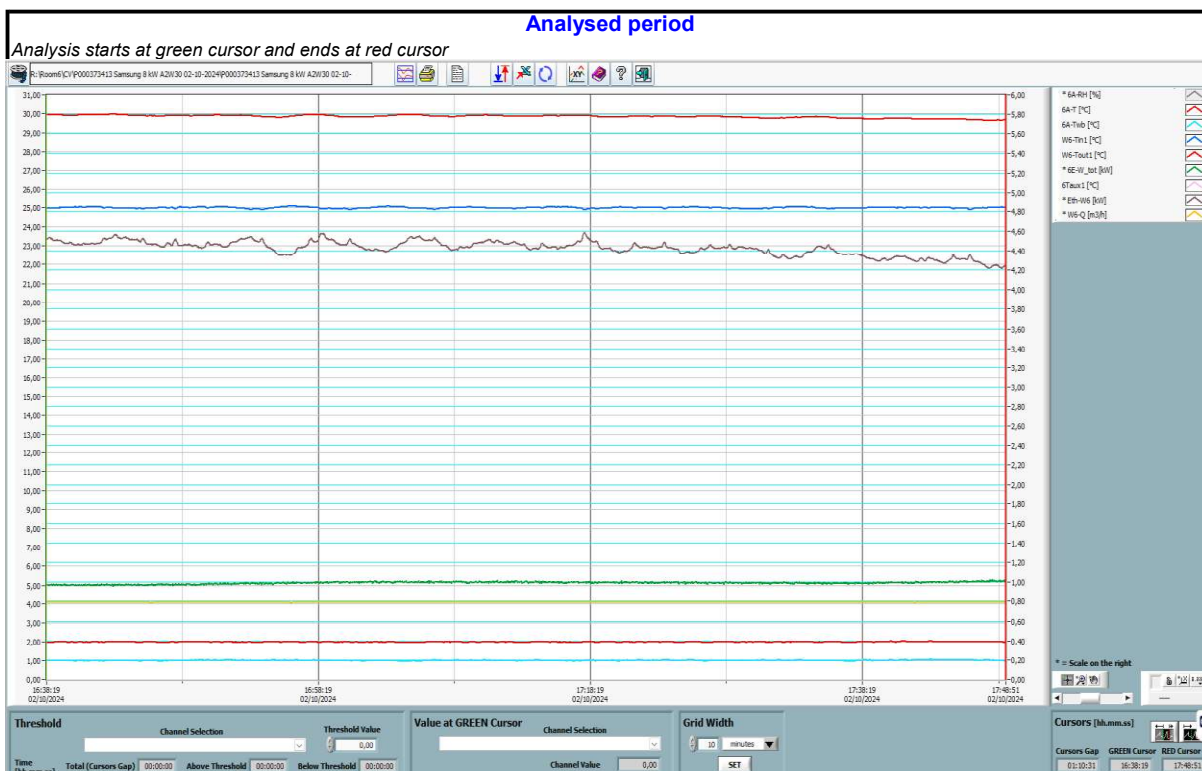
# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_B\_A2W30.xlsx



| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00022 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 78790   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 17.2    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.285   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 60.4    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 43.2    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                       |           |           |
|-----------------------------------------------------------------------------|---------------------------------------|----------|-----------------------|-----------|-----------|
|                                                                             |                                       | Measured | Applied correction(s) |           | Corrected |
|                                                                             |                                       | Air      | Water                 |           |           |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                       | B - A2W30 |           |
| Load                                                                        |                                       |          |                       | 54        | %         |
| Compressor frequency                                                        |                                       |          |                       | 35        | Hz        |
| Defrosts ( Yes / No )                                                       |                                       |          |                       | No        |           |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                       | 0         |           |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                       | 2.01      | °C        |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                       | 1.00      | °C        |
| Inlet water temperature                                                     |                                       |          |                       | 24.97     | °C        |
| Outlet water temperature                                                    |                                       |          |                       | 29.84     | °C        |
| Water flow rate                                                             |                                       | 0.786    |                       | 0.786     | m3/h      |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 4.4260   | 0.0432                | 4.3828    | kW        |
| 6E-W tot                                                                    | Total Power - Unit 6                  | 0.9940   | 0.0604                | 0.9336    | kW        |
| COP-W6                                                                      | Coefficient of Performance            | 4.453    |                       | 4.695     | --        |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_C\_A7W27.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Low Temperature (35°C)**

**Condition : C - A7W27**

**Climate : Average**

**Load : 35 %**

**Flowrate : Variable**

**Compressor Frequency: 19 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 9/26/2024 9/30/2024  
Start time : 14.21 13.45  
Elapsed time : 5:54:30 1:10:23  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 20.3          | 20.2      | 20.5      | °C     |
| Patm  | Atmosferic pressure | 1008.2        | 1007.7    | 1008.5    | mbar   |

## Room

|        |                                           |       |       |       |    |
|--------|-------------------------------------------|-------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 7.00  | 6.91  | 7.07  | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 5.99  | 5.89  | 6.1   | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 86.80 | 86.3  | 87.4  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00 | 19.95 | 20.04 | °C |
|        |                                           |       |       |       |    |
| 6Taux1 | Temperature after evaporator Room 6       | 4.70  | 4.7   | 4.8   | °C |

## Hydronic circuit

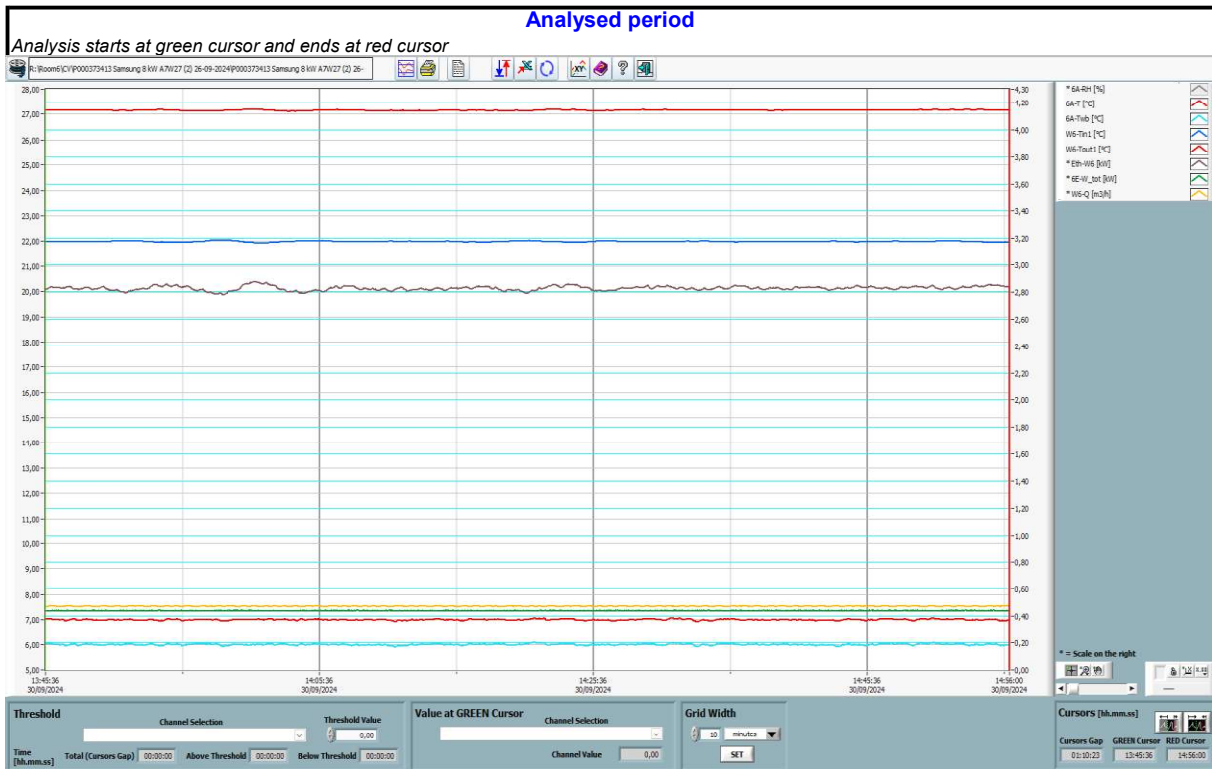
|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.473 | 0.471 | 0.476 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 5.16  | 5.08  | 5.24  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 21.98 | 21.93 | 22.05 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 27.15 | 27.11 | 27.19 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 84.78 | 82.75 | 86.83 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 2.827 | 2.777 | 2.877 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 229.8 | 230   | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 0.76  | 0.74  | 0.77  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.118 | 0.116 | 0.12  | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.679 | 0.672 | 0.688 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.3 | 229.1 | 229.3 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 1.16  | 1.14  | 1.17  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.206 | 0.204 | 0.209 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.779 | 0.775 | 0.783 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 229.7 | 229.9 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 0.74  | 0.73  | 0.75  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.117 | 0.115 | 0.118 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.683 | 0.674 | 0.692 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 229.6 | 229.7 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 0.88  | 0.88  | 0.89  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 0.441 | 0.438 | 0.444 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.724 | 0.721 | 0.727 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00013 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 84780   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 11.1    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.241   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 46.3    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 35.1    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                              |        |                   |
|-----------------------------------------------------------------------------|---------------------------------------|----------|------------------------------|--------|-------------------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air | Water  | Corrected         |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                              |        | <b>C - A7W27</b>  |
| Load                                                                        |                                       |          |                              |        | <b>35</b> %       |
| Compressor frequency                                                        |                                       |          |                              |        | <b>19</b> Hz      |
| Defrosts ( Yes / No )                                                       |                                       |          |                              |        | <b>No</b>         |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                              |        | <b>0</b>          |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | <b>7.00</b> °C    |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | <b>5.99</b> °C    |
| Inlet water temperature                                                     |                                       |          |                              |        | <b>21.98</b> °C   |
| Outlet water temperature                                                    |                                       |          |                              |        | <b>27.15</b> °C   |
| Water flow rate                                                             |                                       | 0.473    |                              |        | <b>0.473</b> m3/h |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 2.8270   |                              | 0.0351 | <b>2.7919</b> kW  |
| 6E-W_tot                                                                    | Total Power - Unit 6                  | 0.4410   |                              | 0.0463 | <b>0.3947</b> kW  |
| COP-W6                                                                      | Coefficient of Performance            | 6.410    |                              |        | <b>7.073</b> --   |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_D\_A12W24.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Low Temperature (35°C)**

**Condition : D - A12W24**

**Climate : Average**

**Load : 15 %**

**Flowrate : Variable**

**Compressor Frequency: 15 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/4/2024 10/5/2024  
Start time : 9.49 16.47  
Elapsed time : 70:20:18 1:10:07  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

measurement after iteration

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 18.6          | 18.6      | 18.6      | °C     |
| Patm  | Atmosferic pressure | 1015.2        | 1015      | 1015.4    | mbar   |

## Room

|        |                                           |       |       |       |    |
|--------|-------------------------------------------|-------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 12.00 | 11.96 | 12.03 | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 10.99 | 10.9  | 11.08 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 88.90 | 88.2  | 89.6  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00 | 19.97 | 20.03 | °C |
| 6Taux1 | Temperature after evaporator Room 6       | 9.90  | 9.8   | 10    | °C |

## Hydronic circuit

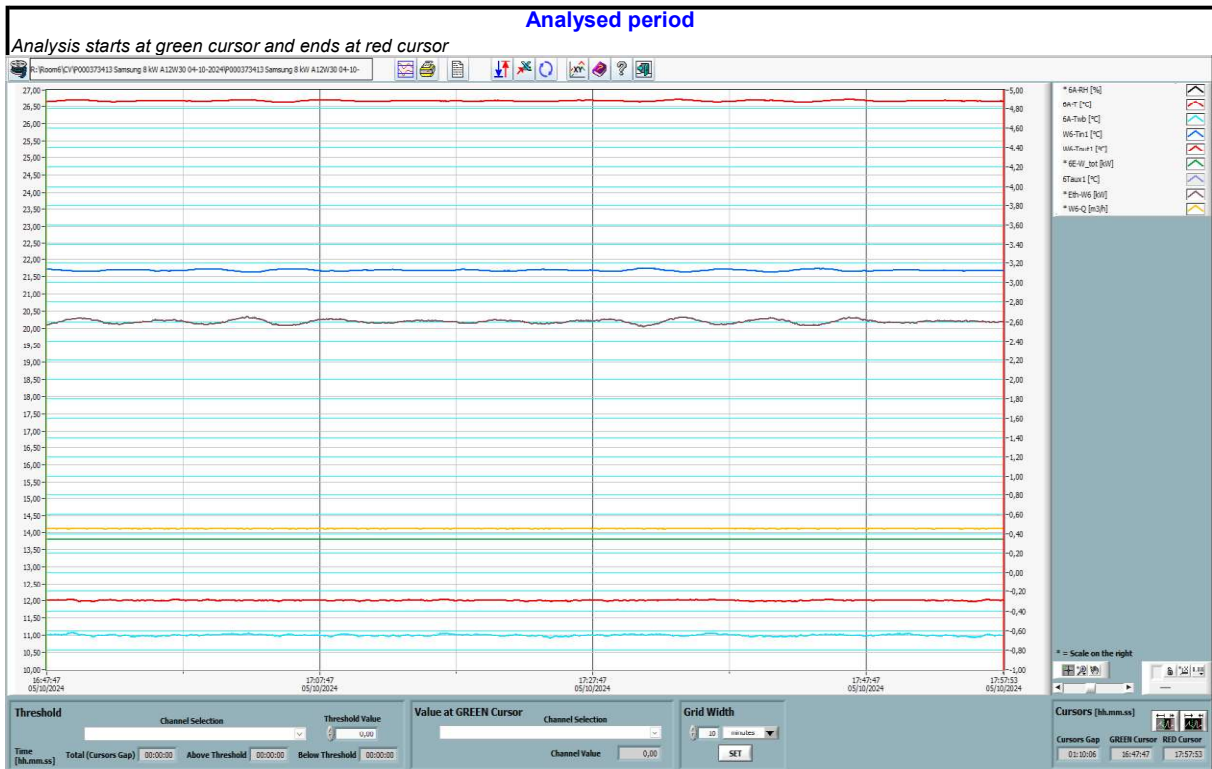
|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.449 | 0.448 | 0.45  | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 5     | 4.91  | 5.09  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 21.68 | 21.63 | 21.75 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 26.68 | 26.64 | 26.72 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 84.82 | 82.44 | 87.41 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 2.599 | 2.548 | 2.647 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 229.9 | 230   | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 0.63  | 0.62  | 0.64  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.088 | 0.087 | 0.089 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.607 | 0.599 | 0.615 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.3 | 229.2 | 229.4 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 0.99  | 0.98  | 1     | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.167 | 0.165 | 0.169 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.735 | 0.732 | 0.739 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 229.7 | 229.9 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 0.62  | 0.61  | 0.63  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.086 | 0.085 | 0.088 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.608 | 0.599 | 0.617 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 229.6 | 229.8 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 0.75  | 0.74  | 0.75  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 0.341 | 0.339 | 0.344 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.664 | 0.66  | 0.668 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00012 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 84820   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 10.6    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.236   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 44.9    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 34.3    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                              |        |                   |
|-----------------------------------------------------------------------------|---------------------------------------|----------|------------------------------|--------|-------------------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air | Water  | Corrected         |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                              |        | <b>D - A12W24</b> |
| Load                                                                        |                                       |          |                              |        | <b>15</b> %       |
| Compressor frequency                                                        |                                       |          |                              |        | <b>15</b> Hz      |
| Defrosts ( Yes / No )                                                       |                                       |          |                              |        | <b>No</b>         |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                              |        | <b>0</b>          |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | <b>12.00</b> °C   |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | <b>10.99</b> °C   |
| Inlet water temperature                                                     |                                       |          |                              |        | <b>21.68</b> °C   |
| Outlet water temperature                                                    |                                       |          |                              |        | <b>26.68</b> °C   |
| Water flow rate                                                             |                                       | 0.449    |                              |        | <b>0.449</b> m3/h |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 2.5990   |                              | 0.0343 | <b>2.5647</b> kW  |
| 6E-W tot                                                                    | Total Power - Unit 6                  | 0.3410   |                              | 0.0449 | <b>0.2961</b> kW  |
| COP-W6                                                                      | Coefficient of Performance            | 7.622    |                              |        | <b>8.661</b> --   |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_E (TOL)\_A-10W35.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Low Temperature (35°C)**

**Condition : E (TOL) - A-10W35**

**Climate : Average**

**Load : 100 %**

**Flowrate : Variable**

**Compressor Frequency: 95 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/7/2024 10/7/2024  
Start time : 8.11 13.37  
Elapsed time : 24:29:18 2:25:42  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description          | Average value | Min value | Max value | [unit] |
|-------|----------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory     | 21.2          | 20.8      | 21.5      | °C     |
| Patm  | Atmospheric pressure | 1001.1        | 1000.7    | 1001.3    | mbar   |

## Room

|        |                                           |        |        |       |    |
|--------|-------------------------------------------|--------|--------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | -9.98  | -10.75 | -8.11 | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | -10.99 | -12.05 | -8.58 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 67.00  | 54.3   | 93.1  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00  | 19.88  | 20.04 | °C |
| 6Taux1 | Temperature after evaporator Room 6       | -13.10 | -14.8  | 19.2  | °C |

## Hydronic circuit

|          |                                                  |       |        |       |      |
|----------|--------------------------------------------------|-------|--------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 1.386 | 1.378  | 1.393 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 4.65  | -6.23  | 5.48  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 29.99 | 29.87  | 30.09 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 34.64 | 23.74  | 35.39 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 57.31 | 55.4   | 59.31 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 7.439 | -9.991 | 8.764 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 227.2 | 232.7 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 4.39  | 0.33  | 5.23  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.934 | 0.026 | 1.124 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.919 | 0.349 | 0.94  |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.2 | 226.6 | 231.9 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 5.31  | 0.96  | 6.18  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 1.157 | 0.13  | 1.35  | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.946 | 0.591 | 0.96  |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 228.6 | 232.5 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 4.35  | 0.32  | 5.2   | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.924 | 0.025 | 1.119 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.917 | 0.333 | 0.94  |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 228.2 | 232.4 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 4.69  | 0.54  | 5.32  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 3.014 | 0.181 | 3.43  | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.929 | 0.49  | 0.939 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

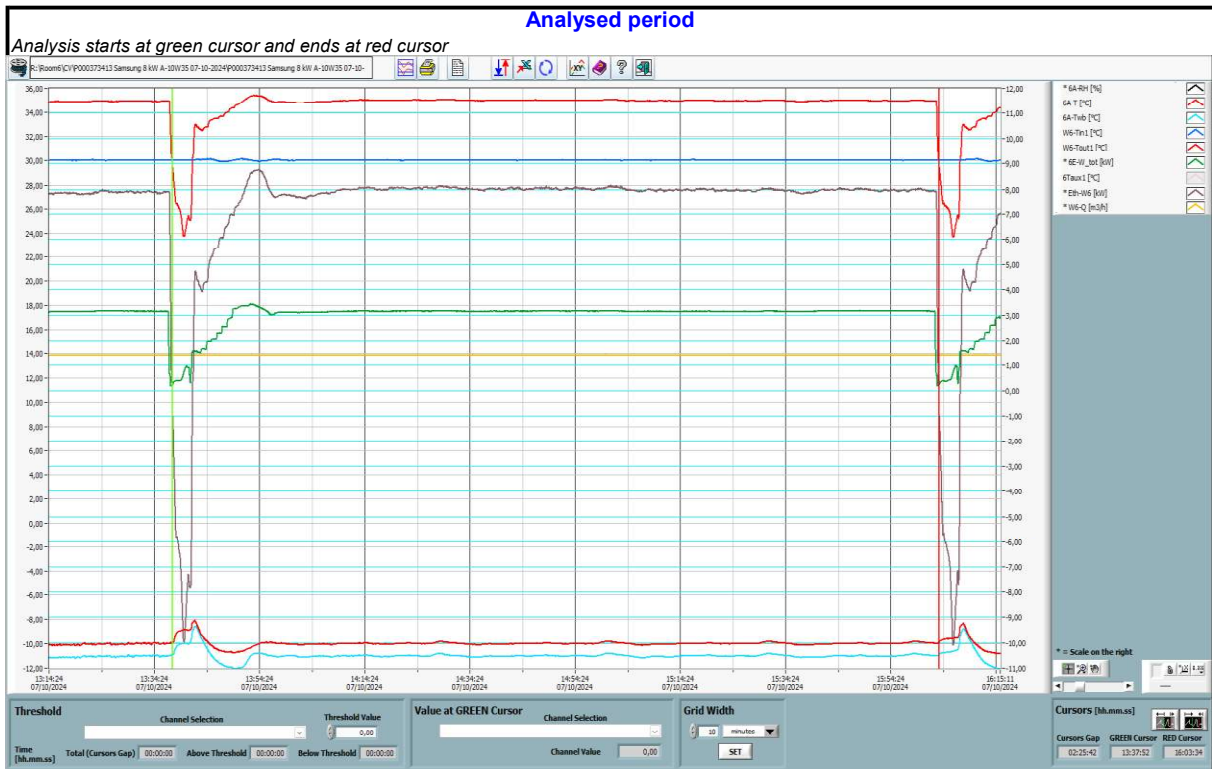
# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HLTA\_E (TOL)\_A-10W35.xlsx



| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00039 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 57310   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 22.1    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.309   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 71.4    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 49.3    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                              |        |                          |
|-----------------------------------------------------------------------------|---------------------------------------|----------|------------------------------|--------|--------------------------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air | Water  | Corrected                |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                              |        | <b>E (TOL) - A-10W35</b> |
| Load                                                                        |                                       |          |                              |        | <b>100</b> %             |
| Compressor frequency                                                        |                                       |          |                              |        | <b>95</b> Hz             |
| Defrosts ( Yes / No )                                                       |                                       |          |                              |        | <b>Yes</b>               |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                              |        | <b>1</b>                 |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | <b>-9.98</b> °C          |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | <b>-10.99</b> °C         |
| Inlet water temperature                                                     |                                       |          |                              |        | <b>29.99</b> °C          |
| Outlet water temperature                                                    |                                       |          |                              |        | <b>34.64</b> °C          |
| Water flow rate                                                             |                                       | 1.386    |                              |        | <b>1.386</b> m3/h        |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 7.4390   |                              | 0.0493 | <b>7.3897</b> kW         |
| 6E-W_tot                                                                    | Total Power - Unit 6                  | 3.0140   |                              | 0.0714 | <b>2.9426</b> kW         |
| COP-W6                                                                      | Coefficient of Performance            | 2.468    |                              |        | <b>2.511</b> --          |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HMTA\_AF (Tbiv)\_A-7W52.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Medium Temperature (55°C)**

**Condition : AF (Tbiv) - A-7W52**

**Climate : Average**

**Load : 88 %**

**Flowrate : Variable**

**Compressor Frequency: 95 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/7/2024 10/8/2024  
Start time : 8.11 18.33  
Elapsed time : 37:09:38 2:26:27  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 21.1          | 20.8      | 21.3      | °C     |
| Patm  | Atmosferic pressure | 996.5         | 996.2     | 996.6     | mbar   |

## Room

|        |                                           |       |       |       |    |
|--------|-------------------------------------------|-------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | -7.01 | -8.08 | -4.15 | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | -8.01 | -9.5  | -4.42 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 73.20 | 53.1  | 100.1 | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00 | 19.73 | 20.12 | °C |
|        |                                           |       |       |       |    |
| 6Taux1 | Temperature after evaporator Room 6       | -9.60 | -11.2 | 25.3  | °C |

## Hydronic circuit

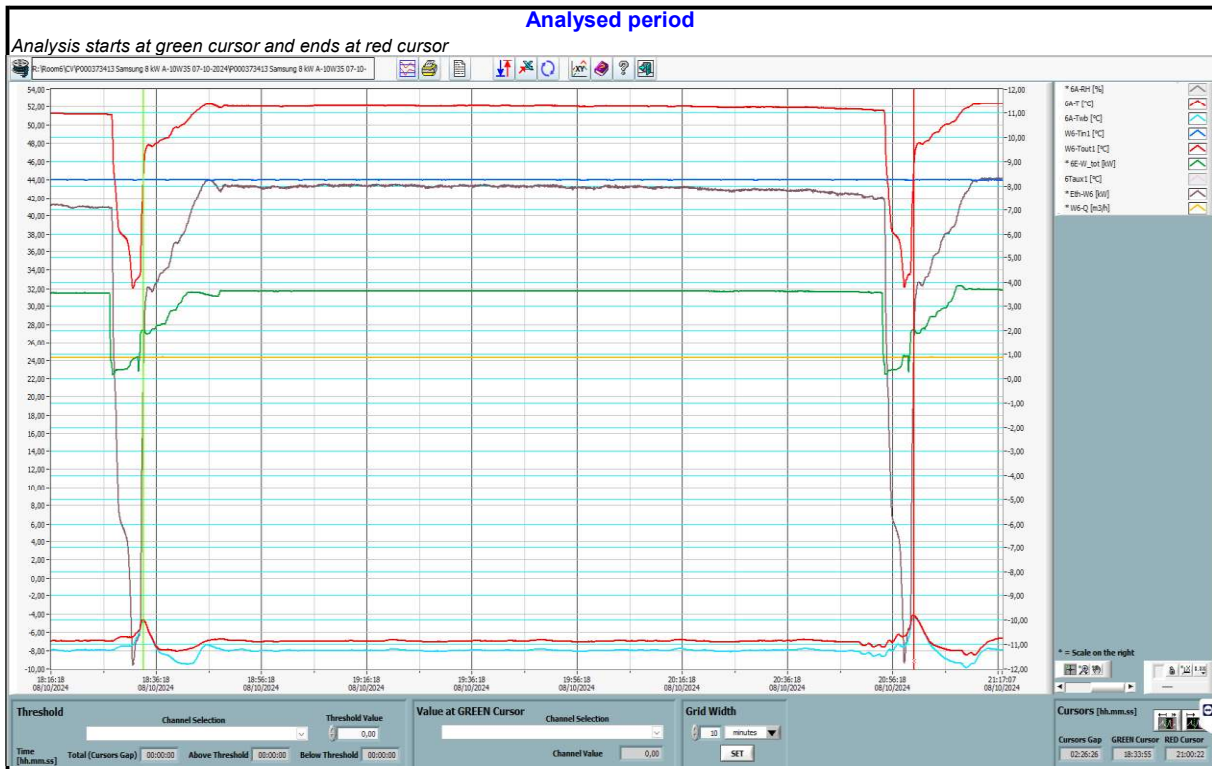
|          |                                                  |       |         |       |      |
|----------|--------------------------------------------------|-------|---------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.864 | 0.854   | 0.874 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 7.27  | -11.85  | 8.33  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 44    | 43.95   | 44.04 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 51.27 | 32.14   | 52.31 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 75.7  | 73.18   | 77.88 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 7.203 | -11.754 | 8.285 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 227.4 | 232.4 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 5.07  | 0.34  | 5.56  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 1.092 | 0.027 | 1.207 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.93  | 0.35  | 0.945 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.2 | 226.8 | 231.8 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 5.9   | 0.82  | 6.43  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 1.29  | 0.112 | 1.411 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.949 | 0.592 | 0.961 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.9 | 227   | 233.1 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 5.03  | 0.32  | 5.51  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 1.082 | 0.025 | 1.194 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.929 | 0.338 | 0.945 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 228   | 232.1 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 5.33  | 0.5   | 5.66  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 3.463 | 0.164 | 3.688 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.937 | 0.481 | 0.946 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00024 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 75700   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 18.2    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.290   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 62.6    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 44.4    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                       |        |                    |
|-----------------------------------------------------------------------------|---------------------------------------|----------|-----------------------|--------|--------------------|
|                                                                             |                                       | Measured | Applied correction(s) |        | Corrected          |
|                                                                             |                                       | Air      | Water                 |        |                    |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                       |        | AF (Tbiv) - A-7W52 |
| Load                                                                        |                                       |          |                       |        | 88 %               |
| Compressor frequency                                                        |                                       |          |                       |        | 95 Hz              |
| Defrosts ( Yes / No )                                                       |                                       |          |                       |        | Yes                |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                       |        | 1                  |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                       |        | -7.01 °C           |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                       |        | -8.01 °C           |
| Inlet water temperature                                                     |                                       |          |                       |        | 44.00 °C           |
| Outlet water temperature                                                    |                                       |          |                       |        | 51.27 °C           |
| Water flow rate                                                             |                                       | 0.864    |                       |        | 0.864 m3/h         |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 7.2030   |                       | 0.0444 | 7.1586 kW          |
| 6E-W tot                                                                    | Total Power - Unit 6                  | 3.4630   |                       | 0.0626 | 3.4004 kW          |
| COP-W6                                                                      | Coefficient of Performance            | 2.080    |                       |        | 2.105 --           |



# Test Results

1(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HMTA\_B\_A2W42.xlsx



**Kiwa Project Number : 1(P000373413)**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Medium Temperature (55°C)**

**Condition : B - A2W42**

**Climate : Average**

**Load : 54 %**

**Flowrate : Variable**

**Compressor Frequency: 36 Hz**

**Supply temperature: Variable**

|                    |                   |           |
|--------------------|-------------------|-----------|
|                    | Test              | Analysis  |
| Start date :       | 12/9/2024         | 12/9/2024 |
| Start time :       | 11.02             | 13.53     |
| Elapsed time :     | 4:00:38           | 1:10:01   |
| Operator :         | Sandra            |           |
| Software version : | PC6 version 8.6.0 |           |

**Internal Reference Number:**  
 IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

|                                                  |                                         |
|--------------------------------------------------|-----------------------------------------|
| <b>Manufacturer:</b> Samsung                     | <b>Refrigerant:</b> R-290               |
| <b>Model name:</b> AE080CXYDGK-EU+AE260CNWMEG-EU | <b>Refrigerant filling:</b> 0.87 [kg]   |
| <b>Model code IDU:</b> AE260CNWMEG-EU            | <b>Model code ODU:</b> AE080CXYDGK-EU   |
| <b>Serial no IDU:</b> 0YU4PAOWC00024E            | <b>Serial no ODU:</b> 0ZEFPAFX100091N   |
| <b>Kiwa Reference number IDU:</b> 10659          | <b>Kiwa Reference number ODU:</b> 10661 |

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 18.7          | 18.6      | 18.8      | °C     |
| Patm  | Atmosferic pressure | 1024.7        | 1024.5    | 1025.1    | mbar   |

## Room

|        |                                           |       |       |       |    |
|--------|-------------------------------------------|-------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 2.00  | 1.98  | 2.04  | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 1.01  | 0.97  | 1.04  | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 83.90 | 83.5  | 84.1  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.68 | 20.48 | 21.02 | °C |
|        |                                           |       |       |       |    |
| 6Taux1 | Temperature after evaporator Room 6       | 0.10  | 0.1   | 0.1   | °C |

## Hydronic circuit

|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.477 | 0.476 | 0.478 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 7.81  | 7.77  | 7.86  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 34.01 | 33.97 | 34.04 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 41.82 | 41.8  | 41.84 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 19.94 | 19.11 | 20.74 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 4.29  | 4.263 | 4.319 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 228   | 232.5 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 1.74  | 1.71  | 1.77  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.362 | 0.353 | 0.372 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.905 | 0.898 | 0.912 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.4 | 226.8 | 231.4 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 1.67  | 1.64  | 1.71  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.341 | 0.332 | 0.352 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.888 | 0.88  | 0.894 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 227.2 | 232.2 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 2.45  | 2.41  | 2.5   | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.489 | 0.475 | 0.502 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.867 | 0.861 | 0.871 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 228.3 | 231.2 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 1.96  | 1.94  | 1.97  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 1.193 | 1.179 | 1.207 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.884 | 0.882 | 0.887 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

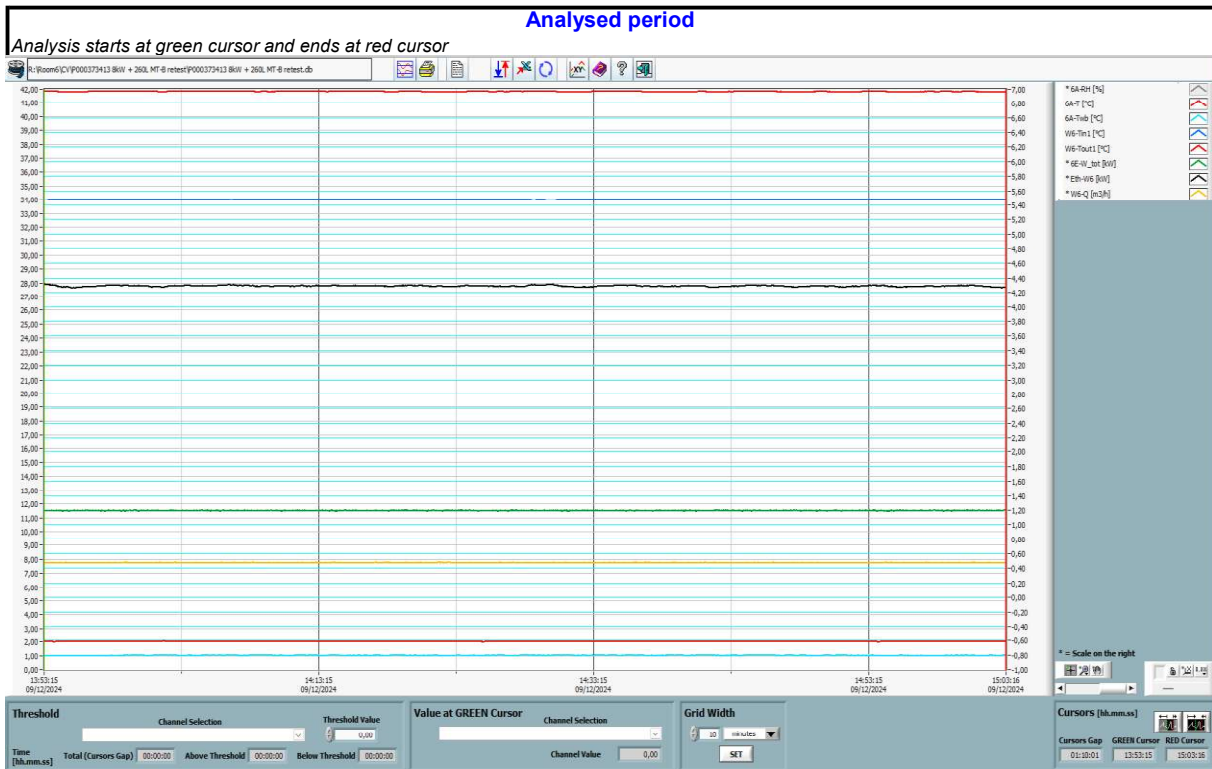
# Test Results

1(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HMTA\_B\_A2W42.xlsx



| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00013 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 19940   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 2.6     | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.146   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 18.1    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 15.4    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                       |        |                   |
|-----------------------------------------------------------------------------|---------------------------------------|----------|-----------------------|--------|-------------------|
|                                                                             |                                       | Measured | Applied correction(s) |        | Corrected         |
|                                                                             |                                       | Air      | Water                 |        |                   |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                       |        | <b>B - A2W42</b>  |
| Load                                                                        |                                       |          |                       |        | <b>54</b> %       |
| Compressor frequency                                                        |                                       |          |                       |        | <b>36</b> Hz      |
| Defrosts ( Yes / No )                                                       |                                       |          |                       |        | <b>No</b>         |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                       |        | <b>0</b>          |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                       |        | <b>2.00</b> °C    |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                       |        | <b>1.01</b> °C    |
| Inlet water temperature                                                     |                                       |          |                       |        | <b>34.01</b> °C   |
| Outlet water temperature                                                    |                                       |          |                       |        | <b>41.82</b> °C   |
| Water flow rate                                                             |                                       | 0.477    |                       |        | <b>0.477</b> m3/h |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 4.2900   |                       | 0.0154 | <b>4.2746</b> kW  |
| 6E-W_tot                                                                    | Total Power - Unit 6                  | 1.1930   |                       | 0.0181 | <b>1.1749</b> kW  |
| COP-W6                                                                      | Coefficient of Performance            | 3.596    |                       |        | <b>3.638</b> --   |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HMTA\_C\_A7W36.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Medium Temperature (55°C)**

**Condition : C - A7W36**

**Climate : Average**

**Load : 35 %**

**Flowrate : Variable**

**Compressor Frequency: 20 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/1/2024 10/1/2024  
Start time : 9.42 12.07  
Elapsed time : 3:35:38 1:10:06  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 19.6          | 19.5      | 19.7      | °C     |
| Patm  | Atmosferic pressure | 1003.5        | 1003.4    | 1003.7    | mbar   |

## Room

|        |                                           |       |       |       |    |
|--------|-------------------------------------------|-------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 7.00  | 6.93  | 7.05  | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 5.99  | 5.91  | 6.09  | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 86.90 | 86.4  | 87.5  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00 | 19.96 | 20.05 | °C |
|        |                                           |       |       |       |    |
| 6Taux1 | Temperature after evaporator Room 6       | 4.70  | 4.7   | 4.8   | °C |

## Hydronic circuit

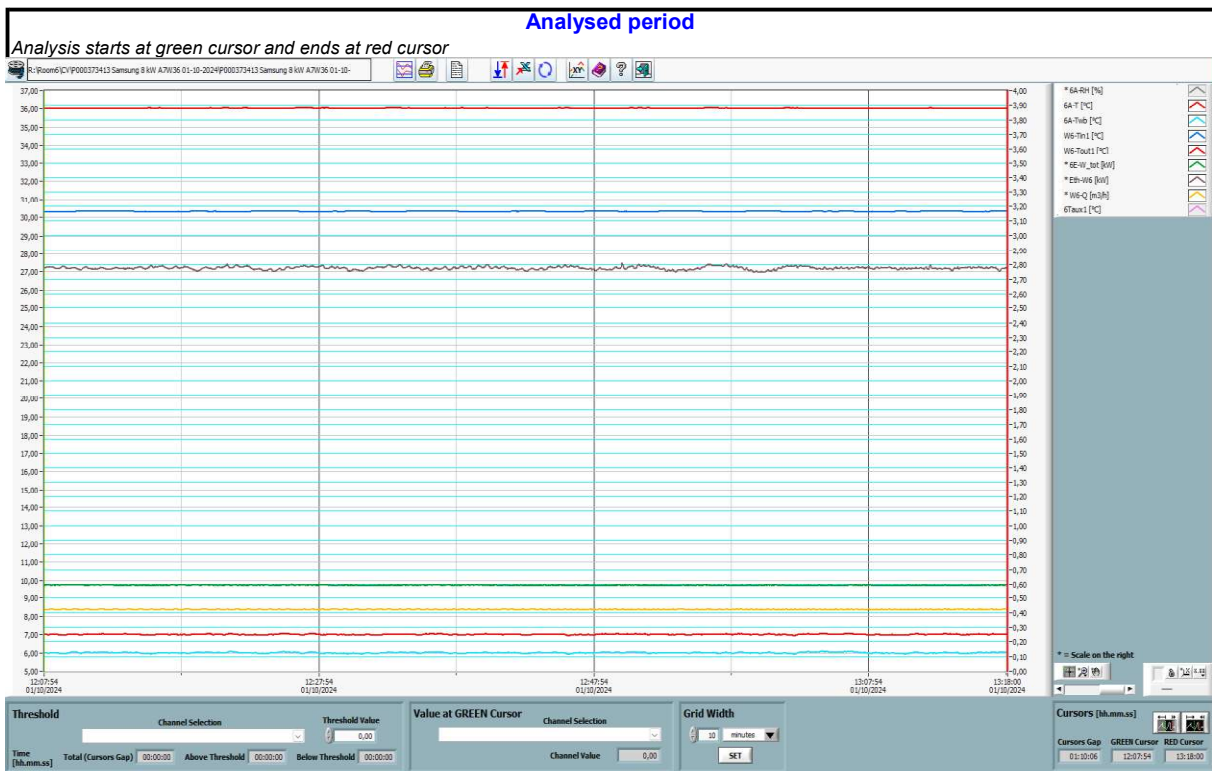
|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.42  | 0.417 | 0.424 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 5.73  | 5.67  | 5.77  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 30.3  | 30.26 | 30.33 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 36.03 | 36    | 36.05 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 85.22 | 82.32 | 87.58 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 2.775 | 2.745 | 2.809 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 229.7 | 230.3 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 0.97  | 0.96  | 0.98  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.17  | 0.168 | 0.173 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.762 | 0.756 | 0.768 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.3 | 227.4 | 231.4 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 1.34  | 1.32  | 1.35  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.255 | 0.252 | 0.259 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.83  | 0.827 | 0.835 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 229.6 | 230.1 | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 0.96  | 0.94  | 0.97  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.168 | 0.166 | 0.171 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.766 | 0.759 | 0.774 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 229.1 | 230.5 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 1.09  | 1.08  | 1.09  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 0.593 | 0.588 | 0.598 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.791 | 0.788 | 0.794 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00012 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 85220   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 9.9     | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.230   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 43.3    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 33.3    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                              |        |                   |
|-----------------------------------------------------------------------------|---------------------------------------|----------|------------------------------|--------|-------------------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air | Water  | Corrected         |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                              |        | <b>C - A7W36</b>  |
| Load                                                                        |                                       |          |                              |        | <b>35</b> %       |
| Compressor frequency                                                        |                                       |          |                              |        | <b>20</b> Hz      |
| Defrosts ( Yes / No )                                                       |                                       |          |                              |        | <b>No</b>         |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                              |        | <b>0</b>          |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | <b>7.00</b> °C    |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                              |        | <b>5.99</b> °C    |
| Inlet water temperature                                                     |                                       |          |                              |        | <b>30.30</b> °C   |
| Outlet water temperature                                                    |                                       |          |                              |        | <b>36.03</b> °C   |
| Water flow rate                                                             |                                       | 0.420    |                              |        | <b>0.420</b> m3/h |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 2.7750   |                              | 0.0333 | <b>2.7417</b> kW  |
| 6E-W_tot                                                                    | Total Power - Unit 6                  | 0.5930   |                              | 0.0433 | <b>0.5497</b> kW  |
| COP-W6                                                                      | Coefficient of Performance            | 4.680    |                              |        | <b>4.987</b> --   |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HMTA\_D\_A12W30.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Medium Temperature (55°C)**

**Condition : D - A12W30**

**Climate : Average**

**Load : 15 %**

**Flowrate : Variable**

**Compressor Frequency: 15 Hz**

**Supply temperature: Variable**

|                    |                   |           |
|--------------------|-------------------|-----------|
|                    | Test              | Analysis  |
| Start date :       | 10/4/2024         | 10/4/2024 |
| Start time :       | 9.49              | 11.29     |
| Elapsed time :     | 2:59:38           | 1:10:24   |
| Operator :         | Roy               |           |
| Software version : | PC6 version 8.6.0 |           |

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

|                                           |                                  |
|-------------------------------------------|----------------------------------|
| Manufacturer: Samsung                     | Refrigerant: R-290               |
| Model name: AE080CXYDGK-EU+AE260CNWMEG-EU | Refrigerant filling: 0.87 [kg]   |
| Model code IDU: AE260CNWMEG-EU            | Model code ODU: AE080CXYDGK-EU   |
| Serial no IDU: 0YU4PAOWC00024E            | Serial no ODU: 0ZEFPAFX100091N   |
| Kiwa Reference number IDU: 10659          | Kiwa Reference number ODU: 10661 |

## Notes

measurement after iteration

## Lab

| Name  | Description         | Average value | Min value | Max value | [unit] |
|-------|---------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory    | 19.1          | 18.9      | 19.4      | °C     |
| Patm  | Atmosferic pressure | 1020.9        | 1020.8    | 1021.1    | mbar   |

## Room

|        |                                           |       |       |       |    |
|--------|-------------------------------------------|-------|-------|-------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | 12.00 | 11.96 | 12.02 | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | 11.00 | 10.93 | 11.05 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 88.90 | 88.4  | 89.4  | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00 | 19.96 | 20.05 | °C |
|        |                                           |       |       |       |    |
| 6Taux1 | Temperature after evaporator Room 6       | 10.00 | 9.8   | 10.1  | °C |

## Hydronic circuit

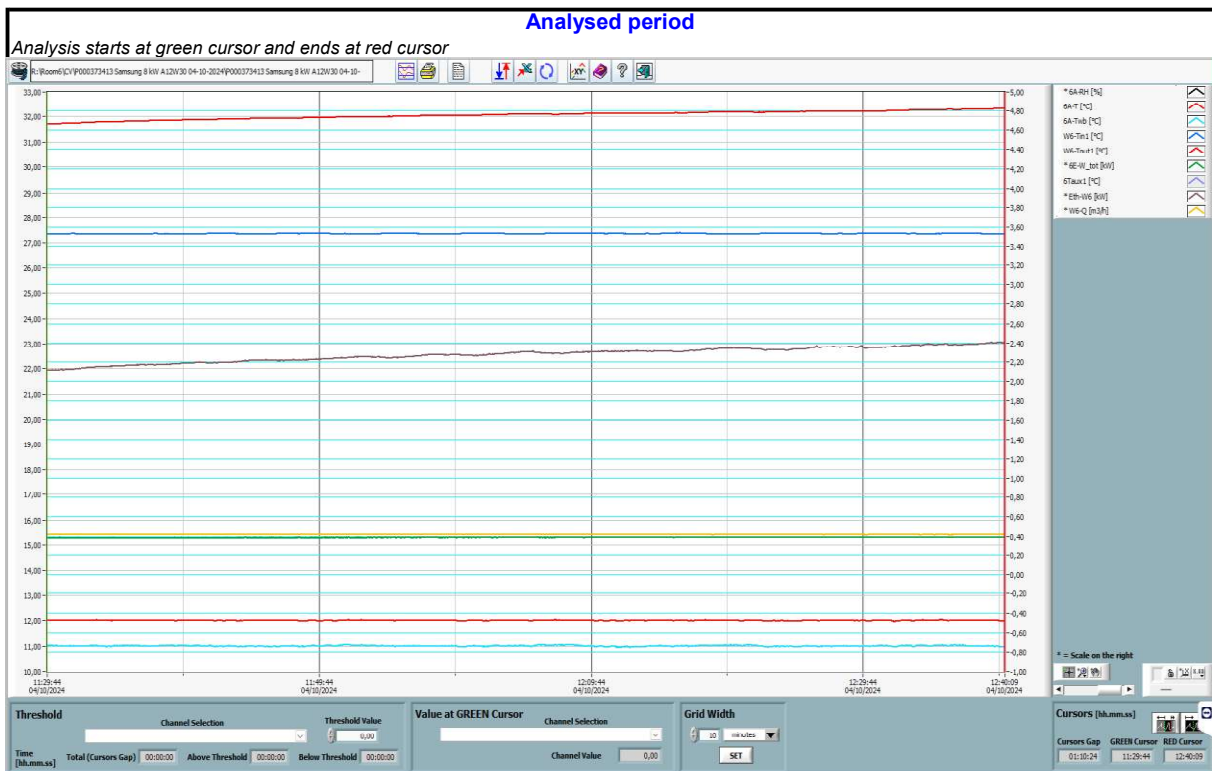
|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.42  | 0.418 | 0.424 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 4.69  | 4.35  | 4.96  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 27.36 | 27.34 | 27.39 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 32.05 | 31.69 | 32.32 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 85.56 | 83.08 | 87.75 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 2.275 | 2.11  | 2.409 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 229.8 | 230.2 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 0.71  | 0.69  | 0.72  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 0.105 | 0.103 | 0.108 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.647 | 0.638 | 0.655 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.3 | 229.2 | 229.5 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 1.04  | 1.03  | 1.06  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 0.182 | 0.18  | 0.185 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.762 | 0.757 | 0.766 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.8 | 229.7 | 230   | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 0.69  | 0.68  | 0.71  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 0.103 | 0.101 | 0.106 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.649 | 0.639 | 0.659 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 229.6 | 229.9 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 0.81  | 0.81  | 0.82  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 0.391 | 0.387 | 0.395 | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.697 | 0.692 | 0.702 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00012 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 85560   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 10.0    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.230   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 43.4    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 33.4    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                       |        |            |
|-----------------------------------------------------------------------------|---------------------------------------|----------|-----------------------|--------|------------|
|                                                                             |                                       | Measured | Applied correction(s) |        | Corrected  |
|                                                                             |                                       |          | Air                   | Water  |            |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                       |        | D - A12W30 |
| Load                                                                        |                                       |          |                       |        | 15 %       |
| Compressor frequency                                                        |                                       |          |                       |        | 15 Hz      |
| Defrosts ( Yes / No )                                                       |                                       |          |                       |        | No         |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                       |        | 0          |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                       |        | 12.00 °C   |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                       |        | 11.00 °C   |
| Inlet water temperature                                                     |                                       |          |                       |        | 27.36 °C   |
| Outlet water temperature                                                    |                                       |          |                       |        | 32.05 °C   |
| Water flow rate                                                             |                                       | 0.420    |                       |        | 0.420 m3/h |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 2.2750   |                       | 0.0334 | 2.2416 kW  |
| 6E-W_tot                                                                    | Total Power - Unit 6                  | 0.3910   |                       | 0.0434 | 0.3476 kW  |
| COP-W6                                                                      | Coefficient of Performance            | 5.818    |                       |        | 6.448 --   |



# Test Results

(P000373413)\_AE080CXYDGK-EU+AE260CNWMEG-EU\_HMTA\_E (TOL)\_A-10W55.xlsx



**Kiwa Project Number : P000373413**

**Test Room : 6**

**Test mode : Heating**

**Standard : EN 14825**

**Application: Medium Temperature (55°C)**

**Condition : E (TOL) - A-10W55**

**Climate : Average**

**Load : 100 %**

**Flowrate : Variable**

**Compressor Frequency: 95 Hz**

**Supply temperature: Variable**

Test Analysis  
Start date : 10/7/2024 10/8/2024  
Start time : 8.11 14.26  
Elapsed time : 32:20:38 1:10:46  
Operator : Roy  
Software version : PC6 version 8.6.0

Internal Reference Number:  
IRN 07, IRN 73, IRN 75, IRN 77, IRN 78

## Info about Device under Test

Manufacturer: Samsung Refrigerant: R-290  
Model name: AE080CXYDGK-EU+AE260CNWMEG-EU Refrigerant filling: 0.87 [kg]  
Model code IDU: AE260CNWMEG-EU Model code ODU: AE080CXYDGK-EU  
Serial no IDU: 0YU4PAOWC00024E Serial no ODU: 0ZEFPAFX100091N  
Kiwa Reference number IDU: 10659 Kiwa Reference number ODU: 10661

## Notes

## Lab

| Name  | Description          | Average value | Min value | Max value | [unit] |
|-------|----------------------|---------------|-----------|-----------|--------|
| T-lab | T air laboratory     | 21.4          | 21.3      | 21.5      | °C     |
| Patm  | Atmospheric pressure | 996.8         | 996.6     | 996.9     | mbar   |

## Room

|        |                                           |        |        |        |    |
|--------|-------------------------------------------|--------|--------|--------|----|
| 6A-T   | Room 6A dry bulb Temp. - Unit 6 (outdoor) | -10.00 | -10.15 | -9.82  | °C |
| 6A-Twb | Room 6A wet bulb temp. (calculated)       | -11.02 | -11.18 | -10.83 | °C |
| 6A-RH  | Room 6A relative humidity from VAISALA    | 66.70  | 65.3   | 68     | %  |
| 6B-T   | Room 6B dry bulb Temp. - Unit 6 (indoor)  | 20.00  | 19.99  | 20.02  | °C |
|        |                                           |        |        |        |    |
| 6Taux1 | Temperature after evaporator Room 6       | -12.60 | -12.8  | -12.4  | °C |

## Hydronic circuit

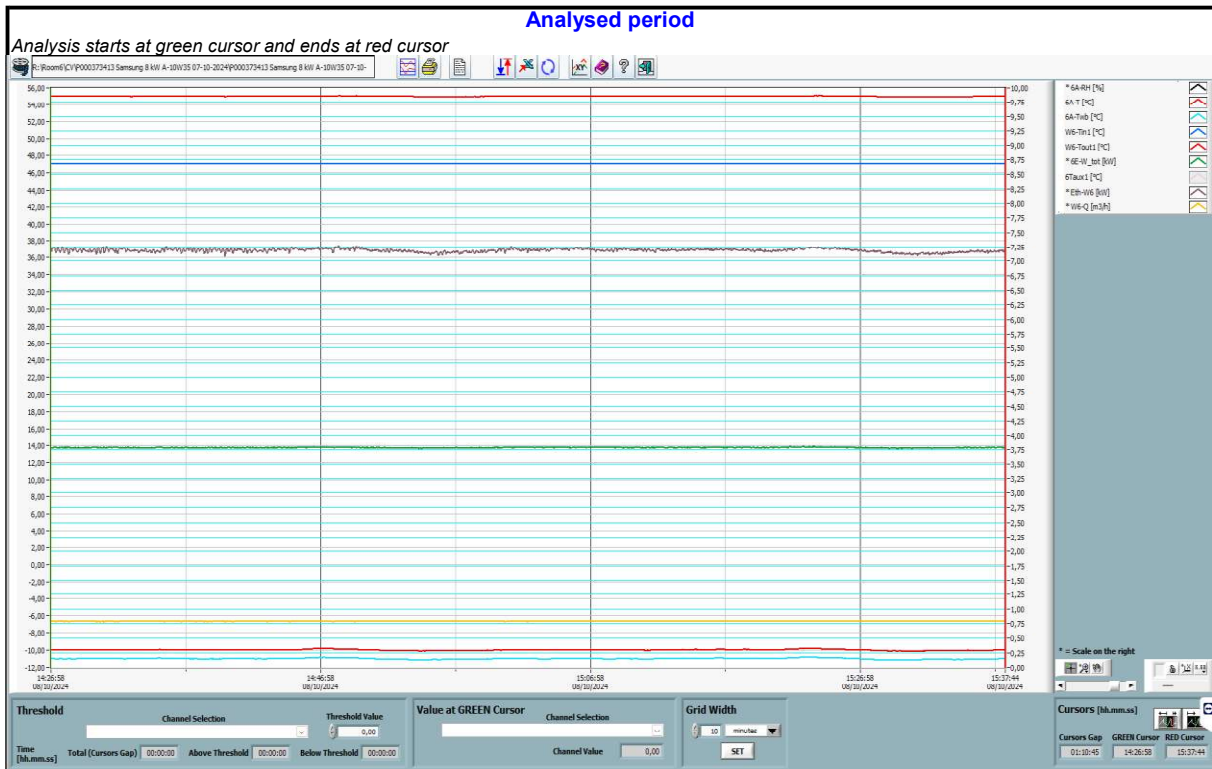
|          |                                                  |       |       |       |      |
|----------|--------------------------------------------------|-------|-------|-------|------|
| W6-Q     | Flowmeter Water Circuit 6                        | 0.785 | 0.775 | 0.791 | m3/h |
| W6-DT_s  | UUT delta T signed for defrost - Water Circuit 6 | 7.99  | 7.91  | 8.07  | °C   |
| W6-Tin1  | Water Circuit 6 - inlet temperature 1            | 46.99 | 46.96 | 47.01 | °C   |
| W6-Tout1 | Water Circuit 6 - outlet temperature 1           | 54.98 | 54.91 | 55.07 | °C   |
| W6-DP    | Water circuit 6 - Delta P                        | 77.88 | 75.66 | 79.89 | kPa  |
| Eth-W6   | UUT Exchanged Power - Water Circuit 6            | 7.182 | 7.071 | 7.274 | kW   |

## Electrical measures

|          |                                          |       |       |       |    |
|----------|------------------------------------------|-------|-------|-------|----|
| 6E-V1    | Voltage - phase 1 - Unit 6               | 230.0 | 229.9 | 230.2 | V  |
| 6E-A1    | Current - phase 1 - Unit 6               | 5.57  | 5.32  | 5.81  | A  |
| 6E-W1    | Power - phase 1 - Unit 6                 | 1.196 | 1.134 | 1.256 | kW |
| 6E-PF1   | Power Factor - phase 1 - Unit 6          | 0.934 | 0.925 | 0.942 |    |
| 6E-V2    | Voltage - phase 2 - Unit 6               | 229.2 | 229.1 | 229.4 | V  |
| 6E-A2    | Current - phase 2 - Unit 6               | 6.38  | 6.11  | 6.66  | A  |
| 6E-W2    | Power - phase 2 - Unit 6                 | 1.397 | 1.337 | 1.459 | kW |
| 6E-PF2   | Power Factor - phase 2 - Unit 6          | 0.956 | 0.95  | 0.961 |    |
| 6E-V3    | Voltage - phase 3 - Unit 6               | 229.9 | 229.8 | 230   | V  |
| 6E-A3    | Current - phase 3 - Unit 6               | 5.52  | 5.28  | 5.77  | A  |
| 6E-W3    | Power - phase 3 - Unit 6                 | 1.185 | 1.124 | 1.247 | kW |
| 6E-PF3   | Power Factor - phase 3 - Unit 6          | 0.933 | 0.923 | 0.942 |    |
| 6E-V_t   | Three-phase Mean Linked Voltage - Unit 6 | 229.7 | 229.6 | 229.9 | V  |
| 6E-A_t   | Three-phase Mean Current - Unit 6        | 5.82  | 5.79  | 5.86  | A  |
| 6E-W_tot | Total Power - Unit 6                     | 3.779 | 3.76  | 3.8   | kW |
| 6E-PF_t  | Three-phase Power Factor - Unit 6        | 0.942 | 0.939 | 0.944 |    |
| 6E-Freq  | Frequency - Unit 6                       | 50    | 50    | 50    | Hz |

| Corrections  |                                                                            |         |      |
|--------------|----------------------------------------------------------------------------|---------|------|
| Liquid       |                                                                            |         |      |
| q            | Liquid volume flow rate                                                    | 0.00022 | m3/s |
| $\Delta p$   | Measured internal/available external static pressure difference (Absolute) | 77880   | Pa   |
| $P_{hyd}$    | Hydraulic power of pump                                                    | 17.0    | W    |
| $\eta$       | Energy efficiency glandless circulator (14511-3:2022 F.3.1)                | 0.283   |      |
| $E_{pumpW6}$ | Electrical power correction for glandless circulator (EN 14511-3:2022)     | 59.9    | W    |
| $C_{pumpW6}$ | Capacity correction for glandless circulator (EN 14511-3:2022)             | 42.9    | W    |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |
|              |                                                                            |         |      |

| Result                                                                      |                                       |          |                                    |                   |      |
|-----------------------------------------------------------------------------|---------------------------------------|----------|------------------------------------|-------------------|------|
|                                                                             |                                       | Measured | Applied correction(s)<br>Air Water | Corrected         |      |
| EN14511 Standard rating / EN14825 Condition ( A-G )                         |                                       |          |                                    | E (TOL) - A-10W55 |      |
| Load                                                                        |                                       |          |                                    | 100               | %    |
| Compressor frequency                                                        |                                       |          |                                    | 95                | Hz   |
| Defrosts ( Yes / No )                                                       |                                       |          |                                    | No                |      |
| No. of defrosts in analysis (0 = stable analysis 70 min in case of defrost) |                                       |          |                                    | 0                 |      |
| Dry bulb air temperature (outdoor unit)                                     |                                       |          |                                    | -10.00            | °C   |
| Wet bulb air temperature (outdoor unit)                                     |                                       |          |                                    | -11.02            | °C   |
| Inlet water temperature                                                     |                                       |          |                                    | 46.99             | °C   |
| Outlet water temperature                                                    |                                       |          |                                    | 54.98             | °C   |
| Water flow rate                                                             |                                       | 0.785    |                                    | 0.785             | m3/h |
| Eth-W6                                                                      | UUT Exchanged Power - Water Circuit 6 | 7.1820   | 0.0429                             | 7.1391            | kW   |
| 6E-W tot                                                                    | Total Power - Unit 6                  | 3.7790   | 0.0599                             | 3.7191            | kW   |
| COP-W6                                                                      | Coefficient of Performance            | 1.901    |                                    | 1.920             | --   |



Calculation of energy efficiency - Average climate

| Product reference        |                            |
|--------------------------|----------------------------|
| Manufacturer             | Samsung                    |
| Product reference        | CXYDGK/EU + AE260CNWMEG/EU |
| Type of heat pump        | outdoor air-to-water       |
| Operating mode           | reversible                 |
| Temperature application  | 35 °C                      |
| Water flow               | variable                   |
| Water outlet temperature | variable                   |
| Capacity control         | variable                   |
| Backup heater            | electricity                |

| Reference conditions          |         |       |
|-------------------------------|---------|-------|
| Climate                       | average |       |
| Tdesignh                      | -10     | °C    |
| Prated                        | 8       | kW    |
| Tbiv                          | -7      | °C    |
| TOL                           | -10     | °C    |
| HHE                           | 2066    | hours |
| QH                            | 16528   | kWh   |
| Fossil fuel backup efficiency | -       | %     |

Calculate

Reset

| Energy Efficiency |      |       |           |
|-------------------|------|-------|-----------|
| SCOPon            | SCOP | ηs    | QHE (kWh) |
| 4.88              | 4.88 | 192.3 | 3385      |

| Performance data      |                  |                     |                |                                               |                        |               |       |      |        |
|-----------------------|------------------|---------------------|----------------|-----------------------------------------------|------------------------|---------------|-------|------|--------|
| Condition             | Outdoor air T °C | Part load ratio (%) | Part Load (kW) | Inlet / outlet water temperatures for testing | Declared Capacity (kW) | Declared COPd | Cdh   | CR   | COPbin |
| A                     | -7               | 88                  | 7.08           |                                               | 7.48                   | 2.79          | 0.900 | 1.00 | 2.79   |
| B                     | 2                | 54                  | 4.31           |                                               | 4.38                   | 4.70          | 0.900 | 1.00 | 4.70   |
| C                     | 7                | 35                  | 2.77           |                                               | 2.79                   | 7.07          | 0.900 | 1.00 | 7.07   |
| D                     | 12               | 15                  | 1.23           |                                               | 2.57                   | 8.66          | 0.900 | 0.48 | 7.81   |
| E(TOL) or E(Tdesignh) | -10              | 100                 | 8.00           |                                               | 7.39                   | 2.51          | 0.900 | 1.00 | 2.51   |
| F(Tbiv)               | -7               | 88                  | 7.08           |                                               | 7.48                   | 2.79          | 0.900 | 1.00 | 2.79   |

| Auxiliary power consumptions     |       |                 |             |                                      |       |                 |             |
|----------------------------------|-------|-----------------|-------------|--------------------------------------|-------|-----------------|-------------|
| Operating modes for heating only |       |                 |             | Operating modes for reversible units |       |                 |             |
|                                  | Hours | Power input (W) | P * h (kWh) |                                      | Hours | Power input (W) | P * h (kWh) |
| Thermostat off                   | 178   | 6               | 1           | Thermostat off                       | 178   | 6               | 1           |
| Stand by                         | 0     | 6               | 0           | Stand by                             | 0     | 6               | 0           |
| Off mode                         | 3672  | 6               | 22          | Off mode                             | 0     | 6               | 0           |
| Crackcase heater                 | 3850  | 0               | 0           | Crackcase heater                     | 178   | 0               | 0           |

| Bin calculation |     |                   |       |                 |                  |                                   |            |                |                       |                           |
|-----------------|-----|-------------------|-------|-----------------|------------------|-----------------------------------|------------|----------------|-----------------------|---------------------------|
| Condition       | Bin | Outdoor air temp. | Hours | Part load ratio | Heat demand (kW) | Hea load covered by the heat pump |            | Back up heater | Annual heating demand | Annual energy consumption |
|                 | j   | Tj                | hj    |                 | Ph(tj)           |                                   | COPbin(Tj) | elbu(Tj)       | hj * Ph(Tj)           |                           |
|                 | -   | °C                | -     |                 |                  |                                   |            |                |                       |                           |
| TOL             | 21  | -10               | 1     | 100.00          | 8.00             | 7.39                              | 2.51       | 0.61           | 8                     | 4                         |
|                 | 22  | -9                | 25    | 96.15           | 7.69             | 7.29                              | 2.60       | 0.41           | 192                   | 80                        |
|                 | 23  | -8                | 23    | 92.31           | 7.38             | 7.18                              | 2.70       | 0.20           | 170                   | 66                        |
| Tbiv            | 24  | -7                | 24    | 88.46           | 7.08             | 7.08                              | 2.79       | 0.00           | 170                   | 61                        |
|                 | 25  | -6                | 27    | 84.62           | 6.77             | 6.77                              | 3.00       | 0.00           | 183                   | 60.87                     |
|                 | 26  | -5                | 68    | 80.77           | 6.46             | 6.46                              | 3.21       | 0.00           | 439                   | 136.70                    |
|                 | 27  | -4                | 91    | 76.92           | 6.15             | 6.15                              | 3.43       | 0.00           | 560                   | 163.47                    |
|                 | 28  | -3                | 89    | 73.08           | 5.85             | 5.85                              | 3.64       | 0.00           | 520                   | 143.05                    |
|                 | 29  | -2                | 165   | 69.23           | 5.54             | 5.54                              | 3.85       | 0.00           | 914                   | 237.44                    |
|                 | 30  | -1                | 173   | 65.38           | 5.23             | 5.23                              | 4.06       | 0.00           | 905                   | 222.87                    |
|                 | 31  | 0                 | 240   | 61.54           | 4.92             | 4.92                              | 4.27       | 0.00           | 1182                  | 276.58                    |
|                 | 32  | 1                 | 280   | 57.69           | 4.62             | 4.62                              | 4.48       | 0.00           | 1292                  | 288.24                    |
| 2               | 33  | 2                 | 320   | 53.85           | 4.31             | 4.31                              | 4.70       | 0.00           | 1378                  | 294                       |
|                 | 34  | 3                 | 357   | 50.00           | 4.00             | 4.00                              | 5.17       | 0.00           | 1428.00               | 276.18                    |
|                 | 35  | 4                 | 356   | 46.15           | 3.69             | 3.69                              | 5.65       | 0.00           | 1314.46               | 232.80                    |
|                 | 36  | 5                 | 303   | 42.31           | 3.38             | 3.38                              | 6.12       | 0.00           | 1025.54               | 167.52                    |
|                 | 37  | 6                 | 330   | 38.46           | 3.08             | 3.08                              | 6.60       | 0.00           | 1015.38               | 153.91                    |
| 7               | 38  | 7                 | 326   | 34.62           | 2.77             | 2.77                              | 7.07       | 0.00           | 903                   | 128                       |
|                 | 39  | 8                 | 348   | 30.77           | 2.46             | 2.73                              | 7.22       | 0.00           | 857                   | 119                       |
|                 | 40  | 9                 | 335   | 26.92           | 2.15             | 2.69                              | 7.37       | 0.00           | 722                   | 98                        |
|                 | 41  | 10                | 315   | 23.08           | 1.85             | 2.65                              | 7.52       | 0.00           | 582                   | 77                        |
|                 | 42  | 11                | 215   | 19.23           | 1.54             | 2.61                              | 7.67       | 0.00           | 331                   | 43                        |
| 12              | 43  | 12                | 169   | 15.38           | 1.23             | 2.57                              | 7.81       | 0.00           | 208                   | 27                        |
|                 | 44  | 13                | 151   | 11.54           | 0.92             | 2.52                              | 7.96       | 0.00           | 139                   | 18                        |
|                 | 45  | 14                | 105   | 7.69            | 0.62             | 2.48                              | 8.11       | 0.00           | 65                    | 8                         |
|                 | 46  | 15                | 74    | 3.85            | 0.31             | 2.44                              | 8.26       | 0.00           | 23                    | 3                         |
|                 |     |                   |       | 4910            |                  |                                   |            |                | 16525                 | 3383                      |

Calculation of energy efficiency - Average climate

| Product reference        |                            |
|--------------------------|----------------------------|
| Manufacturer             | Samsung                    |
| Product reference        | CXYDGK/EU + AE260CNWMEG/EU |
| Type of heat pump        | outdoor air-to-water       |
| Operating mode           | reversible                 |
| Temperature application  | 55 °C                      |
| Water flow               | variable                   |
| Water outlet temperature | variable                   |
| Capacity control         | variable                   |
| Backup heater            | electricity                |

| Reference conditions          |         |       |
|-------------------------------|---------|-------|
| Climate                       | average |       |
| Tdesignh                      | -10     | °C    |
| Prated                        | 8       | kW    |
| Tbiv                          | -7      | °C    |
| TOL                           | -10     | °C    |
| HHE                           | 2066    | hours |
| QH                            | 16528   | kWh   |
| Fossil fuel backup efficiency | -       | %     |

Calculate

Reset

| Energy Efficiency |      |       |           |
|-------------------|------|-------|-----------|
| SCOPon            | SCOP | ηs    | QHE (kWh) |
| 3.68              | 3.68 | 144.4 | 4486      |

| Performance data      |                  |                     |                |                                               |                        |               |       |      |        |
|-----------------------|------------------|---------------------|----------------|-----------------------------------------------|------------------------|---------------|-------|------|--------|
| Condition             | Outdoor air T °C | Part load ratio (%) | Part Load (kW) | Inlet / outlet water temperatures for testing | Declared Capacity (kW) | Declared COPd | Cdh   | CR   | COPbin |
| A                     | -7               | 88                  | 7.08           |                                               | 7.16                   | 2.11          | 0.900 | 1.00 | 2.11   |
| B                     | 2                | 54                  | 4.31           |                                               | 4.28                   | 3.64          | 0.900 | 1.00 | 3.64   |
| C                     | 7                | 35                  | 2.77           |                                               | 2.74                   | 4.99          | 0.900 | 1.00 | 4.99   |
| D                     | 12               | 15                  | 1.23           |                                               | 2.24                   | 6.45          | 0.900 | 0.55 | 5.96   |
| E(TOL) or E(Tdesignh) | -10              | 100                 | 8.00           |                                               | 7.14                   | 1.92          | 0.900 | 1.00 | 1.92   |
| F(Tbiv)               | -7               | 88                  | 7.08           |                                               | 7.16                   | 2.11          | 0.900 | 1.00 | 2.11   |

| Auxiliary power consumptions     |       |                 |             |                                      |       |                 |             |
|----------------------------------|-------|-----------------|-------------|--------------------------------------|-------|-----------------|-------------|
| Operating modes for heating only |       |                 |             | Operating modes for reversible units |       |                 |             |
|                                  | Hours | Power input (W) | P * h (kWh) |                                      | Hours | Power input (W) | P * h (kWh) |
| Thermostat off                   | 178   | 6               | 1           | Thermostat off                       | 178   | 6               | 1           |
| Stand by                         | 0     | 6               | 0           | Stand by                             | 0     | 6               | 0           |
| Off mode                         | 3672  | 6               | 22          | Off mode                             | 0     | 6               | 0           |
| Crackcase heater                 | 3850  | 0               | 0           | Crackcase heater                     | 178   | 0               | 0           |

| Bin calculation |     |                   |       |                 |                  |                                   |            |                |                       |                           |
|-----------------|-----|-------------------|-------|-----------------|------------------|-----------------------------------|------------|----------------|-----------------------|---------------------------|
| Condition       | Bin | Outdoor air temp. | Hours | Part load ratio | Heat demand (kW) | Hea load covered by the heat pump |            | Back up heater | Annual heating demand | Annual energy consumption |
|                 | j   | Tj                | hj    |                 | Ph(tj)           |                                   | COPbin(Tj) | elbu(Tj)       | hj * Ph(Tj)           |                           |
|                 | -   | °C                | -     |                 |                  |                                   |            |                |                       |                           |
| TOL             | 21  | -10               | 1     | 100.00          | 8.00             | 7.14                              | 1.92       | 0.86           | 8                     | 5                         |
|                 | 22  | -9                | 25    | 96.15           | 7.69             | 7.12                              | 1.98       | 0.57           | 192                   | 104                       |
|                 | 23  | -8                | 23    | 92.31           | 7.38             | 7.10                              | 2.04       | 0.29           | 170                   | 86                        |
|                 | 24  | -7                | 24    | 88.46           | 7.08             | 7.08                              | 2.11       | 0.00           | 170                   | 81                        |
| 2               | 25  | -6                | 27    | 84.62           | 6.77             | 6.77                              | 2.28       | 0.00           | 183                   | 80.33                     |
|                 | 26  | -5                | 68    | 80.77           | 6.46             | 6.46                              | 2.45       | 0.00           | 439                   | 179.66                    |
|                 | 27  | -4                | 91    | 76.92           | 6.15             | 6.15                              | 2.62       | 0.00           | 560                   | 214.07                    |
|                 | 28  | -3                | 89    | 73.08           | 5.85             | 5.85                              | 2.79       | 0.00           | 520                   | 186.74                    |
|                 | 29  | -2                | 165   | 69.23           | 5.54             | 5.54                              | 2.96       | 0.00           | 914                   | 309.08                    |
|                 | 30  | -1                | 173   | 65.38           | 5.23             | 5.23                              | 3.13       | 0.00           | 905                   | 289.39                    |
|                 | 31  | 0                 | 240   | 61.54           | 4.92             | 4.92                              | 3.30       | 0.00           | 1182                  | 358.33                    |
|                 | 32  | 1                 | 280   | 57.69           | 4.62             | 4.62                              | 3.47       | 0.00           | 1292                  | 372.67                    |
|                 | 33  | 2                 | 320   | 53.85           | 4.31             | 4.31                              | 3.64       | 0.00           | 1378                  | 379                       |
|                 | 34  | 3                 | 357   | 50.00           | 4.00             | 4.00                              | 3.91       | 0.00           | 1428.00               | 365.42                    |
|                 | 35  | 4                 | 356   | 46.15           | 3.69             | 3.69                              | 4.18       | 0.00           | 1314.46               | 314.65                    |
|                 | 36  | 5                 | 303   | 42.31           | 3.38             | 3.38                              | 4.45       | 0.00           | 1025.54               | 230.59                    |
| 7               | 37  | 6                 | 330   | 38.46           | 3.08             | 3.08                              | 4.72       | 0.00           | 1015.38               | 215.25                    |
|                 | 38  | 7                 | 326   | 34.62           | 2.77             | 2.77                              | 4.99       | 0.00           | 903                   | 181                       |
|                 | 39  | 8                 | 348   | 30.77           | 2.46             | 2.66                              | 5.18       | 0.00           | 857                   | 165                       |
|                 | 40  | 9                 | 335   | 26.92           | 2.15             | 2.56                              | 5.38       | 0.00           | 722                   | 134                       |
| 12              | 41  | 10                | 315   | 23.08           | 1.85             | 2.45                              | 5.57       | 0.00           | 582                   | 104                       |
|                 | 42  | 11                | 215   | 19.23           | 1.54             | 2.35                              | 5.76       | 0.00           | 331                   | 57                        |
|                 | 43  | 12                | 169   | 15.38           | 1.23             | 2.24                              | 5.96       | 0.00           | 208                   | 35                        |
|                 | 44  | 13                | 151   | 11.54           | 0.92             | 2.14                              | 6.15       | 0.00           | 139                   | 23                        |
|                 | 45  | 14                | 105   | 7.69            | 0.62             | 2.03                              | 6.35       | 0.00           | 65                    | 10                        |
|                 | 46  | 15                | 74    | 3.85            | 0.31             | 1.93                              | 6.54       | 0.00           | 23                    | 3                         |
|                 |     |                   |       | 4910            |                  |                                   |            |                | 16525                 | 4485                      |

## Appendix 3 – Test Sheets

|                                 |                                                                  |                                                                                     |
|---------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 1/17                                                                             |

|                                                                                                                                                                                     |           |                     |                 |         |                 |                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------|-----------------|---------|-----------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>EN 14511-3 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process with electrically driven compressors - Part 3: Test methods</b> |           |                     |                 |         |                 | <b>Issue date :</b><br><b>December 2022</b>                                                                                 |
| Key to Test Sheets:                                                                                                                                                                 | YES = YES | NA = Not Applicable | NT = Not Tested | NO = NO | <b>Example:</b> | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>4</b>         | <b>Tests for determination of capacities</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>4.1</b>       | <b>Basic principles, methods</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>4.1.1</b>     | <b>Air-to-air and water(brine)-to-air units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>4.1.2</b>     | <b>Air-to-water(brine) and water(brine)-to-water(brine) units</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | The heating and/or cooling capacity of air-to-water(brine) and water(brine)-to-water(brine) units shall be determined in accordance with the liquid enthalpy test method at the liquid indoor heat exchanger (see Annex D).                                                                                                                                                                                                                                                                    | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                  |
|                  | The heat recovery capacity of air-to-water(brine) and water(brine)-to-water(brine) units shall be determined in accordance with the liquid enthalpy test method at the liquid heat recovery heat exchanger (see Annex D).                                                                                                                                                                                                                                                                      | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | NOTE Annex E (informative) provides additional information to Annex D regarding the test installation and measurements.                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | The measured heating capacity $\Phi_{thi}$ shall be corrected for the heat from the indoor liquid pump as specified in 4.1.3.4 to obtain the heating capacity PH.                                                                                                                                                                                                                                                                                                                              | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                  |
|                  | The measured cooling capacity $\Phi_{tci}$ shall be corrected for the heat from the indoor liquid pump as specified in 4.1.3.4 to obtain the cooling capacity PC.                                                                                                                                                                                                                                                                                                                              | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                  |
|                  | The measured heat recovery capacity $\Phi_{hr}$ shall be corrected for the heat from the heat recovery liquid pump as specified in 4.1.3.4 to obtain the heating recovery capacity PHR                                                                                                                                                                                                                                                                                                         | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>4.1.3</b>     | <b>Capacity Correction</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>4.1.3.1</b>   | <b>General</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | The capacity shall include the correction due to the heat output of indoor fans or pump, integrated into the unit or not as follows.                                                                                                                                                                                                                                                                                                                                                           | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                  |
| <b>4.1.3.2</b>   | <b>Capacity correction due to indoor fan for non-ducted units</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | In the case of units which are not designed for duct connection, i.e. which do not permit any external pressure difference, and which are equipped with an integral fan, no capacity correction due to heat provided by the fan shall apply.                                                                                                                                                                                                                                                   | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                  |
| <b>4.1.3.3</b>   | <b>Capacity correction due to indoor fan for ducted units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>4.1.3.3.1</b> | <b>Units with integrated indoor fan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | If the fan at the indoor heat exchanger is an integral part of the unit, the power input correction of the fan, as calculated with Formula (5) (see 4.1.4.3.1) shall be: <ul style="list-style-type: none"> <li>Subtracted from the measured heating capacity</li> <li>Added to the measured cooling capacity</li> </ul>                                                                                                                                                                       | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                   |
| <b>4.1.3.3.2</b> | <b>Units with non-integrated indoor fan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | If the fan at the indoor heat exchanger is not an integral part of the unit, the power input correction of the fan, as calculated with Formula (6) (see 4.1.4.3.2) shall be: <ul style="list-style-type: none"> <li>Added to the measured heating capacity</li> <li>Subtracted from the measured cooling capacity</li> </ul>                                                                                                                                                                   | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                   |
| <b>4.1.3.4</b>   | <b>Capacity correction due to indoor liquid pump</b>                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>4.1.3.4.1</b> | <b>Units with integrated liquid pump</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | If the liquid pump is an integral part of the unit, the power input correction of the fan, as defined in 4.1.3.4.3 or 4.1.3.4.4 shall be: <ul style="list-style-type: none"> <li>Subtracted from the measured heating capacity</li> <li>Added to the measured cooling capacity</li> <li>Subtracted from the measured heat recovery capacity</li> </ul> In case, the integrated liquid pump does not provide any available external static pressure difference, no capacity correction applies. | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br>Can't be tested<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.1.3.4.2</b> | <b>Units with non-integrated liquid pump</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | If the liquid pump is not an integral part of the unit, the power input correction of the fan, as defined in 4.1.3.4.5 shall be: <ul style="list-style-type: none"> <li>Added to the measured heating capacity</li> <li>Subtracted from the measured cooling capacity</li> <li>Added to the measured heat recovery capacity</li> </ul>                                                                                                                                                         | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br>Can't be tested                                                                                                                                |
| <b>4.1.3.4.3</b> | <b>Capacity correction for integrated glandless circulators</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | If the unit is equipped with a glandless circulator, the capacity correction is calculated using Formula (1):<br><br>$(q \times \Delta p_e) \times \left[ \frac{1-\eta}{\eta} \right]$                                                                                                                                                                                                                                                                                                         | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><div style="text-align: right;">(1)</div>                                                                                                                                                                                                                                     |

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| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 2/17                                                                             |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                             |
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|                  | <p>Where</p> <p><math>q</math> is the measured liquid flow rate, expressed in m<sup>3</sup>/s</p> <p><math>\Delta p_e</math> is the measured available external static pressure difference, expressed in Pa, as defined in EN 14511-1:2022, 3.3</p> <p><math>\eta</math> is the global efficiency of the pump calculated to Annex F</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                             |
| <b>4.1.3.4.4</b> | <b>Capacity correction for integrated dry motor pumps</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                             |
|                  | <p>If the unit is equipped with a dry motor pump, the capacity correction is calculated with Formula (2):</p> $(q \times \Delta p_e) \times \left[ \frac{IE - \eta}{\eta} \right] \quad (2)$ <p>Where</p> <p><math>q</math> is the measured liquid volume flow rate, expressed in m<sup>3</sup>/s</p> <p><math>\Delta p_e</math> is the measured available external static pressure difference, expressed in Pa, as defined in EN 14511-1:2022, 3.3</p> <p><math>IE</math> is the motor efficiency level as defined in the EC 2019/1781 regulation</p> <p><math>\eta</math> is the global efficiency of the pump calculated to Annex F</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.1.3.4.5</b> | <b>Capacity correction for non-integrated liquid pumps</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                             |
|                  | <p>If the measured hydraulic power according to Annex F is <math>\leq 300</math> W, the liquid pump is considered as a glandless circulator. The capacity correction, expressed in W, is calculated using Formula (3).</p> $(q \times (-\Delta p_i)) \times \left[ \frac{1 - \eta}{\eta} \right] \quad (3)$ <p>Where</p> <p><math>q</math> is the measured liquid flow rate, expressed in m<sup>3</sup>/s</p> <p><math>\Delta p_i</math> is the measured internal static pressure difference, expressed in Pa, as defined in EN 14511-1:2022, 3.30</p> <p><math>\eta</math> is the global efficiency of the pump calculated to Annex F</p> <p>If the measured hydraulic power according to Annex F is <math>&gt; 300</math> W, the liquid pump is considered as a dry-motor pump. The capacity correction, expressed in W, is calculated using Formula (4)</p> $(q \times (-\Delta p_i)) \times \left[ \frac{IE - \eta}{\eta} \right] \quad (4)$ <p>Where</p> <p><math>q</math> is the measured liquid flow rate, expressed in m<sup>3</sup>/s</p> <p><math>\Delta p_i</math> is the measured internal static pressure difference, expressed in Pa, as defined in EN 14511-1:2022, 3.30</p> <p><math>IE</math> is equal to 0,88 (average motor nominal efficiency specified in the EC 2019/1781 regulation for IE3 efficiency level)</p> <p><math>\eta</math> is the global efficiency of the pump calculated to Annex F</p> | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.1.4</b>     | <b>Effective power input</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                             |
| <b>4.1.4.1</b>   | <b>General</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                             |
|                  | The effective power input shall include the correction due to the power input of indoor and/or outdoor fans and/or pumps, integrated or not to the unit as indicated in 4.1.5.2 up to and including 4.1.5.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                             |
| <b>4.1.4.2</b>   | <b>Power input correction due to fans for non-ducted units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                             |
|                  | In the case of units which are not designed for duct connection, i.e. which do not permit any external pressure differences, and which are equipped with an integral fan, the power absorbed by the fan shall be included in the effective power absorbed by the unit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.1.4.3</b>   | <b>Power input correction due to fans for ducted units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                             |
| <b>4.1.4.3.1</b> | <b>Power input corrections for integrated fans</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                             |
|                  | <p>If a fan is an integral part of the unit, only a fraction of the power input of the fan motor shall be included in the effective power absorbed by the unit. The fraction that is to be excluded from the total power absorbed by the unit, expressed in W, shall be calculated using Formula (5):</p> $\frac{q \times \Delta p_{e(corr)}}{\eta} \quad (5)$ <p>Where</p> <p><math>\Delta p_{e(corr)}</math> is the available external static pressure difference, expressed in Pa, as defined in EN 14511-1:2022, 3.3 and set according to 4.4.1.3 (<math>\Delta p_{e,lab}</math>) or 4.4.1.4 (<math>\Delta p_{e,outdoor,lab}</math>)</p> <p><math>q</math> is the air volume flow rate, expressed in m<sup>3</sup>/s and set according to 4.4.1.3 (<math>q_{v,lab}</math>) or 4.4.1.4 (<math>q_{v,outdoor,lab}</math>)</p> <p><math>\eta</math> is equal to <math>\eta_{target}</math>; as declared by the fan manufacturer according to the ecodesign regulation n°327/2011 for fans driven by motors between 125 W and 500 kW; otherwise <math>\eta</math> is 0,3 by convention.</p>                                                                                                                                                                                                                                                                                                                                   | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.1.4.3.2</b> | <b>Power input corrections for non-integrated fans</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                             |
|                  | If no fan is provided with the unit, the proportional power input which is to be included in the effective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |

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| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 3/17                                                                             |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                       |
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|                  | <p>power absorbed by the unit, expressed in W, shall be calculated using the Formula (6):</p> $\frac{q \times (-\Delta p_i)}{\eta}$ <p>(6)</p> <p>Where</p> <p><math>\Delta p_i</math> is the measured internal static pressure difference, expressed in Pa, as defined in EN 14511-1:2022, 3.30</p> <p><math>q</math> is the nominal air flow rate in m<sup>3</sup>/s as set according to 4.4.1.3 or 4.4.1.4</p> <p><math>\eta</math> is 0,3 by convention</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                       |
| <b>4.1.4.4</b>   | <b>Power input correction due to liquid pumps</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                       |
| <b>4.1.4.4.1</b> | <b>Power input correction for integrated liquid pumps</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                       |
|                  | <p>When the liquid pump is integrated into the unit, it shall be connected for operation. When the liquid pump is delivered by the manufacturer apart from the unit, it shall be connected for operation according to the manufacturer's instructions and be then considered as an integral part of the unit.</p> <p>If a liquid pump is an integral part of the unit, only a fraction of the input to the pump motor shall be included in the effective power absorbed by the unit. The fraction which is to be excluded from the total power absorbed by the unit shall be calculated using Formula (7):</p> $\frac{q \times \Delta p_e}{\eta}$ <p>(7)</p> <p>Where:</p> <p><math>q</math> is the measured liquid flow rate, expressed in m<sup>3</sup>/s</p> <p><math>\Delta p_e</math> is the measured available external static pressure difference, expressed in Pa, as defined in EN 14511-1:2022, 3.3</p> <p><math>\eta</math> is the efficiency of the pump calculated according to Annex F</p> <p>In case the liquid pump is not able to provide any external static pressure difference, then this correction does not apply but the correction shall be made according to 4.1.4.4.2</p> | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| <b>4.1.4.4.2</b> | <b>Power input correction for non-integrated liquid pumps</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                       |
|                  | <p>If no liquid pump is provided with the unit, the proportional power input which is to be included in the total power absorbed by the unit shall be calculated using Formula (8):</p> $\frac{q \times (-\Delta p_i)}{\eta}$ <p>(8)</p> <p>Where:</p> <p><math>\Delta p_i</math> is the measured internal static pressure difference, expressed in Pa, as defined in EN 14511-1:2022, 3.30</p> <p><math>q</math> is the measured liquid flow rate, expressed in m<sup>3</sup>/s</p> <p><math>\eta</math> is the efficiency of the pump calculated according to Annex F</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                    |
| <b>4.1.5</b>     | <b>Units on a distribution network of pressurized water</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                       |
|                  | In the case of appliances designed especially to operate on a distributing network of pressurized water without water-pump, no correction shall be applied to the power input.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                           |
| <b>4.1.6</b>     | <b>Units for use with remote condenser</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                       |
|                  | The power from the auxiliary liquid pump of the remote condenser shall not be taken into account in the effective power input.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                           |
| <b>4.2</b>       | <b>Test apparatus</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                       |
| <b>4.2.1</b>     | <b>Arrangement of the test apparatus</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                       |
| <b>4.2.1.1</b>   | <b>General requirements</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                       |
|                  | The test apparatus shall be designed in such a way that all requirements on adjustment of set values, stability criteria and uncertainties of measurement according to this document can be fulfilled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                           |
| <b>4.2.1.2</b>   | <b>Test room for the air side</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                       |
|                  | <p>The size of the test room shall be selected such that any resistance to air flow at the air inlet and air outlet orifices of the test object is avoided. The air flow through the room shall not be capable of initiating any short circuit between these two orifices, and therefore the velocity of the air flows through the room at these two locations shall not exceed 1,5 m/s when the test object is switched off. The air velocity in the room shall also not be greater than the mean velocity through the unit inlet. Unless otherwise stated by the manufacturer, the air inlet or air outlet orifices shall be not less than 1 m distant from the surfaces of the test room.</p> <p>Any direct heat radiation by heating units in the test room onto the unit or onto the temperature measuring points shall be avoided.</p>                                                                                                                                                                                                                                                                                                                                                        | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| <b>4.2.1.3</b>   | <b>Appliances with duct connection</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                       |
|                  | Ducted air systems shall be sufficiently air tight to ensure that the measured results are not significantly influenced by exchange of air with the surroundings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                           |
|                  | If defrost controls on the heat pump provide means for stopping the indoor air flow, provision shall be made to stop the test apparatus air flow to the equipment on both the indoor and outdoor-sides during such a defrost period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                           |
| <b>4.2.1.4</b>   | <b>Appliances with integrated pumps</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                       |

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| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 4/17                                                                             |

|                |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                             |
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|                | For appliances with integrated and adjustable water or brine pumps, the pump speed shall be set at the same time as the temperature difference.                                                                                                                                                                                                                                                  | <input type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input checked="" type="checkbox"/> NO |
|                | In case of a liquid pump with several fixed speeds or with variable speed, the manufacturer shall provide information on the settings of the pump (speed or external static pressure to be achieved).                                                                                                                                                                                            | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | If defrost controls on the heat pump provide means for stopping the indoor water flow rate, provision shall be made to stop the test apparatus water flow rate to the equipment during such a defrost period.                                                                                                                                                                                    | Can't be tested                                                                                                             |
| <b>4.2.1.5</b> | <b>Liquid chilling package for use with remote condenser</b>                                                                                                                                                                                                                                                                                                                                     |                                                                                                                             |
|                | Units for use with remote condenser are tested by using a water(brine)-cooled condenser, the characteristics of which shall enable the intended operating conditions to be achieved.                                                                                                                                                                                                             | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.2.2</b>   | <b>Installation and connection of the test object</b>                                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |
| <b>4.2.2.1</b> | <b>General</b>                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                             |
|                | The test object shall be installed and connected for the test as recommended by the manufacturer in his installation and operation manual. The accessories provided by option are not included in the test.                                                                                                                                                                                      | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | If a back-up heater is provided in option or not, it shall be switched off or disconnected to be excluded from the testing.                                                                                                                                                                                                                                                                      | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | For single ducts, regardless of the manufacturer's instructions the discharge duct shall be as short and straight as possible compatibly with minimum distance between the unit and the wall for correct air inlet but not less than 0.5 m. No accessory shall be connected to the discharge end of the duct.                                                                                    | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | For double duct units, the same requirements apply to both suction and discharge ducts, unless the appliance is designed to be installed directly on the wall.                                                                                                                                                                                                                                   | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | For multisplit systems, the test shall be performed with the system operating at a capacity ratio of 1, or as close as possible.                                                                                                                                                                                                                                                                 | Can't be tested                                                                                                             |
|                | As an option, Annex K provides recommendations to determine the capacity of an individual indoor unit, either operating on its own with the other indoor units disconnected, or with all indoor units operating.                                                                                                                                                                                 | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | When performing measures in heating mode, set the highest room temperature on the unit/system control device; when performing measures in cooling mode, set the lowest room temperature on the unit/system control device. If in the instructions, the manufacturer indicates a value for the temperature set on the control device for a given rating condition, then this value shall be used. | <input type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input checked="" type="checkbox"/> NO |
|                | For unit with open-type compressor the electric motor shall be supplied or specified by the manufacturer. The compressor shall be operated at the rotational speed specified by the manufacturer.                                                                                                                                                                                                | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | For inverter type control units, the setting of the frequency shall be done for each rating condition. The manufacturer shall provide in the documentation information about how to obtain the necessary data to set the required frequencies.                                                                                                                                                   | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | If a skilled personnel with knowledge of control software is required for the start of the system, the manufacturer or the nominated agent should be in attendance when the system is being installed and prepared for tests.                                                                                                                                                                    | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.2.2.2</b> | <b>Installation of unit consisting of several parts</b>                                                                                                                                                                                                                                                                                                                                          |                                                                                                                             |
|                | In the case of a unit consisting of several parts, the following installation conditions shall be complied with for the test.                                                                                                                                                                                                                                                                    |                                                                                                                             |
|                | a) The refrigerant lines shall be installed in accordance with the manufacturer instructions with a minimum length of 5 m and a greater length to a maximum of 7,5 m if the constraints of the test installation make 5 m not possible.                                                                                                                                                          | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | b) The lines shall be installed so that the difference in elevation does not exceed 2,5 m.                                                                                                                                                                                                                                                                                                       | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | c) The thermal insulation of the lines shall be applied in accordance with the manufacturer's instructions.                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | d) Unless constrained by the design, at least half of the connecting lines shall be exposed to the outside conditions, with the rest of the lines exposed to the inside conditions.                                                                                                                                                                                                              | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
|                | For single split air-to-air units above 12 kW, if a length of refrigerant lines of 7,5 m cannot be achieved, a length of 11 m $\pm$ 0,5 m shall be used and a cooling correction factor of 1,02 and a heating correction factor of 1,01 shall be applied to the cooling and heating capacity respectively.                                                                                       | Can't be tested                                                                                                             |
|                | For multisplit air-to-air units above 12 kW, if a length of refrigerant lines of 7,5 m cannot be achieved, the total actual length from the outdoor unit to each indoor unit shall be as specified in Table 1. The cooling correction factor and heating correction factor as given in Table 1 shall apply to the cooling and heating capacity respectively.                                     | Can't be tested                                                                                                             |
|                | The maximum height difference can be extended to 3,5 m if the installation constraints make not possible to keep it below 2,5 m.                                                                                                                                                                                                                                                                 | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |

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| Version: 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 5/17                                                                            |

|                                    | The manufacturer shall provide a scheme of the combination to be installed, including indoor/outdoor units and all piping accessories. Piping layout shall be prepared in order to minimize pressure drop over the piping (e.g. minimize number of bends, maximize bending radius).<br>Furthermore, refrigerant lines between the outdoor unit and all indoor units shall have the same length.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| 4.2.2.3                            | Indoor units of multisplit systems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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|                                    | When testing a multisplit system in a calorimeter room, the air flow rate and the external static pressure shall be adjusted separately for each one of the ducted indoor units.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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|                                    | When testing a multisplit system using the air enthalpy method, the air flow rate and the external static pressure shall be adjusted separately for each indoor unit, ducted or not.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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|                                    | In case of equipment with non ducted indoor units tested using the air enthalpy method, the above requirement on ducted indoor units shall apply.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| 4.2.2.4                            | Measuring points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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|                                    | Temperature and pressure measuring points shall be arranged in order to obtain mean significant values.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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|                                    | For free air intake temperature measurements, it is required: <ul style="list-style-type: none"><li>– either to have at least one sensor per square meter, with not less than four measuring points and by restricting to 20 the number of sensors equally distributed on the free air surface;</li><li>– or to use a sampling device. It shall be completed by four sensors for checking uniformity if the surface area is greater than 1 m².</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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|                                    | Air dry bulb temperature sensors shall be placed at a distance between 0,15 m and 0,3 m from the free air surface, defined as the minimal enveloping surface containing the coil(s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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|                                    | For units with V-shape coils, Figure 1 shows the minimum enveloping surface to be considered as the free air surface for the position of the sensors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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|                                    | For free air supply dry bulb temperature measurements, a maximum distance of 0,1 m from the indoor unit is required in order to achieve a representative mean value in the cross section.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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|                                    | For control cabinet air conditioners, the inlet temperature at the evaporator is measured instead of the temperature inside the control cabinet.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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|                                    | For units consisting of a heat pump and a storage tank as a factory made unit, water inlet and outlet temperature measurements shall be taken at the inlet and outlet of the tank respectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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|                                    | For water and brine, the density shall be determined in the temperature conditions measured near the volume flow measuring device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| 4.3                                | Uncertainties of measurements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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|                                    | The uncertainties of measurement shall not exceed the values specified in Table 1.<br>All uncertainties are maximum expanded uncertainties with a 95 % confidence level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                    |      |                            |               |  |  |                          |   |          |                            |    |          |               |      |       |                              |  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|                                    | Table 2 – Uncertainties of measurement for indicated values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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|                                    | <table><tr><th>Measured quantity</th><th>Unit</th><th>Uncertainty of measurement</th></tr><tr><td><b>Liquid</b></td><td></td><td></td></tr><tr><td>- temperature difference</td><td>K</td><td>± 0,15 K</td></tr><tr><td>- temperature inlet/outlet</td><td>°C</td><td>± 0,15 K</td></tr><tr><td>- volume flow</td><td>m³/s</td><td>± 1 %</td></tr><tr><td>- static pressure difference</td><td>kPa</td><td>± 1 kPa (Δp≤20 kPa) or ± 5% (Δp&gt;20 kPa)</td></tr><tr><td><b>Air</b></td><td></td><td></td></tr><tr><td>- dry bulb temperature</td><td>°C</td><td>± 0,2 K</td></tr><tr><td>- wet bulb temperature</td><td>°C</td><td>± 0,4 K</td></tr><tr><td>- volume flow</td><td>m³/s</td><td>± 5 %</td></tr><tr><td>- static pressure difference</td><td>Pa</td><td>± 5 Pa (Δp≤100 Pa) or ± 5% (Δp&gt;100 Pa)</td></tr><tr><td><b>Refrigerant</b></td><td></td><td></td></tr><tr><td>- pressure at compressor outlet</td><td>kPa</td><td>± 1%</td></tr><tr><td>- temperature</td><td>°C</td><td>± 0,5 K</td></tr><tr><td><b>Concentration (in volume)</b></td><td></td><td></td></tr><tr><td>- heat transfer medium</td><td>%</td><td>± 2</td></tr><tr><td><b>Electrical quantities</b></td><td></td><td></td></tr><tr><td>- electric power</td><td>W</td><td>± 1%</td></tr><tr><td>- voltage</td><td>V</td><td>± 0,5%</td></tr><tr><td>- current</td><td>A</td><td>± 0,5%</td></tr><tr><td>- electrical energy</td><td>kWh</td><td>± 1%</td></tr><tr><td><b>Compressor rotational speed</b></td><td>min<sup>-1</sup></td><td>± 0.5%</td></tr></table> | Measured quantity                                                                                                                                                                                                                                              | Unit | Uncertainty of measurement | <b>Liquid</b> |  |  | - temperature difference | K | ± 0,15 K | - temperature inlet/outlet | °C | ± 0,15 K | - volume flow | m³/s | ± 1 % | - static pressure difference | kPa | ± 1 kPa (Δp≤20 kPa) or ± 5% (Δp>20 kPa) | <b>Air</b> |  |  | - dry bulb temperature | °C | ± 0,2 K | - wet bulb temperature | °C | ± 0,4 K | - volume flow | m³/s | ± 5 % | - static pressure difference | Pa | ± 5 Pa (Δp≤100 Pa) or ± 5% (Δp>100 Pa) | <b>Refrigerant</b> |  |  | - pressure at compressor outlet | kPa | ± 1% | - temperature | °C | ± 0,5 K | <b>Concentration (in volume)</b> |  |  | - heat transfer medium | % | ± 2 | <b>Electrical quantities</b> |  |  | - electric power | W | ± 1% | - voltage | V | ± 0,5% | - current | A | ± 0,5% | - electrical energy | kWh | ± 1% | <b>Compressor rotational speed</b> | min <sup>-1</sup> | ± 0.5% | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> 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| Measured quantity                  | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| <b>Liquid</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| - temperature difference           | K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| - temperature inlet/outlet         | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| - volume flow                      | m³/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| - static pressure difference       | kPa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| - wet bulb temperature             | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| - volume flow                      | m³/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| - static pressure difference       | Pa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| - pressure at compressor outlet    | kPa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| - temperature                      | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| - heat transfer medium             | %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| - electric power                   | W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| - voltage                          | V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| - current                          | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| - electrical energy                | kWh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| <b>Compressor rotational speed</b> | min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 6/17                                                                             |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <p>The heating or cooling capacities measured on the liquid side shall be determined within a maximum uncertainty of 5 %.</p> <p>The steady state heating or cooling capacities determined using the calorimeter method shall be determined with a maximum uncertainty of 5 %; this maximum uncertainty is extended to 10% for single duct units due to the air exchange between the two compartments of the calorimeter room.</p> <p>Heating capacity determined during transient operation (defrost cycles) using the calorimeter method shall be determined with a maximum uncertainty of 10 %.</p> <p>For air conditioners and heat pumps tested according to the air enthalpy method and having a capacity below or equal to 12 kW in cooling mode, or heating mode if the unit has no cooling function, under the standard rating conditions of EN 14511-2:2022, the following applies:<br/> — The steady-state heating and cooling capacity shall be determined with a maximum uncertainty of 5 %.<br/> — The transient heating capacity shall be determined with a maximum uncertainty of 10 %</p> <p>For air conditioners and heat pumps tested according to the air enthalpy method and having a capacity above 12 kW in cooling mode, or heating mode if the unit has no cooling function, under the standard rating conditions of EN 14511-2:2022, the heating and cooling capacity shall be determined with a maximum uncertainty of 10 %.</p> <p>Maximum uncertainties on heating and cooling capacities shall be fulfilled, independently of the individual uncertainties of measurements including the uncertainties on the properties of fluids.</p> |                                                                              | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>Can't be tested</p> <p>Can't be tested</p> <p>Can't be tested</p> <p>Can't be tested</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                                                           |
| <b>4.4</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Test procedure</b>                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>4.4.1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Settings</b>                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>4.4.1.1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>All units</b>                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Are the test conditions according to EN 14511-2?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                              | <input type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |
| If liquid heat transfer media other than water are used, the specific heat capacity and density of such heat transfer media shall be determined and taken into consideration for rating the unit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Liquid: <input type="text"/> Density: <input type="text"/> Heat capacity: <input type="text"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Table 5 and Table 6 state the permissible deviation of the measured values from the test conditions. Are the measured values within the permissible deviation?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                              | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>Table 5 – Permissible deviations from set values for steady-state-operation</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Measured quantity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Permissible deviation from the arithmetic mean values from set values</b> | <b>Permissible deviation from the individual measured values from set values</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Liquid</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| - Inlet temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± 0,2 K                                                                      | ± 0,5 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| - outlet temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ± 0,3 K                                                                      | ± 0,6 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| - volume flow                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ± 1 %                                                                        | ± 2,5 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| - static pressure difference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | --                                                                           | ± 10 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Air</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| - inlet temperature (dry bulb) <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ± 0,3 K                                                                      | ± 1 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| - inlet temperature (wet bulb) <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ± 0,4 K                                                                      | ± 1 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| - (dry bulb- wet bulb) temperature difference <sup>b</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± 0,3 K                                                                      | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| - volume flow                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ± 5 %                                                                        | ± 10 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| - static pressure difference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | --                                                                           | ± 10%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Refrigerant</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| - liquid temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ± 1 K                                                                        | ± 2 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| - saturated liquid/bubble point temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ± 0,5 K                                                                      | ± 1 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Voltage</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ± 4 %                                                                        | ± 4 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <sup>a</sup> For units with outdoor heat exchanger surfaces greater than 5 m <sup>2</sup> , the permissible deviation is doubled<br>When testing single duct units, the arithmetic mean value of the difference between the dry bulb temperature of the indoor compartment and of the air introduced from the outdoor compartment should have a maximum permissible deviation of 0,3 K. This requirement also applies to the wet bulb temperature difference.<br><sup>b</sup> This variation applies to the set temperature difference. If equal to 1K, the temperature difference is thus allowed to vary between 0,7 and 1,3 K.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |

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| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 7/17                                                                             |

| Table 6 – Permissible deviations from set values for transient operation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Readings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Permissible deviation of the arithmetical mean values from set values                                                                                                                                                                                                                                                                                                                                                                                                                      |                          | Permissible deviation of each individual measured values from set values |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Interval H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Interval D               | Interval H                                                               | Interval D          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Temperature of air entering indoor-side:<br>- dry bulb<br>- wet bulb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ± 0,6 K<br>--                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± 1,5 K<br>--            | ± 1,0 K<br>--                                                            | ± 2,5 K<br>--       | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Temperature of air entering outdoor-side:<br>- dry bulb <sup>a</sup><br>- wet bulb <sup>a</sup><br>- temperature difference (dry bulb – wet bulb) <sup>d</sup>                                                                                                                                                                                                                                                                                                                                                                                            | ± 0,6 K<br>± 0,4 K<br>± 0,6 K                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± 1,5 K<br>± 1,0 K<br>-- | ± 1,0 K<br>± 1,0 K<br>--                                                 | ± 5,0 K<br>--<br>-- | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Inlet water temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± 0,2 K <sup>c</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | --                       | ± 0,5 K <sup>c</sup>                                                     | <sup>b</sup>        | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Outlet water temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ± 0,5 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | --                       | --                                                                       | --                  | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <sup>a</sup> For units with outdoor heat exchanger surfaces greater than 5 m2, the allowed deviation is doubled.<br><sup>b</sup> The variation shall not exceed – 5,0 K and +2,0 K of the arithmetic mean value measured during the previous interval H.<br><sup>c</sup> Only applies to units tested with a fixed temperature difference between water inlet and outlet temperatures.<br><sup>d</sup> This variation applies to the set temperature difference. If equal to 1K, the temperature difference is thus allowed to vary between 0.4K and 1.6K |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.4.1.2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Non-ducted units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          |                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Adjustable settings such as louvers and fan speed shall be set for maximum steady-state air flow.                                                                                                                                                                                                                                                                                                                                                                                          |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | If the manufacturer indicates a fan speed different from the maximum one to set on the control device for a given rating condition, then this fan speed shall be used.                                                                                                                                                                                                                                                                                                                     |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>4.4.1.3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Units ducted on the indoor heat exchanger</b>                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Supply air flow rate shall be set with dry heat exchanger. Whenever possible only the fan shall be operating to guarantee dry coil conditions.                                                                                                                                                                                                                                                                                                                                             |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The air volume flow rate declared by the manufacturer for the cooling mode (or heating mode if no cooling mode of the unit) shall be related to standard air.                                                                                                                                                                                                                                                                                                                              |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | This air flow rate, $q_{v,declared}$ , shall be corrected for the actual atmospheric conditions at the laboratory location so that the air volume flow rate to be set by the test facility, $q_{v,lab}$ , is as given in Formula (9).                                                                                                                                                                                                                                                      |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $q_{v,lab} = \frac{p_{std}}{p_{lab}} q_{v,declared} \quad (9)$                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Where:<br>$q_{v,declared}$ is the air flow rate in standard air conditions as declared by the manufacturer, expressed in m3/h<br>$p_{std}$ is the density of standard air (20° C, 101 325 Pa), equal to 1,204 kg/m3<br>$p_{lab}$ is the density of air at the actual atmospheric conditions, expressed in kg/m3                                                                                                                                                                            |                          |                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Once the air volume flow rate $q_{v,lab}$ is set, the resulting external static pressure difference is measured as $\Delta p_{e,lab}$ .                                                                                                                                                                                                                                                                                                                                                    |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | This resulting $\Delta p_{e,lab}$ shall be converted to standard air using Formula (10) to obtain the external static pressure difference to be set as $\Delta p_{e,std}$ .                                                                                                                                                                                                                                                                                                                |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $\Delta p_{e,std} = \frac{p_{std}}{p_{lab}} \Delta p_{e,lab} \quad (10)$                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | where<br>$\Delta p_{e,lab}$ is the available external static pressure at the actual atmospheric conditions, expressed in Pa, as defined in EN 14511-1:2022, 3.58                                                                                                                                                                                                                                                                                                                           |                          |                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | If $\Delta p_{e,std}$ is lower than the minimum value given in Table 3 (or Table 4), the fan speed shall be adjusted to reach at least this minimum value, using the closest speed step of the fan that meets the minimum pressure requirement. If no fan speed is available, the air flow rate shall be decreased until reaching the minimum required $\Delta p_{e,std}$ .                                                                                                                |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | If $\Delta p_{e,std}$ is greater than twice the minimum value given in Table 3 (or Table 4), the fan speed shall be adjusted so the external static pressure is twice this minimum value or below, if the closest speed step of the fan doesn't allow to match exactly twice the minimum external static pressure value. If no lowest fan speed is available, the air flow rate shall be increased until reaching twice the minimum external static pressure value ( $\Delta p_{e,std}$ ). |                          |                                                                          |                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 8/17                                                                             |

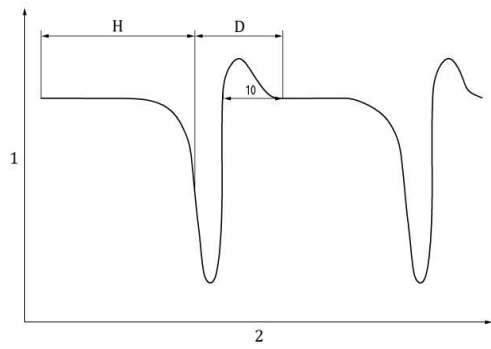
|                                 | <p>The apparatus used for setting the external static pressure difference shall be maintained with the same running settings for all tests on the same unit, once the standard airflow and standard external static pressure have been determined.</p> <p>This usually involves to fix a damper position and to control the fan speed inside the airflow measurement device to achieve 0 Pa pressure difference between the air loop section after the damper and the ambient.</p> <p>Figure 2 provides an example of a layout for setting the ESP with a damper.</p> <p>For ducted units to be tested using the air enthalpy method, the ESP shall be set at point 3 and the pressure at point 8 shall be equal to 0.</p> <p>For ducted units to be tested in a calorimeter room, the ESP shall be set at point 3 while the pressure at point 8 shall be equal to 0. The air flow measurement device can be disconnected after the damper once the air flowrate/ESP are set.</p> <p><i>Table 3 – Pressure requirement for comfort air conditioners and heat pumps</i></p> <table border="1" style="width: 100%;"> <thead> <tr> <th>Standard capacity ratings<br/>kW</th> <th>Minimum external static pressure difference (ESP<sub>min</sub>)<sup>a b</sup><br/>Pa</th> <th></th> </tr> </thead> <tbody> <tr><td>0&lt;Q&lt;8</td><td>25</td><td><input type="checkbox"/></td></tr> <tr><td>8≤Q&lt;12</td><td>37</td><td><input type="checkbox"/></td></tr> <tr><td>12≤Q&lt;20</td><td>50</td><td><input type="checkbox"/></td></tr> <tr><td>20≤Q&lt;30</td><td>62</td><td><input type="checkbox"/></td></tr> <tr><td>30≤Q&lt;45</td><td>75</td><td><input type="checkbox"/></td></tr> <tr><td>45≤Q&lt;82</td><td>100</td><td><input type="checkbox"/></td></tr> <tr><td>82≤Q&lt;117</td><td>125</td><td><input type="checkbox"/></td></tr> <tr><td>117≤Q&lt;147</td><td>150</td><td><input type="checkbox"/></td></tr> <tr><td>Q≥147</td><td>175</td><td><input type="checkbox"/></td></tr> </tbody> </table> <p><sup>a</sup> For equipment tested without an air filter installed, the minimum external static pressure shall be increased by 10 Pa.</p> <p><sup>b</sup> If the manufacturer's installation instructions state that the maximum allowable discharge duct length is less than 1 m, then the unit can be considered as a free delivery unit and be tested as a non-ducted indoor unit with an ESP of 0 Pa.</p> | Standard capacity ratings<br>kW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Minimum external static pressure difference (ESP <sub>min</sub> ) <sup>a b</sup><br>Pa |  | 0<Q<8 | 25 | <input type="checkbox"/> | 8≤Q<12 | 37 | <input type="checkbox"/> | 12≤Q<20 | 50 | <input type="checkbox"/> | 20≤Q<30 | 62 | <input type="checkbox"/> | 30≤Q<45 | 75 | <input type="checkbox"/> | 45≤Q<82 | 100 | <input type="checkbox"/> | 82≤Q<117 | 125 | <input type="checkbox"/> | 117≤Q<147 | 150 | <input type="checkbox"/> | Q≥147 | 175 | <input type="checkbox"/> | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br>Can't be tested<br><br>Can't be tested |
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| Standard capacity ratings<br>kW | Minimum external static pressure difference (ESP <sub>min</sub> ) <sup>a b</sup><br>Pa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| 0<Q<8                           | 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| 8≤Q<12                          | 37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| 12≤Q<20                         | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| 20≤Q<30                         | 62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| 30≤Q<45                         | 75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| 45≤Q<82                         | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| 82≤Q<117                        | 125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| 117≤Q<147                       | 150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| Q≥147                           | 175                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
| <b>4.4.1.4</b>                  | <b>Units ducted on the outdoor heat exchanger</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |
|                                 | <p>The air flow rate shall be set with dry heat exchanger. Whenever possible only the fan shall be operating to guarantee dry coil conditions.</p> <p>The air volume flow rate declared by the manufacturer shall be related to standard air.</p> <p>This air flow rate, <math>q_{v,outdoor,declared}</math>, shall be corrected for the actual atmospheric conditions at the laboratory location so that the air volume flow rate to be set by the test facility, <math>q_{v,outdoor,lab}</math>, is as given in Formula (11).</p> $q_{v,outdoor,lab} = \frac{p_{std}}{p_{lab}} q_{v,outdoor,declared} \quad (11)$ <p>where</p> <p><math>q_{v,outdoor,declared}</math> is the air flow rate in standard air conditions as declared by the manufacturer, expressed in m<sup>3</sup>/h</p> <p><math>p_{std}</math> is the density of standard air (20° C, 101 325 Pa), equal to 1,204 kg/m<sup>3</sup></p> <p><math>p_{lab}</math> is the density of air at the actual atmospheric conditions, expressed in kg/m<sup>3</sup></p> <p>Once the air volume flow rate <math>q_{v,outdoor,lab}</math> is set, the resulting external static pressure difference is measured as <math>\Delta p_{e,outdoor,lab}</math>.</p> <p>This resulting <math>\Delta p_{e,outdoor,lab}</math> shall be converted to standard air using Formula (12) to obtain the external static pressure difference to be set as <math>\Delta p_{e,outdoor,std}</math>.</p> $\Delta p_{e,outdoor,std} = \frac{p_{std}}{p_{lab}} \Delta p_{e,outdoor,lab} \quad (12)$ <p>Where</p> <p><math>\Delta p_{e,outdoor,lab}</math> is the available external static pressure at the actual atmospheric conditions, expressed in Pa, as defined in EN 14511-1:2022, 3.58</p> <p><math>p_{std}</math> is the density of standard air (20° C, 101 325 Pa), equal to 1,204 kg/m<sup>3</sup></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |                                                                                        |  |       |    |                          |        |    |                          |         |    |                          |         |    |                          |         |    |                          |         |     |                          |          |     |                          |           |     |                          |       |     |                          |                                                                                                                                                                                                                                                                                                              |

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|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                   |
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|                | <p><math>\rho_{lab}</math> is the density of air at the actual atmospheric conditions, expressed in kg/m<sup>3</sup></p> <p>If <math>\Delta p_{e,outdoor,std}</math> is lower than 30 Pa, the fan speed shall be adjusted to reach this minimum value. If no fan speed is available, the air flow rate shall be decreased.</p> <p>The apparatus used for setting the external static pressure difference shall be maintained in the same position during all the tests.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                    |
| <b>4.4.2</b>   | <b>Output measurement for water(brine)-to-water(brine) and water(brine)-to-air units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>4.4.2.1</b> | <b>Steady-state conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                | <p>These conditions are considered obtained and maintained when all the measured quantities remain constant without having to alter the set values, for a minimum duration of 30 min, with respect to the tolerances given in Table 5. Periodic fluctuations of measured quantities caused by the operation of regulation and control devices are permissible, on condition the mean value of such fluctuations does not exceed the permissible deviations listed in Table 5.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                       |
| <b>4.4.2.2</b> | <b>Measurement of heating capacity, cooling capacity and heat recovery capacity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                | <p>The data collection starts after the steady-state conditions have been achieved according to 4.4.2.1.</p> <p>For the output measurement it is necessary to record all the meaningful data continuously. In the case of recording instruments which operate on a cyclic basis, the sequence shall be adjusted such that a complete recording is effected at least once every 30 s.</p> <p>The output shall be measured in the steady state condition. The duration of measurement shall be not less than 35 min.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.4.3</b>   | <b>Output measurement for cooling capacity of air-to-water(brine) and air-to-air units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>4.4.3.1</b> | <b>Steady state conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                | <p>These conditions are considered obtained and maintained when all the measured quantities remain constant without having to alter the set values, for a minimum duration of 1 h, with respect to the tolerances given in Table 5.</p> <p>Periodic fluctuations of measured quantities caused by the operation of regulation and control devices are permissible, on condition the mean value of such fluctuations does not exceed the permissible deviations listed in Table 5.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                    |
| <b>4.4.3.2</b> | <b>Measurement of cooling capacity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                | <p>The data collection starts after the steady-state conditions have been achieved according to 4.4.3.1.</p> <p>For the output measurement it is necessary to record all the meaningful data continuously. In the case of recording instruments which operate on a cyclic basis, the sequence shall be adjusted such that a complete recording is effected at least once every 30 s.</p> <p>The output shall be measured in steady state condition. The duration of measurement shall be not less than 35 min.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.4.4</b>   | <b>Output measurement for heating capacity of air-to-air and of air-to-water units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>4.4.4.1</b> | <b>General</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                | <p>The test procedure shall identify whether the data collection will occur in steady-state operation of the unit or will integrate transient operation of the unit (due to defrost cycles that may occur depending on the operating conditions).</p> <p>A defrost cycle starts when the operation of the unit is modified to manage the defrost of the outdoor heat exchanger.</p> <p><i>NOTE 1 Here below some examples of modified operation which define the start of a defrost cycle:</i></p> <ul style="list-style-type: none"> <li>— The 4-way valve signal indicates a change of state;</li> <li>— The water temperature difference between inlet and outlet is smaller than 0,2 K;</li> <li>— One or several compressor(s) stop(s).</li> </ul> <p>A defrost cycle ends when the operation of the unit comes back to heating.</p> <p><i>NOTE 2 Here below some examples of modified operation which define the end of a defrost cycle:</i></p> <ul style="list-style-type: none"> <li>— The 4-way valve signal indicates a change of state;</li> <li>— The water temperature difference between inlet and outlet is larger than 0,2 K;</li> <li>— One or several compressor(s) start(s).</li> </ul> <p>In transient regime, an interval H is defined as a heating period with the exception of the first 10 min after defrost termination. An interval D consists of a defrost cycle plus the first 10 min of heating operation after the termination of the defrost cycle (see Figure 3).</p> |                                                                                                                                                                                                                                                                                                                                                                                                   |

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Key  
1 Water temperature, in °C  
2 Time, in min

Figure 3 – Example of defrost cycle with intervals H and D

During intervals H, data shall be sampled at equal intervals that span every 30 s or less.

During intervals D, data used in evaluating the integrated heating capacity and the integrated power input of the heat pump shall be sampled more frequently, at equal intervals that span every 10 s or less.

When using the indoor air enthalpy method, these more frequently sampled data include the change in indoor-side dry bulb temperature. When using the calorimeter method, these more frequently sampled data include all measurements required to determine the indoor side capacity.

For heat pumps that automatically switch off the indoor fan during a defrost, the contribution of the net heating delivered and/or the change in indoor-side dry bulb temperature shall be assigned the value of zero when the indoor fan is off, if using the indoor air enthalpy method. If using the calorimeter test method, the integration of capacity shall continue while the indoor fan is off.

The test procedure is applicable to both the air enthalpy and calorimeter room methods.

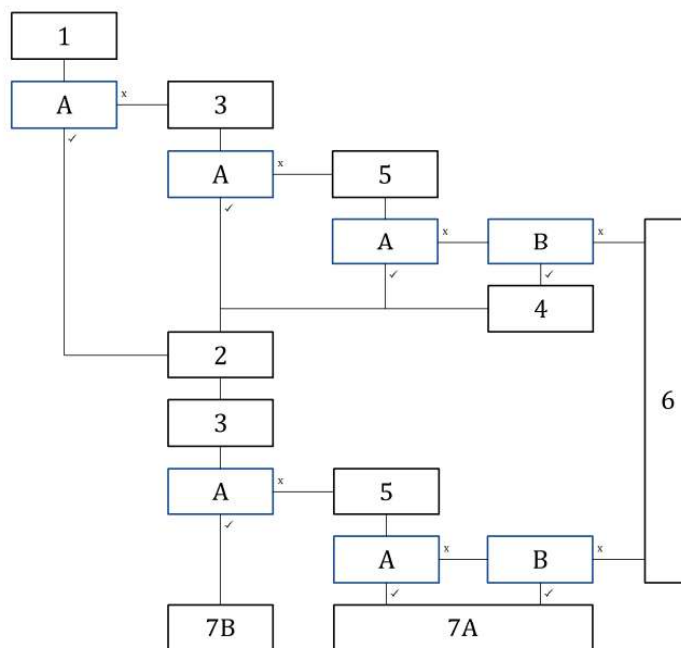
The test procedure is described in the following flowchart (see Figure 4). The steps of the flowchart shall immediately follow each other.

The different steps of the procedure are explained in the following subclauses.

For air-to-water units which are tested with a fixed temperature difference between inlet and outlet temperatures, the setting of the water flowrate shall be done as follows:

- The water flow rate is set during the preconditioning period (Step 1).
- When and if the unit undergoes the first defrost cycle at any step of the procedure, it shall be checked if the permissible deviations specified in Table 5 are fulfilled on a 5-min period starting 20 min after the end of this defrost cycle.
- If the above requirement is not fulfilled, the water flowrate shall be adapted and the whole procedure shall be restarted from Step 1 with this new water flowrate.

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**Key**

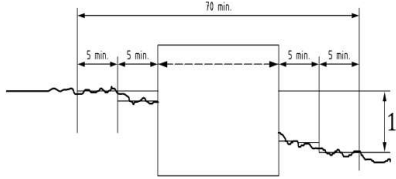
- |                                                |                                  |
|------------------------------------------------|----------------------------------|
| ✓ yes                                          | 3 Step 3: Equilibrium period     |
| ✗ no                                           | 4 Step 4: Defrost cycle          |
| A Did a defrost cycle occur?                   | 5 Step 5: Data collection        |
| B Did the quantity $\% \Delta T$ exceed 2,5 %? | 6 Step 6: Steady-state operation |
| 1 Step 1: Preconditioning                      | 7A Step 7A: Transient operation  |
| 2 Step 2: End of defrost cycle                 | 7B Step 7B: Transient operation  |

Figure 4 - Flowchart of steps procedure

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                            |
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| <b>4.4.4.2</b> | <b>Step 1: Preconditioning period</b><br>The test room reconditioning apparatus and the heat pump under test shall start and operate until the test tolerances specified in Table 5 are attained for at least 10 min.<br><br>It is recommended that the preconditioning ends with an automatic or manually induced defrost cycle.<br><br>Question A: Did a defrost cycle occur?<br>— If Step 1 ends with a defrost cycle, then go to Step 2.<br>— If Step 1 does not end with a defrost cycle, go to Step 3                                                                                                                                                                             | ■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>4.4.4.3</b> | <b>Step 2: End of defrost cycle</b><br>As the previous Step terminates with a defrost cycle, wait 10 min after this defrost cycle before continuing with Step 3.<br><br>Defrost cycle of the previous step and these 10 min constitute an interval D for which permissible deviations specified in Table 6 apply.                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                            |
| <b>4.4.4.4</b> | <b>Step 3: Equilibrium period</b><br>During an equilibrium period of 60 min, the heat pump shall operate while meeting the permissible deviations specified in Table 5. If a defrost occurs during this period, the permissible deviations specified in Table 6 apply.<br><br>Question A: Did a defrost cycle occur?<br>— If Step 3 ends with a defrost cycle, then go to next Step, either Step 2 or Step 7B.<br>— If Step 3 does not end with a defrost cycle, go to Step 5.<br><br><i>NOTE If a defrost occurs before the end of Step 3, it is not necessary to wait for the complete duration of this step. The test can continue directly with the next step of the flowchart.</i> | ■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                  |
| <b>4.4.4.5</b> | <b>Step 4: Defrost cycle</b><br>As the previous Step does not terminate with a defrost cycle, wait for a defrost cycle before continuing with Step 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                  |

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| <b>4.4.4.6</b>   | <p><b>Step 5: Data collection period</b></p> <p>Data shall be collected for a duration of 70 min.</p> <p>The difference between the leaving and entering temperatures of the heat transfer medium at the indoor heat exchanger shall be measured during this Step 5 of data collection. For each interval of 5 min during the data collection period, an average temperature difference shall be calculated, <math>\Delta T_i(t)</math>. The average temperature difference for the first 5 min of the data collection period, <math>\Delta T_i(t=0)</math>, shall be saved for the purpose of calculating the percent change:</p> $\% \Delta T = \left[ \frac{\Delta T_i(t=0) - \Delta T_i(t)}{\Delta T_i(t=0)} \right] \quad (13)$ <p>The following Figure 5 illustrates the temperature decrease during Step 5 and the calculation of <math>\% \Delta T</math>.</p> <p><i>Figure 2 – Data collection</i></p>  <p><b>Key</b><br/>1 <math>\% \Delta T</math></p> <p>Question A: Did a defrost cycle occur?<br/> — If Step 5 does not terminate with a defrost cycle, check Question B.<br/> — If Step 5 does terminate with a defrost cycle, go to next Step, either Step 2 or Step 7A.</p> <p><i>NOTE If a defrost occurs before the end of Step 5, it is not necessary to wait for the complete duration of this step. The test can continue directly with the next step of the flowchart.</i></p> <p>Question B: Did the quantity <math>\% \Delta T</math> exceed 2,5 %?<br/> — If the quantity <math>\% \Delta T</math> did not exceed 2,5 %, then go to Step 6.<br/> — If the quantity <math>\% \Delta T</math> did exceed 2,5 %, then go to next step, either Step 4 or Step 7A.</p> | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>Can't be tested<br/>Can't be tested</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| <b>4.4.4.7</b>   | <p><b>Step 6: Steady-state operation</b></p> <p>The test is considered to be steady state and shall be terminated after the data collection (Step 5) during which permissible deviations specified in Table 5 were fulfilled.</p> <p>Periodic fluctuations of measured quantities caused by the operation of regulation and control devices are permissible on condition the mean value of such fluctuations does not exceed the permissible deviations listed in Table 5.</p> <p>Data from the 70 min of the data collection is used for calculating the heating capacity of the unit (see 4.5.3)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                                                                                                                                                                                                  |
| <b>4.4.4.8</b>   | <b>Step 7: Transient operation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>4.4.4.8.1</b> | <b>General</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                  | <p>The test is considered to be a transient test and defrost cycles might occur.</p> <p>As noted in Table 6, the test tolerances are specified for the two sub-intervals H and D</p> <p>All data collected during each interval H, or D, shall be used to evaluate compliance with the Table 6 permissible deviations. Data from two or more H intervals and two or more D intervals shall not be combined and then used in evaluating Table 6 compliance. Compliance is based on evaluating data from each interval separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                            |
| <b>4.4.4.8.2</b> | <b>Step 7A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                  | <p>The data collection, including the duration of previous Step 5, is extended until 3 h have elapsed or until the heat pump completes three complete cycles during the period, whichever occurs first. In Step 7A, the permissible deviations specified in Table 6 shall be achieved during the total duration.</p> <p>Only the data from the completed cycles that occurred during the 3 h, are used for performance calculation. If no complete cycle occurs during 3 h, then the performance is calculated from the average data over the 3 hours.</p> <p>If at an elapsed time of 3 h, the heat pump is conducting a defrost cycle, the cycle shall be completed before ending the data recording. A complete cycle consists of a heating period and a defrost period; from defrost termination to defrost termination.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                            |

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| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 13/17                                                                            |

|                                                | For a multiple refrigerant circuit units, the data is recorded and calculated over a 3-hour duration whatever the state of cycling of the different refrigerant circuits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| <b>4.4.4.8.3</b>                               | <b>Step 7B</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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                                                                                                 |
|                                                | <p>In Step 7b, the data shall be recorded until 3 h have elapsed or until the heat pump completes three complete cycles during the period, whichever occurs first, as no data collection (Step 5) occurred after the latest equilibrium period (Step 3). In Step 7B, the permissible deviations specified in Table 6 shall be achieved during the total duration.</p> <p>Only the data from the completed cycles that occurred during the 3 h, are used for performance calculation. If no complete cycle occurs during 3, then the performance is calculated from the average data over the 3 h.</p> <p>If at an elapsed time of 3 h, the heat pump is conducting a defrost cycle, the cycle shall be completed before ending the data recording. A complete cycle consists of a heating period and a defrost period; from defrost termination to defrost termination.</p> <p>For a multiple refrigerant circuit units, the data is recorded and calculated over a 3-h duration whatever the state of cycling of the different refrigerant circuits.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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<p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>Can't be tested</p> |                     |                        |                     |                        |                              |  |  |  |  |                             |    |  |   |   |                        |     |   |   |  |                                 |  |  |  |  |           |   |   |   |   |                 |   |   |   |   |                                    |    |   |   |   |                                        |    |   |   |   |                                    |  |  |  |  |                                 |  |  |  |  |            |  |  |  |  |                                |    |   |   |    |                                |    |   |   |    |                            |  |  |  |  |       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|  |                                                                                                                                                                                                                                                                                                                                  |
| <b>4.4.5</b>                                   | <b>Test Results</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| <b>4.5.1</b>                                   | <b>Data to be recorded</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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                                                                                                 |
|                                                | <p>The data to be recorded for the capacity tests are given in Table 7. The table identifies the general information required but is not intended to limit the data to be obtained.</p> <p>These data shall be the mean values taken over the data collection period, with the exception of time measurement.</p> <p><i>Table 7 – Data to be recorded</i></p> <table border="1"> <thead> <tr> <th>Quantity</th><th>Unit</th><th>Calorimeter</th><th>Air enthalpy method</th><th>Liquid enthalpy method</th></tr> </thead> <tbody> <tr> <td><b>1) Ambient conditions</b></td><td></td><td></td><td></td><td></td></tr> <tr> <td>- air temperature, dry bulb</td><td>°C</td><td></td><td>X</td><td>X</td></tr> <tr> <td>- atmospheric pressure</td><td>kPa</td><td>X</td><td>X</td><td></td></tr> <tr> <td><b>2) Electrical quantities</b></td><td></td><td></td><td></td><td></td></tr> <tr> <td>- voltage</td><td>V</td><td>X</td><td>X</td><td>X</td></tr> <tr> <td>- total current</td><td>A</td><td>X</td><td>X</td><td>X</td></tr> <tr> <td>- total power input P<sub>T</sub></td><td>kW</td><td>X</td><td>X</td><td>X</td></tr> <tr> <td>- effective power input P<sub>E</sub></td><td>kW</td><td>X</td><td>X</td><td>X</td></tr> <tr> <td><b>3) Thermodynamic quantities</b></td><td></td><td></td><td></td><td></td></tr> <tr> <td><b>a) Indoor heat exchanger</b></td><td></td><td></td><td></td><td></td></tr> <tr> <td><u>Air</u></td><td></td><td></td><td></td><td></td></tr> <tr> <td>- inlet temperature (dry bulb)</td><td>°C</td><td>X</td><td>X</td><td>--</td></tr> <tr> <td>- inlet temperature (wet bulb)</td><td>°C</td><td>X</td><td>X</td><td>--</td></tr> <tr> <td><u>For duct connection</u></td><td></td><td></td><td></td><td></td></tr> <tr> <td>- outlet temperature (dry bulb)</td><td>°C</td><td>--</td><td>X</td><td>--</td></tr> <tr> <td>- outlet temperature (wet bulb)</td><td>°C</td><td>--</td><td>X</td><td>--</td></tr> <tr> <td>- external/internal static pressure difference</td><td>Pa</td><td>X</td><td>X</td><td>--</td></tr> <tr> <td>- volume flow rate, q</td><td>m³/s</td><td>--</td><td>X</td><td>--</td></tr> <tr> <td>- rate of condensate</td><td>kg/s</td><td>X</td><td>X</td><td>--</td></tr> <tr> <td><u>Water or brine</u></td><td></td><td></td><td></td><td></td></tr> <tr> <td>- inlet temperature</td><td>°C</td><td>X</td><td></td><td>X</td></tr> <tr> <td>- outlet temperature</td><td>°C</td><td>X</td><td></td><td>X</td></tr> <tr> <td>- volume flow</td><td>m³/s</td><td>X</td><td></td><td>X</td></tr> <tr> <td>- liquid pump speed setting if applicable</td><td>--</td><td>X</td><td></td><td>X</td></tr> <tr> <td>- external/internal static pressure difference</td><td>kPa</td><td>X</td><td></td><td>X</td></tr> <tr> <td><b>b) Outdoor heat exchanger</b></td><td></td><td></td><td></td><td></td></tr> <tr> <td><u>Air</u></td><td></td><td></td><td></td><td></td></tr> <tr> <td>- inlet temperature (dry bulb)</td><td>°C</td><td>X</td><td>X</td><td>X</td></tr> <tr> <td>- inlet temperature (wet bulb, if applicable)</td><td>°C</td><td>X</td><td>X</td><td>X</td></tr> <tr> <td><u>For duct connection</u></td><td></td><td></td><td></td><td></td></tr> <tr> <td>- outlet temperature (dry bulb)</td><td>°C</td><td>--</td><td>X</td><td>--</td></tr> <tr> <td>- outlet temperature (wet bulb)</td><td>°C</td><td>--</td><td>X</td><td>--</td></tr> <tr> <td>- external/internal static pressure difference</td><td>Pa</td><td>X</td><td>X</td><td>--</td></tr> <tr> <td>- volume flow rate</td><td>m³/s</td><td>X</td><td>X</td><td>--</td></tr> <tr> <td><u>Water or brine</u></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> | Quantity                                                                                                                                                                                                                                                                                                                                                                                                                        | Unit                | Calorimeter            | Air enthalpy method | Liquid enthalpy method | <b>1) Ambient conditions</b> |  |  |  |  | - air temperature, dry bulb | °C |  | X | X | - atmospheric pressure | kPa | X | X |  | <b>2) Electrical quantities</b> |  |  |  |  | - voltage | V | X | X | X | - total current | A | X | X | X | - total power input P <sub>T</sub> | kW | X | X | X | - effective power input P <sub>E</sub> | kW | X | X | X | <b>3) Thermodynamic quantities</b> |  |  |  |  | <b>a) Indoor heat exchanger</b> |  |  |  |  | <u>Air</u> |  |  |  |  | - inlet temperature (dry bulb) | °C | X | X | -- | - inlet temperature (wet bulb) | °C | X | X | -- | <u>For duct connection</u> |  |  |  |  | - outlet temperature (dry bulb) | °C | -- | X | -- | - outlet temperature (wet bulb) | °C | -- | X | -- | - external/internal static pressure difference | Pa | X | X | -- | - volume flow rate, q | m³/s | -- | X | -- | - rate of condensate | kg/s | X | X | -- | <u>Water or brine</u> |  |  |  |  | - inlet temperature | °C | X |  | X | - outlet temperature | °C | X |  | X | - volume flow | m³/s | X |  | X | - liquid pump speed setting if applicable | -- | X |  | X | - external/internal static pressure difference | kPa | X |  | X | <b>b) Outdoor heat exchanger</b> |  |  |  |  | <u>Air</u> |  |  |  |  | - inlet temperature (dry bulb) | °C | X | X | X | - inlet temperature (wet bulb, if applicable) | °C | X | X | X | <u>For duct connection</u> |  |  |  |  | - outlet temperature (dry bulb) | °C | -- | X | -- | - outlet temperature (wet bulb) | °C | -- | X | -- | - external/internal static pressure difference | Pa | X | X | -- | - volume flow rate | m³/s | X | X | -- | <u>Water or brine</u> |  |  |  |  | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>Calorimeter and Air enthalpy method can't be tested</p> |
| Quantity                                       | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| <b>1) Ambient conditions</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| - air temperature, dry bulb                    | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - atmospheric pressure                         | kPa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| <b>2) Electrical quantities</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| - voltage                                      | V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| - total current                                | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| - total power input P <sub>T</sub>             | kW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - effective power input P <sub>E</sub>         | kW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| <b>3) Thermodynamic quantities</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| <b>a) Indoor heat exchanger</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| <u>Air</u>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| - inlet temperature (dry bulb)                 | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - inlet temperature (wet bulb)                 | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| <u>For duct connection</u>                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| - outlet temperature (dry bulb)                | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - outlet temperature (wet bulb)                | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - external/internal static pressure difference | Pa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - volume flow rate, q                          | m³/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| - rate of condensate                           | kg/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| <u>Water or brine</u>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| - inlet temperature                            | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - outlet temperature                           | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - volume flow                                  | m³/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| - liquid pump speed setting if applicable      | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| - external/internal static pressure difference | kPa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| <b>b) Outdoor heat exchanger</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| <u>Air</u>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| - inlet temperature (dry bulb)                 | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                                                                                 |
| - inlet temperature (wet bulb, if applicable)  | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| <u>For duct connection</u>                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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                                                                                                 |
| - outlet temperature (dry bulb)                | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                                                                                 |
| - outlet temperature (wet bulb)                | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                                                                                 |
| - external/internal static pressure difference | Pa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                                                                                 |
| - volume flow rate                             | m³/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| <u>Water or brine</u>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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Initials: SW

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| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 14/17                                                                            |

|                                                                |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----|----|-----------------|
| - inlet temperature                                            | °C                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | X  | X  |                 |
| - outlet temperature                                           | °C                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | X  | X  |                 |
| - volume flow                                                  | m³/s                                                                                                                                                                                                                                                                                                                       | X                                                                                                                           | X  | X  |                 |
| - liquid pump speed setting if applicable                      | --                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | X  | X  |                 |
| - external/internal static pressure difference                 | kPa                                                                                                                                                                                                                                                                                                                        | X                                                                                                                           | X  | X  |                 |
| <b>c) heat recovery heat exchanger</b>                         |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| - inlet temperature                                            | °C                                                                                                                                                                                                                                                                                                                         | --                                                                                                                          | -- | X  |                 |
| - outlet temperature                                           | °C                                                                                                                                                                                                                                                                                                                         | --                                                                                                                          | -- | X  |                 |
| - volume flow                                                  | m³/s                                                                                                                                                                                                                                                                                                                       | --                                                                                                                          | -- | X  |                 |
| - external/internal static pressure difference                 | kPa                                                                                                                                                                                                                                                                                                                        | --                                                                                                                          | -- | X  |                 |
| <b>d) Heat transfer medium (other than water)</b>              |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| - concentration (volume)                                       | %                                                                                                                                                                                                                                                                                                                          | X                                                                                                                           | X  | X  | Can't be tested |
| - density (if needed for calculation)                          | kg/m³                                                                                                                                                                                                                                                                                                                      | X                                                                                                                           | X  | X  |                 |
| - specific heat (if needed for calculation)                    | J/kg·K                                                                                                                                                                                                                                                                                                                     | X                                                                                                                           | X  | X  |                 |
| <b>e) Refrigerant <sup>a</sup></b>                             |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| - discharge pressure                                           | bar abs.                                                                                                                                                                                                                                                                                                                   | --                                                                                                                          | -- | X  |                 |
| - saturated vapour/bubble point temperature                    | °C                                                                                                                                                                                                                                                                                                                         | --                                                                                                                          | -- | X  | Can't be tested |
| - liquid temperature                                           | °C                                                                                                                                                                                                                                                                                                                         | --                                                                                                                          | -- | X  |                 |
| <b>f) Compressor</b>                                           |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| - rotational speed (open compressor)                           | min <sup>-1</sup>                                                                                                                                                                                                                                                                                                          | --                                                                                                                          | -- | X  |                 |
| - power input motor (open compressor)                          | W                                                                                                                                                                                                                                                                                                                          | --                                                                                                                          | -- | X  | Can't be tested |
| - compressor frequency (inverter)                              | Hz                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | X  | X  |                 |
| <b>g) Calorimeter</b>                                          |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| - heat input calorimeter                                       | kW                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | -- | -- |                 |
| - heat extracted from calorimeter                              | kW                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | -- | -- |                 |
| - ambient temperature around calorimeter                       | °C                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | -- | -- | Can't be tested |
| - temperature of the water entering the humidifier             | °C                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | -- | -- |                 |
| - condensate temperature                                       | °C                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | -- | -- |                 |
| <b>h) Defrost</b>                                              |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| - defrost period (s)                                           | s                                                                                                                                                                                                                                                                                                                          | X                                                                                                                           | X  | X  |                 |
| - operating cycles with defrost                                | min                                                                                                                                                                                                                                                                                                                        | X                                                                                                                           | X  | X  |                 |
| <b>4) Data collection period</b>                               | min                                                                                                                                                                                                                                                                                                                        | X                                                                                                                           | X  | X  |                 |
| <b>5) Capacities</b>                                           |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| - heating capacity (P <sub>H</sub> )                           | kW                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | X  | X  |                 |
| - total cooling capacity (P <sub>C</sub> )                     | kW                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | X  | X  |                 |
| - latent cooling capacity (P <sub>L</sub> )                    | kW                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | X  | X  |                 |
| - sensible cooling capacity (P <sub>S</sub> )                  | kW                                                                                                                                                                                                                                                                                                                         | X                                                                                                                           | X  | X  |                 |
| - heat recovery capacity                                       | kW                                                                                                                                                                                                                                                                                                                         | --                                                                                                                          | -- | X  |                 |
| <b>6) Ratios</b>                                               |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| - COP                                                          | kW/kW                                                                                                                                                                                                                                                                                                                      | X                                                                                                                           | X  | X  |                 |
| - EER                                                          | kW/kW                                                                                                                                                                                                                                                                                                                      | X                                                                                                                           | X  | X  |                 |
| - SHR <sup>b</sup>                                             | kW/kW                                                                                                                                                                                                                                                                                                                      | X                                                                                                                           | X  | -- |                 |
| <sup>a</sup> Only for unit with remote condenser               |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| <sup>b</sup> Only for air-to-air and water(brine)-to-air units |                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |    |    |                 |
| <b>4.5.2</b>                                                   | <b>Cooling capacity and heat recovery capacity calculation</b>                                                                                                                                                                                                                                                             | IRN 77                                                                                                                      |    |    |                 |
|                                                                | Average cooling and heat recovery capacities shall be determined from the set of cooling and heat recovery capacities recorded over the data collection period, or on the basis of average values of temperature and volume flow recorded over the data collection period.                                                 | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |    |    |                 |
| <b>4.5.3</b>                                                   | <b>Heating capacity calculation</b>                                                                                                                                                                                                                                                                                        |                                                                                                                             |    |    |                 |
| <b>4.5.3.1</b>                                                 | <b>Steady state capacity test</b>                                                                                                                                                                                                                                                                                          | IRN 77                                                                                                                      |    |    |                 |
|                                                                | An average heating capacity shall be determined from the set of heating capacities recorded over the data collection period or on the basis of average values of temperature and volume flow recorded over the data collection period.                                                                                     | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |    |    |                 |
| <b>4.5.3.2</b>                                                 | <b>Transient capacity test</b>                                                                                                                                                                                                                                                                                             | IRN 77                                                                                                                      |    |    |                 |
|                                                                | For equipment where one or more complete cycle occur during the data collection period, the following shall apply. The average heating capacity shall be determined using the integrated capacity and the elapsed time corresponding to the total number of complete cycles that occurred over the data collection period. | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |    |    |                 |
|                                                                | For equipment where no complete cycle occurs during the data collection period, the following shall apply. The average heating capacity shall be determined by using the integrated capacity and the elapsed time corresponding to the total data collection period.                                                       | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |    |    |                 |

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|  | Initials: SW |
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| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 15/17                                                                            |

|                | When using the air enthalpy method, in case the flow rates are different during intervals H and D of the transient test, a weighted value of flow rates during H and D intervals shall be used for the calculation of the pump/fan correction(s) to be applied.                                                                                                    | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|--|-----------------------|--|--|--|-------------------------|-------------------------|-------------------------|-------------------------|--------------|-------------------|----|----|----|--------|--|-------------------|----|----|----|----|
| <b>4.5.4</b>   | <b>Effective power input calculation</b>                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>4.5.4.1</b> | <b>Steady state test</b>                                                                                                                                                                                                                                                                                                                                           | IRN 78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | An average electric power input shall be determined from the integrated electrical power over the same data collection period than the one used for the heating / cooling capacity or heat recovery capacity calculation.                                                                                                                                          | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>4.5.4.2</b> | <b>Transient with defrost cycle</b>                                                                                                                                                                                                                                                                                                                                | IRN 78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | An average electric power input shall be determined on the basis of the integrated electrical power and the time corresponding to the total number of complete cycles during the same data collection period as the one used for the heat capacity calculation.                                                                                                    | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | In case the flow rates are different during intervals H and D of the transient test, a weighted value of flow rates during H and D intervals shall be used for the calculation of the pump/fan correction(s) to be applied.                                                                                                                                        | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>4.5.4.3</b> | <b>Transient without defrost cycle</b>                                                                                                                                                                                                                                                                                                                             | IRN 78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | An average electric power input shall be determined on the basis of the integrated electrical power and the time corresponding to the same data collection period as the one used for the heat capacity calculation.                                                                                                                                               | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>5</b>       | <b>Electrical consumptions for single duct and double duct units</b>                                                                                                                                                                                                                                                                                               | IRN 78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>5.1</b>     | <b>Determination of power consumption due to standby mode</b>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | After the unit (for cooling only and reverse cycle units) has been running for 30 min in cooling mode, it is switched in standby mode with the control device, if available. After 10 min, the electrical energy consumption is measured during the next 10 min and the average value during this period is assumed to be the standby mode consumption, $P_{SB}$ . | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | For heating only units, the measurements are made in the same way, after the following test condition.                                                                                                                                                                                                                                                             | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | <i>Table 8 — Test conditions for power consumption due to standby mode for heating only units</i>                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                |                                                                                                                                                                                                                                                                                                                                                                    | <table border="1"> <thead> <tr> <th colspan="2"></th><th colspan="2">Outdoor heat exchanger</th><th colspan="2">Indoor heat exchanger</th></tr> <tr> <th colspan="2"></th><th>Inlet dry bulb temp. °C</th><th>Inlet wet bulb temp. °C</th><th>Inlet dry bulb temp. °C</th><th>Inlet wet bulb temp. °C</th></tr> </thead> <tbody> <tr> <td>Heating mode</td><td>Double duct units</td><td>12</td><td>11</td><td>20</td><td>15 max</td></tr> <tr> <td></td><td>Single duct units</td><td>20</td><td>12</td><td>20</td><td>12</td></tr> </tbody> </table> |                         |                         | Outdoor heat exchanger  |  | Indoor heat exchanger |  |  |  | Inlet dry bulb temp. °C | Inlet wet bulb temp. °C | Inlet dry bulb temp. °C | Inlet wet bulb temp. °C | Heating mode | Double duct units | 12 | 11 | 20 | 15 max |  | Single duct units | 20 | 12 | 20 | 12 |
|                |                                                                                                                                                                                                                                                                                                                                                                    | Outdoor heat exchanger                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         | Indoor heat exchanger   |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                |                                                                                                                                                                                                                                                                                                                                                                    | Inlet dry bulb temp. °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Inlet wet bulb temp. °C | Inlet dry bulb temp. °C | Inlet wet bulb temp. °C |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| Heating mode   | Double duct units                                                                                                                                                                                                                                                                                                                                                  | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 11                      | 20                      | 15 max                  |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | Single duct units                                                                                                                                                                                                                                                                                                                                                  | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12                      | 20                      | 12                      |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>5.2</b>     | <b>Determination of power consumption in off-mode</b>                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | Following the standby mode test, the unit shall be switched in off mode, if available, while remaining plugged. After 10 min, the residual energy power is measured and assumed to be the off mode consumption, $P_{OFF}$ .                                                                                                                                        | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>5.3</b>     | <b>Electricity consumption</b>                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | The electricity consumption in cooling mode, $Q_{SD}$ for single duct units and $Q_{DD}$ for double duct units, shall be declared as the rated power input $P_{EER}$ multiplied by the number of "on mode" hours as specified in the regulation and equal to 1. It is expressed in kWh/h.                                                                          | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | The electricity consumption in heating mode, $Q_{SD}$ for single duct units and $Q_{DD}$ for double duct units, shall be declared as the rated power input $P_{COP}$ multiplied by the number of "on mode" hours as specified in the regulation and equal to 1. It is expressed in kWh/h.                                                                          | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>6</b>       | <b>Air flow rate measurement of ducted units</b>                                                                                                                                                                                                                                                                                                                   | IRN 03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | For ducted units, the manufacturer shall declare the nominal air flow rate, indoor and/or outdoor as applicable, measured according to Annex I.                                                                                                                                                                                                                    | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>7</b>       | <b>Heat recovery test for air-cooled multisplit systems</b>                                                                                                                                                                                                                                                                                                        | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>8</b>       | <b>Test report</b>                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
| <b>8.1</b>     | <b>General information</b>                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | The test report shall at least contain:                                                                                                                                                                                                                                                                                                                            | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |
|                | a) date;<br>b) test institute;<br>c) test location;<br>d) test method;<br>e) test supervisor;<br>f) test object designation:<br>1) type;<br>2) serial number;<br>3) name of the manufacturer;<br>g) type of refrigerant;<br>h) mass of refrigerant;<br>i) properties of fluids;                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |                         |  |                       |  |  |  |                         |                         |                         |                         |              |                   |    |    |    |        |  |                   |    |    |    |    |

|                                 |                                                                  |                                                                                     |
|---------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 16/17                                                                            |

|                                                                                        | j) reference to this European Standard.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
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| <b>8.2</b>                                                                             | <b>Additional information</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
|                                                                                        | Additional information given on the rating plate shall be noted and any other information relevant for the test. Particularly, it shall be stated whether the test is performed on a unit new or not. In the case of a test performed on a unit in use, information relative to the year of installation and heat exchanger tubes cleaning shall be given.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| <b>8.3</b>                                                                             | <b>Rating test results</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
|                                                                                        | <p>The rating capacities, power inputs, COP, EER, internal or external static pressure shall be given together with the rating conditions.</p> <p>Table 9 provides a template for the test results to be reported for single duct and double duct units.</p> <p><i>Table 9 – Test results for single duct and double duct units</i></p> <table border="1"> <thead> <tr> <th>Description</th> <th>Symbol</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>Standard rating conditions, indoor air dry bulb (wet bulb) temperature in cooling mode</td> <td>--</td> <td>°C</td> </tr> <tr> <td>Standard rating conditions, indoor air dry bulb (wet bulb) temperature in cooling mode</td> <td>--</td> <td>°C</td> </tr> <tr> <td>Rated capacity for cooling</td> <td><math>P_{rated}</math></td> <td>kW</td> </tr> <tr> <td>Rated power input for cooling</td> <td><math>P_{EER}</math></td> <td>kW</td> </tr> <tr> <td>Rated Energy efficiency ratio</td> <td><math>EER_{rated}</math></td> <td>--</td> </tr> <tr> <td>Electricity consumption in cooling mode</td> <td></td> <td></td> </tr> <tr> <td>- single duct unit</td> <td><math>Q_{SD}</math></td> <td>kWh/h</td> </tr> <tr> <td>- double duct unit</td> <td><math>Q_{DD}</math></td> <td>kWh/h</td> </tr> <tr> <td>Standard rating conditions, indoor air dry bulb (wet bulb) temperature in heating mode</td> <td>--</td> <td>W</td> </tr> <tr> <td>Standard rating conditions, indoor air dry bulb (wet bulb) temperature in heating mode</td> <td>--</td> <td>W</td> </tr> <tr> <td>Rated capacity for heating</td> <td><math>P_{rated}</math></td> <td>kW</td> </tr> <tr> <td>Rated power input for heating</td> <td><math>P_{COP}</math></td> <td>kW</td> </tr> <tr> <td>Rated Coefficient of Performance</td> <td><math>COP_{rated}</math></td> <td>--</td> </tr> <tr> <td>Electricity consumption in heating mode</td> <td></td> <td></td> </tr> <tr> <td>- single duct unit</td> <td><math>Q_{SD}</math></td> <td>kWh/h</td> </tr> <tr> <td>- double duct unit</td> <td><math>Q_{DD}</math></td> <td>kWh/h</td> </tr> <tr> <td>Power consumption in off-mode</td> <td><math>P_{OFF}</math></td> <td>W</td> </tr> <tr> <td>Power consumption in standby mode</td> <td><math>P_{SB}</math></td> <td>W</td> </tr> </tbody> </table> | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Symbol | Unit | Standard rating conditions, indoor air dry bulb (wet bulb) temperature in cooling mode | -- | °C | Standard rating conditions, indoor air dry bulb (wet bulb) temperature in cooling mode | -- | °C | Rated capacity for cooling | $P_{rated}$ | kW | Rated power input for cooling | $P_{EER}$ | kW | Rated Energy efficiency ratio | $EER_{rated}$ | -- | Electricity consumption in cooling mode |  |  | - single duct unit | $Q_{SD}$ | kWh/h | - double duct unit | $Q_{DD}$ | kWh/h | Standard rating conditions, indoor air dry bulb (wet bulb) temperature in heating mode | -- | W | Standard rating conditions, indoor air dry bulb (wet bulb) temperature in heating mode | -- | W | Rated capacity for heating | $P_{rated}$ | kW | Rated power input for heating | $P_{COP}$ | kW | Rated Coefficient of Performance | $COP_{rated}$ | -- | Electricity consumption in heating mode |  |  | - single duct unit | $Q_{SD}$ | kWh/h | - double duct unit | $Q_{DD}$ | kWh/h | Power consumption in off-mode | $P_{OFF}$ | W | Power consumption in standby mode | $P_{SB}$ | W | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| Description                                                                            | Symbol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Standard rating conditions, indoor air dry bulb (wet bulb) temperature in cooling mode | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Standard rating conditions, indoor air dry bulb (wet bulb) temperature in cooling mode | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Rated capacity for cooling                                                             | $P_{rated}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | kW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Rated power input for cooling                                                          | $P_{EER}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | kW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Rated Energy efficiency ratio                                                          | $EER_{rated}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Electricity consumption in cooling mode                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| - single duct unit                                                                     | $Q_{SD}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | kWh/h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| - double duct unit                                                                     | $Q_{DD}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | kWh/h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Standard rating conditions, indoor air dry bulb (wet bulb) temperature in heating mode | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Standard rating conditions, indoor air dry bulb (wet bulb) temperature in heating mode | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Rated capacity for heating                                                             | $P_{rated}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | kW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Rated power input for heating                                                          | $P_{COP}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | kW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Rated Coefficient of Performance                                                       | $COP_{rated}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Electricity consumption in heating mode                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| - single duct unit                                                                     | $Q_{SD}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | kWh/h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| - double duct unit                                                                     | $Q_{DD}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | kWh/h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Power consumption in off-mode                                                          | $P_{OFF}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| Power consumption in standby mode                                                      | $P_{SB}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| <b>Annex A</b>                                                                         | <b>Calorimeter test method</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| <b>Annex B</b>                                                                         | <b>Indoor air enthalpy method</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| <b>Annex C</b>                                                                         | <b>Recommendation for reducing the indoor air enthalpy method uncertainty</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| <b>Annex D</b>                                                                         | <b>Liquid enthalpy test method</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
|                                                                                        | <p>Calculations-heating capacities</p> <p>The measured heating capacity, <math>\phi_{thi}</math>, shall be determined using the Formula (D.1):</p> $\phi_{thi} = q_v \times \rho \times (c_{p,out} \times t_{out} - c_{p,in} \times t_{in}) \quad (D.1)$ <p>The measured heat recovery capacity, <math>\phi_{hr}</math>, shall be determined using the Formula (D.2)</p> $\phi_{hr} = q_{v,hr} \times \rho \times (c_{p,hr,out} \times t_{hr,out} - c_{p,hr,in} \times t_{hr,in}) \quad (D.2)$ <p><i>NOTE 1 The mass flow rate can directly be determined instead of the term (<math>q_{v,hr} \times \rho</math>).</i><br/> <i>NOTE 2 The specific enthalpy H can be directly used instead of the term (<math>C_p \times t</math>).</i></p> <p>Calculations-cooling capacities</p> <p>The measured cooling capacity, <math>\phi_{tci}</math>, shall be determined using the Formula (D.3):</p> $\phi_{tci} = -q_v \times \rho \times (c_{p,out} \times t_{out} - c_{p,in} \times t_{in}) \quad (D.3)$ <p><i>NOTE 1 The mass flow rate can directly be determined instead of the term (<math>q_v \times \rho</math>).</i><br/> <i>NOTE 2 The specific enthalpy H can be directly used instead of the term (<math>C_p \times t</math>).</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| <b>Annex E</b>                                                                         | <b>Test installation and measurements for liquid enthalpy method</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
| <b>Annex F</b>                                                                         | <b>Determination of the liquid pump efficiency</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |
|                                                                                        | <p>Where the liquid pump is an integral part of the unit, the hydraulic power <math>P_{hyd}</math> in W is calculated with G.1.</p> $P_{hyd} = q \times \Delta p_e \quad (G.1)$ <p>Where the liquid pump is not an integral part of the unit, the hydraulic power is calculated with G.2.</p> $P_{hyd} = q \times (-\Delta p_i) \quad (G.2)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |      |                                                                                        |    |    |                                                                                        |    |    |                            |             |    |                               |           |    |                               |               |    |                                         |  |  |                    |          |       |                    |          |       |                                                                                        |    |   |                                                                                        |    |   |                            |             |    |                               |           |    |                                  |               |    |                                         |  |  |                    |          |       |                    |          |       |                               |           |   |                                   |          |   |                                                                                                                             |

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| Version; 001<br>Date:21-1-2025  | <b>TEST SHEETS</b><br><b>EN 14511-3; Test Methods</b>            |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | TS 17/17                                                                            |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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|                 | <p>For Glandless circulators, the calculation of the global efficiency <math>\eta</math> is based on the Energy Efficiency Index EEI as defined in regulation 641/2009 modified by regulation 622/2012 and using formula G.3.</p> $\eta = \frac{0,35844 \times P_{hyd}}{1,7 \times P_{hyd} + 17 \times (1 - e^{-0,3 \times P_{hyd}})} \times \frac{C_{20}}{EEI} \quad (G.3)$ <p>Where</p> <p><math>C_{20}</math> is a scaling factor equal to 0,49<br/> <math>EEI</math> is the energy efficiency index equal to 0,23</p> <p>For dry motor pumps, the global efficiency <math>\eta</math> is calculated with formula G.4 (<math>P_{hyd} \leq 500W</math>) or G.5 (<math>P_{hyd} &gt; 500W</math>)</p> $\eta = 0,0721 P_{hyd}^{0,3183} \quad (G.4)$ $\eta = 0,092 \ln(P_{hyd}) - 0,0403 \quad (G.5)$ | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                                                                                                                                                       |
| <b>Annex G</b>  | <b>Rating of indoor and outdoor units of multisplit systems and modular heat recovery multisplit systems</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Annex H</b>  | <b>Symbols used in annexes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Annex I</b>  | <b>Air flow rate measurement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                 | <p>The air flow rate shall be related to standard air and measured with dry heat exchanger, when the fan only is operating.</p> <p>For ducted units, the external static pressure (ESP) shall be set in accordance with 4.4.1.3 for units ducted on the indoor heat exchanger and with 4.4.1.4 for units ducted on the outdoor heat exchanger.</p> <p>For non-ducted units, the ESP shall be set equal to zero (0).</p> <p>Air flow measurements shall be made so that the requirement of the uncertainty of measurement given in table 1 is fulfilled.</p>                                                                                                                                                                                                                                         | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| <b>Annex J</b>  | <b>Conformance criteria</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Annex K</b>  | <b>Individual unit tests</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Annex ZA</b> | <b>Relationship between this European standard and the requirements of commission regulation (EC) No 206/2012 aimed to be covered</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Annex ZB</b> | <b>Relationship between this European standard and the energy labelling requirements of commission delegated regulation (EU) No 626/2011 aimed to be covered</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Annex ZC</b> | <b>Relationship between this European Standard and the ecodesign requirements of commission regulation (EU) No 2016/2281 aimed to be covered</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Informative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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**Table 5 – Part load conditions for water(brine)-to-water(brine) units**

|   | Part load ratio                    | Part load ratio | Outdoor heat exchanger                    |                      |                  | Indoor heat exchanger |                              |                     |
|---|------------------------------------|-----------------|-------------------------------------------|----------------------|------------------|-----------------------|------------------------------|---------------------|
|   |                                    |                 | Cooling tower or water (brine) loop appl. | Ground coupled appl. | Dry cooler appl. | Fan coil appl.        |                              | Cooling floor appl. |
|   |                                    |                 |                                           |                      |                  | Fixed outlet          | Variable outlet <sup>c</sup> |                     |
|   |                                    |                 |                                           |                      |                  |                       |                              |                     |
| A | (35-16)/(T <sub>designc</sub> -16) | 100,00          | 30/35                                     | 10/15                | 50/55            | 12/7                  | 12/7                         | 23/18               |
| B | (30-16)/(T <sub>designc</sub> -16) | 73,68           | 26 <sup>b</sup>                           | 10 <sup>b</sup>      | 45/b             | <sup>a</sup> /7       | <sup>a</sup> /8,5            | <sup>a</sup> /18    |
| C | (25-16)/(T <sub>designc</sub> -16) | 47,37           | 22 <sup>b</sup>                           | 10 <sup>b</sup>      | 40/b             | <sup>a</sup> /7       | <sup>a</sup> /10             | <sup>a</sup> /18    |
| D | (20-16)/(T <sub>designc</sub> -16) | 21,05           | 18 <sup>b</sup>                           | 10 <sup>b</sup>      | 35/b             | <sup>a</sup> /7       | <sup>a</sup> /11.5           | <sup>a</sup> /18    |

<sup>a,b</sup> With the flow rate as determined during 'A' test for units with a fixed flow rate or with a fixed delta T of 5K for units with a variable flow rate. If the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the outlet temperature  
<sup>c</sup> if the variable outlet temperature is above the maximum operating range of the unit, this maximum should be considered

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| <b>5</b>   | <b>Calculation methods for seasonal space cooling efficiency <math>\eta_{s,c}</math> SEER and SEER<sub>on</sub></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                       |
| <b>5.1</b> | <b>General</b><br>For units, except multi-split Air-to-Air units > 12 kW cooling capacity at standard rating conditions and multi-split Water(Brine)-to-Air, the calculation method as described below shall be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                           |
| <b>5.2</b> | <b>Calculation of the seasonal space cooling efficiency <math>\eta_{s,c}</math></b><br>The seasonal space cooling efficiency $\eta_{s,c}$ expressed in % is calculated with formula 1 and 2. $\eta_{s,c} = \frac{1}{CC} \times SEER - \sum F(i) \quad (1)$ $\sum F(i) = F(1) + F(2) \quad (2)$ Where<br>CC is the coefficient for electricity generation efficiency<br>SEER is the seasonal energy efficiency ratio (see 5.3)<br>$\sum F(i)$ is the correction calculated according to Formula (2)<br>F(1) is the correction that accounts for a negative contribution of the seasonal energy efficiency ratio due to adjusted contributions of temperature controls, equal to 3%<br>F(2) is the correction that accounts for a negative contribution of the seasonal energy efficiency ratio by electricity consumption of ground water (brine) pumps. This factor is only for water(brine)-to-water(brine) and water(brine)-to-air units and is equal to 5% | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                           |
| <b>5.3</b> | <b>General formula for calculation of SEER</b><br>The SEER equals reference annual cooling demand $Q_c$ divided by the annual energy consumption for cooling $Q_{CE}$ . $SEER = \frac{Q_c}{Q_{CE}} \quad (3)$ Where<br>$Q_c$ is the reference annual cooling demand expressed in kWh<br>$Q_{CE}$ is the annual energy consumption for cooling expressed in kWh<br><i>Note 1 Climate conditions and hours to be used for SEER calculations for air-to-air units ≤ 12 kW can be found in Annex A.</i><br><i>Note 2 Climate conditions and hours to be used for SEER calculations for air-to-air units &gt; 12 kW, water(brine)-to-air units and comfort chillers can be found in Annex D.</i>                                                                                                                                                                                                                                                                   | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br>Air-to-Air and Water(Brine)-to-Air can't be tested |
| <b>5.4</b> | <b>Calculation of the reference annual cooling demand <math>Q_c</math></b><br>The reference annual cooling demand $Q_c$ is expressed in kWh and can be calculated as follows: $Q_c = P_{designc} \times H_{CE} \quad (4)$ Where<br>$P_{designc}$ is the design cooling load of the building the unit is suitable for as declared by the manufacturer expressed in kWh<br>$H_{CE}$ is the number of equivalent active mode hours for cooling, expressed in hours<br><i>Note 1 Climate conditions and hours to be used for HCE for air-to-air units ≤ 12 kW can be found in Annex A.</i><br><i>Note 2 Climate conditions and hours to be used for HCE for air-to-air units &gt; 12 kW and water(brine)-to-air units can be found in Annex D.</i>                                                                                                                                                                                                                | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br>Air-to-Air and Water(Brine)-to-Air can't be tested |
| <b>5.5</b> | <b>Calculation of the reference annual electricity consumption for cooling <math>Q_{CE}</math></b><br>The annual electricity consumption $Q_{CE}$ , expressed in kWh, includes the power consumption during active mode, thermostat-off mode, standby mode, off mode and that of the crankcase heater calculated according to Formula (5).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                           |



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| <b>5.7.2.2</b> | <b>Air-to-Water (Brine) and Water(Brine)-to-Water(Brine) units</b><br>For each part load condition B, C and D, the $EER_{bin}$ is calculated as follows: $EER_{bin} = EER_d \times \frac{CR}{Cd \times CR + (1 - Cd)} \quad (10)$ Where<br>$EER_d$ is the EER corresponding to the declared capacity ( $P_{dc}$ ) of the unit at the same temperature conditions as for part load conditions B, C and D;<br>$Cd$ is the degradation coefficient as determined according to 11.5.3. If not determined 0,9 is used by default;<br>$CR$ is the capacity ratio, determined with Formula (8) (see 5.7.1) | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
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| <b>5.7.3</b> | <b>Calculation procedure for staged and variable capacity units</b><br>The capacity, effective power input and EER shall be determined at the closest step or increment of the capacity control of the unit to reach the required cooling load.<br>If the resulting capacity is within $\pm 10\%$ of the required cooling load (e.g. between 9,9 kW and 8,1 kW for a required cooling load of 9 kW), the required cooling load is considered achieved. The resulting capacity and EER are considered as $P_{dc}$ and $EER_d$ . $EER_d$ shall be used as $EER_{bin}$ .<br><br>If the resulting capacity is deviating from the required cooling load by more than $\pm 10\%$ , then another capacity and effective power input shall be determined at the same part load conditions for the step or increment of the capacity control on the opposite side of the required cooling load. The part load effective power input at the required cooling load is determined by linear interpolation between the two effective power input values obtained at these two steps. The $EER_{bin}$ is determined by dividing the required cooling load and the interpolated part load effective power input. The declared capacity $P_{dc}$ is equal to the required cooling load.<br><br>If the resulting capacity achieved with the smallest step of the capacity control exceeds the required cooling load by more than $10\%$ then the procedure for the determination of $EER_{bin}$ described in 5.7.2 shall apply. The resulting capacity is considered as $P_{dc}$ . | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
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| <b>6</b> | <b>Part load conditions for space heating</b> |  |
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| <b>6.1</b> | <b>General</b><br>For the purpose of calculation of $SCOP / SCOP_{on} / SCOP_{net}$ as explained in Clause 7, the part load ratios mentioned below shall be based on the part load ratio formulas with at least two decimal digits.<br><br>For the purpose of $SCOP / SCOP_{on} / SCOP_{net}$ , there are three reference design conditions: average (A), warmer (W) and colder (C).<br><br>The relevant $T_{designh}$ values are defined as follows: <ul style="list-style-type: none"> <li>Average climate: dry bulb temperature conditions at <math>-10\text{ }^{\circ}\text{C}</math> outdoor temperature for <math>20\text{ }^{\circ}\text{C}</math> indoor temperature;</li> <li>Colder climate: dry bulb temperature conditions at <math>-22\text{ }^{\circ}\text{C}</math> outdoor temperature for <math>20\text{ }^{\circ}\text{C}</math> indoor temperature ;</li> <li>Warmer climate: dry bulb temperature conditions at <math>+2\text{ }^{\circ}\text{C}</math> outdoor temperature for <math>20\text{ }^{\circ}\text{C}</math> indoor temperature,</li> </ul> For outdoor air dry bulb temperatures $\geq -10\text{ }^{\circ}\text{C}$ , the wet bulb temperature equals the dry bulb temperature minus 1 K. For dry bulb temperatures $< -10\text{ }^{\circ}\text{C}$ , the wet bulb temperature is not defined.<br><br>For heat pumps, the relevant $T_{biv}$ is defined as follows: <ul style="list-style-type: none"> <li>Average climate: dry bulb temperature is <math>+2\text{ }^{\circ}\text{C}</math> or lower;</li> <li>Colder climate: dry bulb temperature is <math>-7\text{ }^{\circ}\text{C}</math> or lower;</li> <li>Warmer climate: dry bulb temperature is <math>+7\text{ }^{\circ}\text{C}</math> or lower.</li> </ul> For heat pumps, the relevant TOL is defined as follows: <ul style="list-style-type: none"> <li>Average climate: dry bulb temperature is <math>-7\text{ }^{\circ}\text{C}</math> or lower;</li> <li>Colder climate: dry bulb temperature is <math>-15\text{ }^{\circ}\text{C}</math> or lower;</li> <li>Warmer climate: dry bulb temperature is <math>+2\text{ }^{\circ}\text{C}</math> or lower</li> </ul> If the declared TOL is lower than the $T_{designh}$ of the considered climate, then the outdoor dry bulb temperature for the part load condition E shall be $T_{designh}$ in Tables 6 to 15.<br>In case of colder climate and if TOL is below $-20\text{ }^{\circ}\text{C}$ , an additional part load condition G at $-15\text{ }^{\circ}\text{C}$ shall apply for air-to-air and air-to-water heat pumps.<br><br>For hybrid units: <ul style="list-style-type: none"> <li><math>T_{biv}</math> is not applicable but replaced by <math>T_{fb,off}</math>, the lowest outdoor air temperature at which the gas or liquid fuel boiler is not providing any heating capacity. The limitation for <math>T_{biv}</math> does not apply to <math>T_{fb,off}</math>.</li> </ul> | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
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|              | <ul style="list-style-type: none"> <li>TOL is not applicable but replaced by <math>T_{hp,on}</math>, the lowest outdoor air temperature at which the heat pump starts providing heating capacity. If the declared <math>T_{hp,on}</math> is lower than <math>T_{designh}</math> of the considered climate then <math>T_{hp,on}</math> shall be considered equal to <math>T_{designh}</math>. The limitation for TOL does not apply to <math>T_{hp,on}</math>.</li> </ul> <p><math>T_{biv}</math> and TOL, or <math>T_{fb,off}</math> and <math>T_{hp,on}</math> for hybrid units, shall be declared as integer values.<br/>When calculating the outlet water(brine) temperature for these part load conditions the resulting value to be used shall be given with one decimal.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |        |                            | 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| <b>6.2</b>   | <b>Air-to-Air units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| <b>6.3</b>   | <b>Water(Brine)-to-Air units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| <b>6.4</b>   | <b>Air-to-Water(Brine) units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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|        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>6.4.1</b> | <p><b>General</b><br/>The part load conditions for determining the declared capacity (<math>P_{ah}</math>) and the declared coefficient of performance (<math>COP_d</math>) are given in tables 8 to 11.</p> <p>The variable outlet temperature shall only be applied when the control provides an outdoor temperature dependant modification of the outlet temperature. Has the unit a variable outlet temperature?</p> <p>For units with variable outlet that have to cycle on/off to reach the required part load ratio inlet and outlet temperatures of the indoor heat exchanger shall be determined according to Formula (38) in 11.5.1.</p> $t_{out,av} = t_{in,test} + (t_{out,test} - t_{in,test}) \times CR \quad (38)$ <p><math>T_{in,test}</math> and <math>T_{out,test}</math> are determined iterative until a convergence of 0,1K is reached. Is the unit on/off cycling or does the unit to cycle on/off to reach the desired part load ratio?</p> <p>For hybrid units <math>T_{biv}</math> and TOL mentioned in tables 8 to 11 of part load conditions shall be replaced by <math>T_{fb,off}</math> and <math>T_{hp,on}</math> respectively.</p> <p>For hybrid units using the combined test method (see 8.3) in case <math>T_{hp,on}</math> is greater than <math>T_{designh}</math> an additional condition at <math>T_{designh}</math> is required.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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        |        |                   |                   |      |                   |   |                             |       |        |       |       |        |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                        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| <b>6.4.2</b> | <p><b>Low Temperature Application</b></p> <p><i>Table 8 – Part load conditions for air-to-water(brine) units in low temperature application for the reference heating seasons</i></p> <table border="1"> <thead> <tr> <th rowspan="3">condition</th><th colspan="4">Part load ratio</th><th colspan="2">Outdoor heat exchanger</th><th colspan="4">Indoor heat exchanger</th></tr> <tr> <th colspan="4"></th><th colspan="2">Dry (wet) bulb temp.</th><th colspan="2">Fixed outlet</th><th colspan="2">Variable outlet<sup>d</sup></th></tr> <tr> <th colspan="4">In %</th><th colspan="8">°C</th></tr> <tr> <th></th><th>Formula</th><th>Average</th><th>Warmer</th><th>Colder</th><th>Outdoor air</th><th>Exhaust air</th><th>All climates</th><th>Average</th><th>Warmer</th><th>Colder</th></tr> </thead> <tbody> <tr> <td>A</td><td><math>(-7-16) / (T_{designh}-16)</math></td><td>88,46</td><td>n.a.</td><td>60,53</td><td>-7 (-8)</td><td>20(12)</td><td><sup>a</sup> / 35</td><td><sup>a</sup> / 34</td><td>n.a.</td><td><sup>a</sup> / 30</td></tr> <tr> <td>B</td><td><math>(2-16) / (T_{designh}-16)</math></td><td>53,85</td><td>100,00</td><td>36,84</td><td>2 (1)</td><td>20(12)</td><td><sup>a</sup> / 35</td><td><sup>a</sup> / 30</td><td><sup>a</sup> / 35</td><td><sup>a</sup> / 27</td></tr> <tr> <td>C</td><td><math>(7-16) / (T_{designh}-16)</math></td><td>34,62</td><td>64,29</td><td>23,68</td><td>7 (6)</td><td>20(12)</td><td><sup>a</sup> / 35</td><td><sup>a</sup> / 27</td><td><sup>a</sup> / 31</td><td><sup>a</sup> / 25</td></tr> <tr> <td>D</td><td><math>(12-16) / (T_{designh}-16)</math></td><td>15,38</td><td>28,57</td><td>10,53</td><td>12 (11)</td><td>20(12)</td><td><sup>a</sup> / 35</td><td><sup>a</sup> / 24</td><td><sup>a</sup> / 26</td><td><sup>a</sup> / 24</td></tr> <tr> <td>E</td><td><math>(TOL^e-16)/(T_{designh}-16)</math></td><td></td><td></td><td></td><td>TOL<sup>e</sup></td><td>20(12)</td><td><sup>a</sup> / 35</td><td><sup>a</sup> / <sup>b</sup></td><td><sup>a</sup> / <sup>b</sup></td><td><sup>a</sup> / <sup>b</sup></td></tr> <tr> <td>F</td><td><math>(T_{biv}-16)/(T_{designh}-16)</math></td><td></td><td></td><td></td><td><math>T_{biv}</math></td><td>20(12)</td><td><sup>a</sup> / 35</td><td><sup>a</sup> / <sup>c</sup></td><td><sup>a</sup> / <sup>c</sup></td><td><sup>a</sup> / <sup>c</sup></td></tr> <tr> <td>G</td><td><math>(-15-16) / (T_{designh}-16)</math></td><td>n.a.</td><td>n.a.</td><td>81,58</td><td>-15</td><td>20(12)</td><td><sup>a</sup> / 35</td><td>n.a.</td><td>n.a.</td><td><sup>a</sup> / 32</td></tr> </tbody> </table> <p><sup>a</sup> With the water flow rate as determined at the standard rating test conditions given in Table 12 of EN 14511-2:2018 at 30/55 conditions for units with a fixed water flow rate and with a fixed delta T of 5K for units with a variable water flow rate. If for any of the test conditions the resulting flow rate is below the minimum flow rate then this minimum flow rate is used as a fixed flow rate with the outlet temperature for this test condition.</p> <p><sup>b</sup> Variable outlet shall be calculated by interpolation from <math>T_{designh}</math> and the temperature which is closest to the TOL</p> <p><sup>c</sup> Variable outlet shall be calculated by interpolation between the upper and lower temp. which are closest to the bivalent temperature.</p> <p><sup>d</sup> If the variable outlet temperature is below the minimum operation range of the unit, this minimum is used.</p> <p><sup>e</sup> If <math>TOL &lt; T_{designh}</math> than TOL shall be replaced by <math>T_{designh}</math></p> | condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Part load ratio |        |                            |             | Outdoor heat exchanger |                             | Indoor heat exchanger        |                             |  |  |  |  |  |  | Dry (wet) bulb temp.       |  | Fixed outlet |  | Variable outlet <sup>d</sup> |  | In % |  |  |  | °C |  |  |  |  |  |  |  |  | Formula | Average | Warmer | Colder | Outdoor air | Exhaust air | All climates | Average | Warmer | Colder | A | $(-7-16) / (T_{designh}-16)$ | 88,46 | n.a. | 60,53 | -7 (-8) | 20(12) | <sup>a</sup> / 35 | <sup>a</sup> / 34 | n.a. | <sup>a</sup> / 30 | B | $(2-16) / (T_{designh}-16)$ | 53,85 | 100,00 | 36,84 | 2 (1) | 20(12) | <sup>a</sup> / 35 | <sup>a</sup> / 30 | <sup>a</sup> / 35 | <sup>a</sup> / 27 | C | $(7-16) / (T_{designh}-16)$ | 34,62 | 64,29 | 23,68 | 7 (6) | 20(12) | <sup>a</sup> / 35 | <sup>a</sup> / 27 | <sup>a</sup> / 31 | <sup>a</sup> / 25 | D | $(12-16) / (T_{designh}-16)$ | 15,38 | 28,57 | 10,53 | 12 (11) | 20(12) | <sup>a</sup> / 35 | <sup>a</sup> / 24 | <sup>a</sup> / 26 | <sup>a</sup> / 24 | E | $(TOL^e-16)/(T_{designh}-16)$ |  |  |  | TOL <sup>e</sup> | 20(12) | <sup>a</sup> / 35 | <sup>a</sup> / <sup>b</sup> | <sup>a</sup> / <sup>b</sup> | <sup>a</sup> / <sup>b</sup> | F                                                                                                                                                                                                                                                                                                                                                                             | $(T_{biv}-16)/(T_{designh}-16)$ |  |  |  | $T_{biv}$ | 20(12) | <sup>a</sup> / 35 | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup> | G | $(-15-16) / (T_{designh}-16)$ | n.a. | n.a. | 81,58 | -15 | 20(12) | <sup>a</sup> / 35 | n.a. | n.a. | <sup>a</sup> / 32 | <input type="checkbox"/> Not Tested<br><br>Outlet temp:<br><input type="checkbox"/> Fixed<br><input checked="" type="checkbox"/> Variable<br><br>Climate tested:<br><input checked="" type="checkbox"/> Average<br><input type="checkbox"/> Warmer<br><input type="checkbox"/> Colder<br><br>Air source:<br><input checked="" type="checkbox"/> Outdoor air<br><input type="checkbox"/> Exhaust air<br><br><input type="checkbox"/> fixed flow<br><input checked="" type="checkbox"/> $\Delta T = 5K$ |
| condition    | Part load ratio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                                                                                                                                                                                                                                                                                                                    |                 |        | Dry (wet) bulb temp.       |             | Fixed outlet           |                             | Variable outlet <sup>d</sup> |                             |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |       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|              | Formula                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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                                                                                                                                                                                                                                                                                                                                                    | Warmer          | Colder | Outdoor air                | Exhaust air | All climates           | Average                     | Warmer                       | Colder                      |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |       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| A            | $(-7-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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                                                                                                                                                                                                                                                                                                                                                    | n.a.            | 60,53  | -7 (-8)                    | 20(12)      | <sup>a</sup> / 35      | <sup>a</sup> / 34           | n.a.                         | <sup>a</sup> / 30           |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |       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| B            | $(2-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| C            | $(7-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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                                                                                                                                                                                                                                                                                                                                                    | 64,29           | 23,68  | 7 (6)                      | 20(12)      | <sup>a</sup> / 35      | <sup>a</sup> / 27           | <sup>a</sup> / 31            | <sup>a</sup> / 25           |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |        |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                               |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| D            | $(12-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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                                                                                                                                                                                                                                                                                                                                                    | 28,57           | 10,53  | 12 (11)                    | 20(12)      | <sup>a</sup> / 35      | <sup>a</sup> / 24           | <sup>a</sup> / 26            | <sup>a</sup> / 24           |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |        |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                               |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| E            | $(TOL^e-16)/(T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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                                                                                                                                                                                                                                                                                                                                                    |                 |        | TOL <sup>e</sup>           | 20(12)      | <sup>a</sup> / 35      | <sup>a</sup> / <sup>b</sup> | <sup>a</sup> / <sup>b</sup>  | <sup>a</sup> / <sup>b</sup> |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |        |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                               |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| F            | $(T_{biv}-16)/(T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                                                                                                                                                                                                                                                                                                                    |                 |        | $T_{biv}$                  | 20(12)      | <sup>a</sup> / 35      | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup>  | <sup>a</sup> / <sup>c</sup> |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |       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|        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| G            | $(-15-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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                                                                                                                                                                                                                                                                                                                                                    | n.a.            | 81,58  | -15                        | 20(12)      | <sup>a</sup> / 35      | n.a.                        | n.a.                         | <sup>a</sup> / 32           |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |       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|        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>6.4.3</b> | <p><b>Intermediate Temperature Application</b></p> <p><i>Table 9 – Part load conditions for air-to-water(brine) units in intermediate temperature application for the reference heating seasons</i></p> <table border="1"> <thead> <tr> <th rowspan="3">condition</th><th colspan="4">Part load ratio</th><th colspan="2">Outdoor heat exchanger</th><th colspan="4">Indoor heat exchanger</th></tr> <tr> <th colspan="4"></th><th colspan="2">Dry (wet) bulb temperature</th><th colspan="2">Fixed outlet</th><th colspan="2">Variable outlet<sup>d</sup></th></tr> <tr> <th colspan="4">In %</th><th colspan="8">°C</th></tr> <tr> <th></th><th>Formula</th><th>Average</th><th>Warmer</th><th>Colder</th><th>Outdoor air</th><th>Exhaust air</th><th>All climates</th><th>Average</th><th>Warmer</th><th>Colder</th></tr> </thead> <tbody> <tr> <td>A</td><td><math>(-7-16) / (T_{designh}-16)</math></td><td>88,46</td><td>n.a.</td><td>60,53</td><td>-7 (-8)</td><td>20(12)</td><td><sup>a</sup> / 45</td><td><sup>a</sup> / 43</td><td>n.a.</td><td><sup>a</sup> / 38</td></tr> <tr> <td>B</td><td><math>(2-16) / (T_{designh}-16)</math></td><td>53,85</td><td>100,00</td><td>36,84</td><td>2 (1)</td><td>20(12)</td><td><sup>a</sup> / 45</td><td><sup>a</sup> / 37</td><td><sup>a</sup> / 45</td><td><sup>a</sup> / 33</td></tr> <tr> <td>C</td><td><math>(7-16) / (T_{designh}-16)</math></td><td>34,62</td><td>64,29</td><td>23,68</td><td>7 (6)</td><td>20(12)</td><td><sup>a</sup> / 45</td><td><sup>a</sup> / 33</td><td><sup>a</sup> / 39</td><td><sup>a</sup> / 30</td></tr> <tr> <td>D</td><td><math>(12-16) / (T_{designh}-16)</math></td><td>15,38</td><td>28,57</td><td>10,53</td><td>12 (11)</td><td>20(12)</td><td><sup>a</sup> / 45</td><td><sup>a</sup> / 28</td><td><sup>a</sup> / 31</td><td><sup>a</sup> / 26</td></tr> <tr> <td>E</td><td><math>(TOL^e-16)/(T_{designh}-16)</math></td><td></td><td></td><td></td><td>TOL<sup>e</sup></td><td>20(12)</td><td><sup>a</sup> / 45</td><td><sup>a</sup> / <sup>b</sup></td><td><sup>a</sup> / <sup>b</sup></td><td><sup>a</sup> / <sup>b</sup></td></tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Part load ratio |        |                            |             | Outdoor heat exchanger |                             | Indoor heat exchanger        |                             |  |  |  |  |  |  | Dry (wet) bulb temperature |  | Fixed outlet |  | Variable outlet <sup>d</sup> |  | In % |  |  |  | °C |  |  |  |  |  |  |  |  | Formula | Average | Warmer | Colder | Outdoor air | Exhaust air | All climates | Average | Warmer | Colder | A | $(-7-16) / (T_{designh}-16)$ | 88,46 | n.a. | 60,53 | -7 (-8) | 20(12) | <sup>a</sup> / 45 | <sup>a</sup> / 43 | n.a. | <sup>a</sup> / 38 | B | $(2-16) / (T_{designh}-16)$ | 53,85 | 100,00 | 36,84 | 2 (1) | 20(12) | <sup>a</sup> / 45 | <sup>a</sup> / 37 | <sup>a</sup> / 45 | <sup>a</sup> / 33 | C | $(7-16) / (T_{designh}-16)$ | 34,62 | 64,29 | 23,68 | 7 (6) | 20(12) | <sup>a</sup> / 45 | <sup>a</sup> / 33 | <sup>a</sup> / 39 | <sup>a</sup> / 30 | D | $(12-16) / (T_{designh}-16)$ | 15,38 | 28,57 | 10,53 | 12 (11) | 20(12) | <sup>a</sup> / 45 | <sup>a</sup> / 28 | <sup>a</sup> / 31 | <sup>a</sup> / 26 | E | $(TOL^e-16)/(T_{designh}-16)$ |  |  |  | TOL <sup>e</sup> | 20(12) | <sup>a</sup> / 45 | <sup>a</sup> / <sup>b</sup> | <sup>a</sup> / <sup>b</sup> | <sup>a</sup> / <sup>b</sup> | <input checked="" type="checkbox"/> Not Tested<br><br>Outlet temp:<br><input type="checkbox"/> Fixed<br><input type="checkbox"/> Variable<br><br>Climate tested:<br><input type="checkbox"/> Average<br><input type="checkbox"/> Warmer<br><input type="checkbox"/> Colder<br><br>Air source:<br><input type="checkbox"/> Outdoor air<br><input type="checkbox"/> Exhaust air |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| condition    | Part load ratio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                                                                                                                                                                                                                                                                                                                    |                 |        | Outdoor heat exchanger     |             | Indoor heat exchanger  |                             |                              |                             |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |       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|        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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                                                                                                                                                                                                                                                                                                                                                    |                 |        | Dry (wet) bulb temperature |             | Fixed outlet           |                             | Variable outlet <sup>d</sup> |                             |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |       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 |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                               |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|              | Formula                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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                                                                                                                                                                                                                                                                                                                                                    | Warmer          | Colder | Outdoor air                | Exhaust air | All climates           | Average                     | Warmer                       | Colder                      |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |        |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                               |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| A            | $(-7-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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                                                                                                                                                                                                                                                                                                                                                    | n.a.            | 60,53  | -7 (-8)                    | 20(12)      | <sup>a</sup> / 45      | <sup>a</sup> / 43           | n.a.                         | <sup>a</sup> / 38           |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |        |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                               |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| B            | $(2-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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                                                                                                                                                                                                                                                                                                                                                    | 100,00          | 36,84  | 2 (1)                      | 20(12)      | <sup>a</sup> / 45      | <sup>a</sup> / 37           | <sup>a</sup> / 45            | <sup>a</sup> / 33           |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |        |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                               |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| C            | $(7-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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 |                   |                   |                   |                   |   |                             |       |       |       |       |        |                   |                   |                   |                   |   |                              |       |       |       |         |        |                   |                   |                   |                   |   |                               |  |  |  |                  |        |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                               |                                 |  |  |  |           |        |                   |                             |                             |                             |   |                               |      |      |       |     |        |                   |      |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| D            | $(12-16) / (T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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                                                                                                                                                                                                                                                                                                                                                    | 28,57           | 10,53  | 12 (11)                    | 20(12)      | <sup>a</sup> / 45      | <sup>a</sup> / 28           | <sup>a</sup> / 31            | <sup>a</sup> / 26           |  |  |  |  |  |  |                            |  |              |  |                              |  |      |  |  |  |    |  |  |  |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                              |       |      |       |         |        |                   |                   |      |                   |   |                             |       |        |       |       |       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| E            | $(TOL^e-16)/(T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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|                                 |                                                                  |                                                                                     |
|---------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Version: 001<br>Date: 21-1-2025 | <b>TEST SHEETS</b><br><b>EN 14825; Requirements</b>              |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | 6/19                                                                                |

| <table border="1"> <tr> <td>F</td> <td colspan="4"><math>(T_{biv}-16)/(T_{designh}-16)</math></td> <td><math>T_{biv}</math></td> <td>20(12)</td> <td><math>a/45</math></td> <td><math>a/c</math></td> <td><math>a/c</math></td> <td><math>a/c</math></td> </tr> <tr> <td>G</td> <td><math>(-15-16)/(T_{designh}-16)</math></td> <td>n.a.</td> <td>n.a.</td> <td>81,58</td> <td>-15</td> <td>20(12)</td> <td><math>a/45</math></td> <td>n.a.</td> <td>n.a.</td> <td><math>a/41</math></td> </tr> </table> <p><sup>a</sup> With the water flow rate as determined at the standard rating test conditions given in Table 13 of EN 14511-2:2018 at 40/45 conditions for units with a fixed water flow rate and with a fixed delta T of 5K for units with a variable water flow rate. If for any of the test conditions the resulting flow rate is below the minimum flow rate then this minimum flow rate is used as a fixed flow rate with the outlet temperature for this test condition.<br/> <sup>b</sup> Variable outlet shall be calculated by interpolation from <math>T_{designh}</math> and the temperature which is closest to the TOL.<br/> <sup>c</sup> Variable outlet shall be calculated by interpolation between the upper and lower temp. which are closest to the bivalent temperature.<br/> <sup>d</sup> If the variable outlet temperature is below the min. operation range of the unit, this minimum is used<br/> <sup>e</sup> If <math>TOL &lt; T_{designh}</math> then TOL shall be replaced by <math>T_{designh}</math>.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | F       | $(T_{biv}-16)/(T_{designh}-16)$ |        |                            |             | $T_{biv}$             | 20(12)                       | $a/45$ | $a/c$  | $a/c$                                                                                                                                                                                                                                                          | $a/c$           | G | $(-15-16)/(T_{designh}-16)$ | n.a. | n.a.                   | 81,58 | -15                   | 20(12) | $a/45$ | n.a. | n.a. | $a/41$ | <input type="checkbox"/> fixed flow<br><input type="checkbox"/> $\Delta T = 5K$ |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |        |       |       |        |        |        |        |        |   |                           |       |       |       |       |        |        |        |        |        |   |                            |       |       |       |         |        |        |        |        |        |   |                               |  |  |  |  |         |        |       |       |       |   |                                 |  |  |  |  |           |        |       |       |       |   |                             |      |      |       |     |        |        |      |      |        |                                                                                                                                                                                   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      | $T_{biv}$                  | 20(12)      | $a/45$                | $a/c$                        | $a/c$  | $a/c$  |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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| G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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81,58  | -15                        | 20(12)      | $a/45$                | n.a.                         | n.a.   | $a/41$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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| 6.4.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Medium Temperature Application</b><br><br><i>Table 10 – Part load conditions for air-to-water units in medium temperature application for the reference heating seasons</i> <table border="1"> <tr> <th rowspan="4">condition</th> <th colspan="4">Part load ratio</th> <th colspan="2">Outdoor heat exchanger</th> <th colspan="4">Indoor heat exchanger</th> </tr> <tr> <th colspan="4"></th> <th colspan="2">Dry (wet) bulb temperature</th> <th>Fixed outlet</th> <th colspan="2">Variable outlet<sup>d</sup></th> </tr> <tr> <th colspan="4">In %</th> <th colspan="6">°C</th> </tr> <tr> <th>Formula</th> <th>Average</th> <th>Warmer</th> <th>Colder</th> <th>Outdoor air</th> <th>Exhaust air</th> <th>All climates</th> <th>Average</th> <th>Warmer</th> <th>Colder</th> </tr> <tr> <td>A</td> <td><math>(-7-16)/(T_{designh}-16)</math></td> <td>88,46</td> <td>n.a.</td> <td>60,53</td> <td>-7 (-8)</td> <td>20(12)</td> <td><math>a/55</math></td> <td><math>a/52</math></td> <td>n.a.</td> <td><math>a/44</math></td> </tr> <tr> <td>B</td> <td><math>(2-16)/(T_{designh}-16)</math></td> <td>53,85</td> <td>100,00</td> <td>36,84</td> <td>2 (1)</td> <td>20(12)</td> <td><math>a/55</math></td> <td><math>a/42</math></td> <td><math>a/55</math></td> <td><math>a/37</math></td> </tr> <tr> <td>C</td> <td><math>(7-16)/(T_{designh}-16)</math></td> <td>34,62</td> <td>64,29</td> <td>23,68</td> <td>7 (6)</td> <td>20(12)</td> <td><math>a/55</math></td> <td><math>a/36</math></td> <td><math>a/46</math></td> <td><math>a/32</math></td> </tr> <tr> <td>D</td> <td><math>(12-16)/(T_{designh}-16)</math></td> <td>15,38</td> <td>28,57</td> <td>10,53</td> <td>12 (11)</td> <td>20(12)</td> <td><math>a/55</math></td> <td><math>a/30</math></td> <td><math>a/34</math></td> <td><math>a/28</math></td> </tr> <tr> <td>E</td> <td><math>(TOL^e-16)/(T_{designh}-16)</math></td> <td colspan="4"></td> <td><math>TOL^e</math></td> <td><math>a/55</math></td> <td><math>a/b</math></td> <td><math>a/b</math></td> <td><math>a/b</math></td> </tr> <tr> <td>F</td> <td><math>(T_{biv}-16)/(T_{designh}-16)</math></td> <td colspan="4"></td> <td><math>T_{biv}</math></td> <td><math>a/55</math></td> <td><math>a/c</math></td> <td><math>a/c</math></td> <td><math>a/c</math></td> </tr> <tr> <td>G</td> <td><math>(-15-16)/(T_{designh}-16)</math></td> <td>n.a.</td> <td>n.a.</td> <td>81,58</td> <td>-15</td> <td>20(12)</td> <td><math>a/55</math></td> <td>n.a.</td> <td>n.a.</td> <td><math>a/49</math></td> </tr> </table> <p><sup>a</sup> With the water flow rate as determined at the standard rating test conditions given in Table 14 of EN 14511-2:2018 at 47/55 conditions for units with a fixed water flow rate and with a fixed delta T of 8K for units with a variable water flow rate. If for any of the test conditions the resulting flow rate is below the minimum flow rate then this minimum flow rate is used as a fixed flow rate with the outlet temperature for this test condition.<br/> <sup>b</sup> Variable outlet shall be calculated by interpolation from <math>T_{designh}</math> and the temperature which is closest to the TOL.<br/> <sup>c</sup> Variable outlet shall be calculated by interpolation between the upper and lower temperatures which are closest to the bivalent temperature.<br/> <sup>d</sup> If the variable outlet temperature is below the min. operation range of the unit, this minimum is used.<br/> <sup>e</sup> If <math>TOL &lt; T_{designh}</math> then TOL shall be replaced by <math>T_{designh}</math>.</p> |         |                                 |        |                            |             |                       |                              |        |        | condition                                                                                                                                                                                                                                                      | Part load ratio |   |                             |      | Outdoor heat exchanger |       | Indoor heat exchanger |        |        |      |      |        |                                                                                 |  | Dry (wet) bulb temperature |  | Fixed outlet | Variable outlet <sup>d</sup> |  | In % |  |  |  | °C |  |  |  |  |  | Formula | Average | Warmer | Colder | Outdoor air | Exhaust air | All climates | Average | Warmer | Colder | A | $(-7-16)/(T_{designh}-16)$ | 88,46 | n.a. | 60,53 | -7 (-8) | 20(12) | $a/55$ | $a/52$ | n.a. | $a/44$ | B | $(2-16)/(T_{designh}-16)$ | 53,85 | 100,00 | 36,84 | 2 (1) | 20(12) | $a/55$ | $a/42$ | $a/55$ | $a/37$ | C | $(7-16)/(T_{designh}-16)$ | 34,62 | 64,29 | 23,68 | 7 (6) | 20(12) | $a/55$ | $a/36$ | $a/46$ | $a/32$ | D | $(12-16)/(T_{designh}-16)$ | 15,38 | 28,57 | 10,53 | 12 (11) | 20(12) | $a/55$ | $a/30$ | $a/34$ | $a/28$ | E | $(TOL^e-16)/(T_{designh}-16)$ |  |  |  |  | $TOL^e$ | $a/55$ | $a/b$ | $a/b$ | $a/b$ | F | $(T_{biv}-16)/(T_{designh}-16)$ |  |  |  |  | $T_{biv}$ | $a/55$ | $a/c$ | $a/c$ | $a/c$ | G | $(-15-16)/(T_{designh}-16)$ | n.a. | n.a. | 81,58 | -15 | 20(12) | $a/55$ | n.a. | n.a. | $a/49$ | <input type="checkbox"/> Not Tested<br><br>Outlet temp:<br><input type="checkbox"/> Fixed<br><input checked="" type="checkbox"/> Variable<br><br>Climate tested:<br><input checked="" type="checkbox"/> Average<br><input type="checkbox"/> Warmer<br><input type="checkbox"/> Colder<br><br>Air source:<br><input checked="" type="checkbox"/> Outdoor air<br><input type="checkbox"/> Exhaust air<br><br><input type="checkbox"/> fixed flow<br><input checked="" type="checkbox"/> $\Delta T = 8K$ |
| condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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      | Outdoor heat exchanger     |             | Indoor heat exchanger |                              |        |        |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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      | Dry (wet) bulb temperature |             | Fixed outlet          | Variable outlet <sup>d</sup> |        |        |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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Colder | Outdoor air                | Exhaust air | All climates          | Average                      | Warmer | Colder |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 88,46   | n.a.                            | 60,53  | -7 (-8)                    | 20(12)      | $a/55$                | $a/52$                       | n.a.   | $a/44$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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36,84  | 2 (1)                      | 20(12)      | $a/55$                | $a/42$                       | $a/55$ | $a/37$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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23,68  | 7 (6)                      | 20(12)      | $a/55$                | $a/36$                       | $a/46$ | $a/32$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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10,53  | 12 (11)                    | 20(12)      | $a/55$                | $a/30$                       | $a/34$ | $a/28$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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      |                            | $TOL^e$     | $a/55$                | $a/b$                        | $a/b$  | $a/b$  |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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      |                            | $T_{biv}$   | $a/55$                | $a/c$                        | $a/c$  | $a/c$  |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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81,58  | -15                        | 20(12)      | $a/55$                | n.a.                         | n.a.   | $a/49$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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| 6.4.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>High Temperature Application</b><br><br><i>Table 11 – Part load conditions for air-to-water(brine) units in high temperature application for the reference heating seasons</i> <table border="1"> <tr> <th rowspan="4">condition</th> <th colspan="4">Part load ratio</th> <th colspan="2">Outdoor heat exchanger</th> <th colspan="4">Indoor heat exchanger</th> </tr> <tr> <th colspan="4"></th> <th colspan="2">Dry (wet) bulb temp.</th> <th>Fixed outlet</th> <th colspan="2">Variable outlet<sup>d</sup></th> </tr> <tr> <th colspan="4">In %</th> <th colspan="6">°C</th> </tr> <tr> <th>Formula</th> <th>Average</th> <th>Warmer</th> <th>Colder</th> <th>Outdoor air</th> <th>Exhaust air</th> <th>All climates</th> <th>Average</th> <th>Warmer</th> <th>Colder</th> </tr> <tr> <td>A</td> <td><math>(-7-16)/(T_{designh}-16)</math></td> <td>88,46</td> <td>n.a.</td> <td>60,53</td> <td>-7 (-8)</td> <td>20(12)</td> <td><math>a/65</math></td> <td><math>a/61</math></td> <td>n.a.</td> <td><math>a/50</math></td> </tr> <tr> <td>B</td> <td><math>(2-16)/(T_{designh}-16)</math></td> <td>53,85</td> <td>100,00</td> <td>36,84</td> <td>2 (1)</td> <td>20(12)</td> <td><math>a/65</math></td> <td><math>a/49</math></td> <td><math>a/65</math></td> <td><math>a/41</math></td> </tr> <tr> <td>C</td> <td><math>(7-16)/(T_{designh}-16)</math></td> <td>34,62</td> <td>64,29</td> <td>23,68</td> <td>7 (6)</td> <td>20(12)</td> <td><math>a/65</math></td> <td><math>a/41</math></td> <td><math>a/53</math></td> <td><math>a/36</math></td> </tr> <tr> <td>D</td> <td><math>(12-16)/(T_{designh}-16)</math></td> <td>15,38</td> <td>28,57</td> <td>10,53</td> <td>12 (11)</td> <td>20(12)</td> <td><math>a/65</math></td> <td><math>a/32</math></td> <td><math>a/39</math></td> <td><math>a/30</math></td> </tr> <tr> <td>E</td> <td><math>(TOL^e-16)/(T_{designh}-16)</math></td> <td colspan="4"></td> <td><math>TOL^e</math></td> <td><math>a/65</math></td> <td><math>a/b</math></td> <td><math>a/b</math></td> <td><math>a/b</math></td> </tr> <tr> <td>F</td> <td><math>(T_{biv}-16)/(T_{designh}-16)</math></td> <td colspan="4"></td> <td><math>T_{biv}</math></td> <td><math>a/65</math></td> <td><math>a/c</math></td> <td><math>a/c</math></td> <td><math>a/c</math></td> </tr> <tr> <td>G</td> <td><math>(-15-16)/(T_{designh}-16)</math></td> <td>n.a.</td> <td>n.a.</td> <td>81,58</td> <td>-15</td> <td>20(12)</td> <td><math>a/65</math></td> <td>n.a.</td> <td>n.a.</td> <td><math>a/57</math></td> </tr> </table> <p><sup>a</sup> With the water flow rate as determined at the standard rating test conditions given in Table 15 of EN 14511-2:2018 at 55/65 conditions for units with a fixed water flow rate and with a fixed delta T of 10K for units with a variable water flow rate. If for any of the test conditions the resulting flow rate is below the minimum flow rate then this minimum flow rate is used as a fixed flow rate with the outlet temperature for this test condition.<br/> <sup>b</sup> Variable outlet shall be calculated by interpolation from <math>T_{designh}</math> and the temperature which is closest to the TOL.<br/> <sup>c</sup> Variable outlet shall be calculated by interpolation between the upper and lower temperatures which are closest to the bivalent temperature.<br/> <sup>d</sup> If the variable outlet temperature is below the min. operation range of the unit, this minimum is used.<br/> <sup>e</sup> If <math>TOL &lt; T_{designh}</math> then TOL shall be replaced by <math>T_{designh}</math>.</p>   |         |                                 |        |                            |             |                       |                              |        |        | condition                                                                                                                                                                                                                                                      | Part load ratio |   |                             |      | Outdoor heat exchanger |       | Indoor heat exchanger |        |        |      |      |        |                                                                                 |  | Dry (wet) bulb temp.       |  | Fixed outlet | Variable outlet <sup>d</sup> |  | In % |  |  |  | °C |  |  |  |  |  | Formula | Average | Warmer | Colder | Outdoor air | Exhaust air | All climates | Average | Warmer | Colder | A | $(-7-16)/(T_{designh}-16)$ | 88,46 | n.a. | 60,53 | -7 (-8) | 20(12) | $a/65$ | $a/61$ | n.a. | $a/50$ | B | $(2-16)/(T_{designh}-16)$ | 53,85 | 100,00 | 36,84 | 2 (1) | 20(12) | $a/65$ | $a/49$ | $a/65$ | $a/41$ | C | $(7-16)/(T_{designh}-16)$ | 34,62 | 64,29 | 23,68 | 7 (6) | 20(12) | $a/65$ | $a/41$ | $a/53$ | $a/36$ | D | $(12-16)/(T_{designh}-16)$ | 15,38 | 28,57 | 10,53 | 12 (11) | 20(12) | $a/65$ | $a/32$ | $a/39$ | $a/30$ | E | $(TOL^e-16)/(T_{designh}-16)$ |  |  |  |  | $TOL^e$ | $a/65$ | $a/b$ | $a/b$ | $a/b$ | F | $(T_{biv}-16)/(T_{designh}-16)$ |  |  |  |  | $T_{biv}$ | $a/65$ | $a/c$ | $a/c$ | $a/c$ | G | $(-15-16)/(T_{designh}-16)$ | n.a. | n.a. | 81,58 | -15 | 20(12) | $a/65$ | n.a. | n.a. | $a/57$ | <input checked="" type="checkbox"/> Not Tested<br><br>Outlet temp:<br><input type="checkbox"/> Fixed<br><input type="checkbox"/> Variable<br><br>Climate tested:<br><input type="checkbox"/> Average<br><input type="checkbox"/> Warmer<br><input type="checkbox"/> Colder<br><br>Air source:<br><input type="checkbox"/> Outdoor air<br><input type="checkbox"/> Exhaust air<br><br><input type="checkbox"/> fixed flow<br><input type="checkbox"/> $\Delta T = 10K$                                 |
| condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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      | Outdoor heat exchanger     |             | Indoor heat exchanger |                              |        |        |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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      | Dry (wet) bulb temp.       |             | Fixed outlet          | Variable outlet <sup>d</sup> |        |        |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Average | Warmer                          | Colder | Outdoor air                | Exhaust air | All climates          | Average                      | Warmer | Colder |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $(-7-16)/(T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 88,46   | n.a.                            | 60,53  | -7 (-8)                    | 20(12)      | $a/65$                | $a/61$                       | n.a.   | $a/50$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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| B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $(2-16)/(T_{designh}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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36,84  | 2 (1)                      | 20(12)      | $a/65$                | $a/49$                       | $a/65$ | $a/41$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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| C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 34,62   | 64,29                           | 23,68  | 7 (6)                      | 20(12)      | $a/65$                | $a/41$                       | $a/53$ | $a/36$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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| D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 15,38   | 28,57                           | 10,53  | 12 (11)                    | 20(12)      | $a/65$                | $a/32$                       | $a/39$ | $a/30$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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| E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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      |                            | $TOL^e$     | $a/65$                | $a/b$                        | $a/b$  | $a/b$  |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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| F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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      |                            | $T_{biv}$   | $a/65$                | $a/c$                        | $a/c$  | $a/c$  |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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| G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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81,58  | -15                        | 20(12)      | $a/65$                | n.a.                         | n.a.   | $a/57$ |                                                                                                                                                                                                                                                                |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |   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| 6.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>DX-to-Water(Brine) (can't be tested) and Water(Brine)-to-Water(Brine) units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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      |                            |             |                       |                              |        |        | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                    |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |        |        |   |                            |       |      |       |         |        |        |        |      |        |   |                           |       |    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| 6.5.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>General</b><br>The part load conditions for determining the declared capacity ( $P_{ah}$ ) and the declared coefficient of performance ( $COP_d$ ) are given in tables 12 to 15.<br><br>The variable outlet temperature shall only be applied when the control provides an outdoor temperature dependant modification of the outlet temperature. Has the unit a variable outlet temperature?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |                                 |        |                            |             |                       |                              |        |        | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |                 |   |                             |      |                        |       |                       |        |        |      |      |        |                                                                                 |  |                            |  |              |                              |  |      |  |  |  |    |  |  |  |  |  |         |         |        |        |             |             |              |         |   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|                                 |                                                                  |                                                                                     |
|---------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Version: 001<br>Date: 21-1-2025 | <b>TEST SHEETS</b><br><b>EN 14825; Requirements</b>              |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | 7/19                                                                                |

|                                                                                                                                                                                                                    |                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| For units with variable outlet that have to cycle on/off to reach the required part load ratio inlet and outlet temperatures of the indoor heat exchanger shall be determined according to Formula (38) in 11.5.1. | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| $t_{out,av} = t_{in,test} + (t_{out,test} - t_{in,test}) \times CR \quad (38)$                                                                                                                                     | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| T <sub>in,test</sub> and T <sub>out,test</sub> are determined iterative until a convergence of 0,1K is reached. Is the unit on/off cycling or does the unit to cycle on/off to reach the desired part load ratio?  | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| For hybrid units test points F (T <sub>biv</sub> ) and E mentioned in Tables 12 to 15 of part load conditions shall be replaced by T <sub>fb,off</sub> and T <sub>hp,on</sub> respectively as explained in 6.1.    | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| For hybrid units using the combined test method (see 8.3) in case T <sub>hp,on</sub> is greater than T <sub>designh</sub> an additional condition at T <sub>designh</sub> is required.                             | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |

|                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                  |                                     |         |        |        |                        |                  |              |                              |                             |                                     |                             |                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------|--------|--------|------------------------|------------------|--------------|------------------------------|-----------------------------|-------------------------------------|-----------------------------|-----------------------------------------------|
| 6.5.2                                                                                                                                                                                                                                                                                                                                                                                                                     | Low Temperature Application                                                                                                                      |                                     |         |        |        |                        |                  |              |                              |                             |                                     | ■ Not Tested                |                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | Table 12 – Part load conditions for Water(Brine)-to-Water(Brine) units in low temperature application for the reference heating seasons          |                                     |         |        |        |                        |                  |              |                              |                             |                                     | Outdoor heat exchanger:     |                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | condition                                                                                                                                        | Part load ratio                     |         |        |        | Outdoor heat exchanger |                  |              | Indoor heat exchanger        |                             |                                     |                             | <input type="checkbox"/> Water                |
|                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                  |                                     |         |        |        | Inlet/Outlet temp.     | Bath             | Fixed outlet | Variable outlet <sup>d</sup> |                             | <input type="checkbox"/> Brine      |                             |                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                  | In %                                |         |        |        | °C                     |                  |              |                              |                             |                                     |                             | <input type="checkbox"/> DX (can't be tested) |
|                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                  | Formula                             | Average | Warmer | Colder | Water                  | Brine            | DX           | All climates                 | Average                     | Warmer                              | Colder                      | Outlet temp:                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | A                                                                                                                                                | $(-7-16) / (T_{designh}-16)$        | 88,46   | n.a    | 60,53  | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 35            | <sup>a</sup> / 34           | n.a                                 | <sup>a</sup> / 30           | <input type="checkbox"/> Fixed                |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | B                                                                                                                                                | $(2-16) / (T_{designh}-16)$         | 53,85   | 100,00 | 36,84  | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 35            | <sup>a</sup> / 30           | <sup>a</sup> / 35                   | <sup>a</sup> / 27           | <input type="checkbox"/> Variable             |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | C                                                                                                                                                | $(7-16) / (T_{designh}-16)$         | 34,62   | 64,29  | 23,68  | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 35            | <sup>a</sup> / 27           | <sup>a</sup> / 31                   | <sup>a</sup> / 25           | Climate tested:                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | D                                                                                                                                                | $(12-16) / (T_{designh}-16)$        | 15,38   | 28,57  | 10,53  | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 35            | <sup>a</sup> / 24           | <sup>a</sup> / 26                   | <sup>a</sup> / 24           | <input type="checkbox"/> Average              |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | E                                                                                                                                                | $(T_{designh}-16)/(T_{designh}-16)$ | 100,00  |        |        | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 35            | <sup>a</sup> / 35           | <sup>a</sup> / 35                   | <sup>a</sup> / 35           | <input type="checkbox"/> Warmer               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | F                                                                                                                                                | $(T_{biv}-16)/(T_{designh}-16)$     |         |        |        | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 35            | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup>         | <sup>a</sup> / <sup>c</sup> | <input type="checkbox"/> Colder               |
| <sup>a</sup> With the flow rate as determined at the standard rating test conditions given in Table 7 of EN 14511-2:2018 or in Table 3 of EN 15879-1:2011 at 30/35 conditions for units with a fixed water flow rate and with a fixed delta T of 5K for units with a variable water flow rate. If the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the outlet temperature. |                                                                                                                                                  |                                     |         |        |        |                        |                  |              |                              |                             | <input type="checkbox"/> fixed flow |                             |                                               |
| <sup>b</sup> With the flow rate as determined at the standard rating test conditions given in Table 7 of EN 14511-2:2018 for units with a fixed flow rate or with a fixed delta T of 3K for units with a variable flow rate. If for any of the test conditions the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the inlet temperature for this test condition.             |                                                                                                                                                  |                                     |         |        |        |                        |                  |              |                              |                             | <input type="checkbox"/> ΔT = 5K    |                             |                                               |
| <sup>c</sup> Variable outlet shall be calculated by interpolation between the upper and lower temp. which are closest to the bivalent temperature                                                                                                                                                                                                                                                                         |                                                                                                                                                  |                                     |         |        |        |                        |                  |              |                              |                             |                                     |                             |                                               |
| <sup>d</sup> If the variable outlet temp. is below the minimum operation range of the unit, this minimum is used.                                                                                                                                                                                                                                                                                                         |                                                                                                                                                  |                                     |         |        |        |                        |                  |              |                              |                             |                                     |                             |                                               |
| 6.5.3                                                                                                                                                                                                                                                                                                                                                                                                                     | Intermediate Temperature Application                                                                                                             |                                     |         |        |        |                        |                  |              |                              |                             |                                     | ■ Not Tested                |                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | Table 13 – Part load conditions for Water(Brine)-to-Water(Brine) units in intermediate temperature application for the reference heating seasons |                                     |         |        |        |                        |                  |              |                              |                             |                                     | Outdoor heat exchanger:     |                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | condition                                                                                                                                        | Part load ratio                     |         |        |        | Outdoor heat exchanger |                  |              | Indoor heat exchanger        |                             |                                     |                             | <input type="checkbox"/> Water                |
|                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                  |                                     |         |        |        | Inlet/Outlet temp.     | Bath             | Fixed outlet | Variable outlet <sup>d</sup> |                             | <input type="checkbox"/> Brine      |                             |                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                  | In %                                |         |        |        | °C                     |                  |              |                              |                             |                                     |                             | <input type="checkbox"/> DX (can't be tested) |
|                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                  | Formula                             | Average | Warmer | Colder | Water                  | Brine            | DX           | All climates                 | Average                     | Warmer                              | Colder                      | Outlet temp:                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | A                                                                                                                                                | $(-7-16) / (T_{designh}-16)$        | 88,46   | n.a    | 60,53  | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 45            | <sup>a</sup> / 43           | n.a                                 | <sup>a</sup> / 38           | <input type="checkbox"/> Fixed                |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | B                                                                                                                                                | $(2-16) / (T_{designh}-16)$         | 53,85   | 100,00 | 36,84  | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 45            | <sup>a</sup> / 37           | <sup>a</sup> / 45                   | <sup>a</sup> / 33           | <input type="checkbox"/> Variable             |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | C                                                                                                                                                | $(7-16) / (T_{designh}-16)$         | 34,62   | 64,29  | 23,68  | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 45            | <sup>a</sup> / 33           | <sup>a</sup> / 39                   | <sup>a</sup> / 30           | Climate tested:                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | D                                                                                                                                                | $(12-16) / (T_{designh}-16)$        | 15,38   | 28,57  | 10,53  | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 45            | <sup>a</sup> / 28           | <sup>a</sup> / 31                   | <sup>a</sup> / 26           | <input type="checkbox"/> Average              |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | E                                                                                                                                                | $(T_{designh}-16)/(T_{designh}-16)$ | 100,00  |        |        | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 45            | <sup>a</sup> / 45           | <sup>a</sup> / 45                   | <sup>a</sup> / 45           | <input type="checkbox"/> Warmer               |
|                                                                                                                                                                                                                                                                                                                                                                                                                           | F                                                                                                                                                | $(T_{biv}-16)/(T_{designh}-16)$     |         |        |        | 10 / <sup>b</sup>      | 0 / <sup>b</sup> | 4            | <sup>a</sup> / 45            | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup>         | <sup>a</sup> / <sup>c</sup> | <input type="checkbox"/> Colder               |
| <sup>a</sup> With the flow rate as determined at the standard rating test conditions given in Table 8 of EN 14511-2:2018 or in Table 3 of EN 15879-1:2011 at 40/45 conditions for units with a fixed water flow rate and with a fixed delta T of 5K for units with a variable water flow rate. If the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the outlet temperature. |                                                                                                                                                  |                                     |         |        |        |                        |                  |              |                              |                             | <input type="checkbox"/> fixed flow |                             |                                               |
| <sup>b</sup> With the flow rate as determined at the standard rating test conditions given in Table 8 of EN 14511-2:2018 for units with a fixed flow rate or with a fixed delta T of 3K for units with a variable flow rate. If for any of the test conditions the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the inlet temperature for this test condition.             |                                                                                                                                                  |                                     |         |        |        |                        |                  |              |                              |                             | <input type="checkbox"/> ΔT = 5K    |                             |                                               |

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|                                 |                                                                  |                                                                                     |
|---------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Version: 001<br>Date: 21-1-2025 | <b>TEST SHEETS</b><br><b>EN 14825; Requirements</b>              |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | 8/19                                                                                |

<sup>c</sup> Variable outlet shall be calculated by interpolation between the upper and lower temp. which are closest to the bivalent temperature  
<sup>d</sup> If the variable outlet temp. is below the minimum operation range of the unit, this minimum is used

| 6.5.4     | <div>Medium Temperature Application</div> <div>Table 14 – Part load conditions for Water(Brine)-to-Water(Brine) units in Medium temperature application for the reference heating seasons</div> <table><tr><th rowspan="4">condition</th><th colspan="4" rowspan="2">Part load ratio</th><th colspan="3">Outdoor heat exchanger</th><th colspan="4">Indoor heat exchanger</th></tr><tr><th colspan="2">Inlet/Outlet temp.</th><th>Bath</th><th>Fixed outlet</th><th colspan="2">Variable outlet<sup>d</sup></th></tr><tr><th colspan="4">In %</th><th colspan="7">°C</th></tr><tr><th>Formula</th><th>Average</th><th>Warmer</th><th>Colder</th><th>Water</th><th>Brine</th><th>DX</th><th>All climates</th><th>Average</th><th>Warmer</th><th>Colder</th></tr><tr><td>A</td><td><math>(-7-16) / (T_{\text{designh}}-16)</math></td><td>88,46</td><td>n.a</td><td>60,53</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / 52</td><td>n.a.</td><td><sup>a</sup> / 44</td></tr><tr><td>B</td><td><math>(2-16) / (T_{\text{designh}}-16)</math></td><td>53,85</td><td>100,00</td><td>36,84</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / 42</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / 37</td></tr><tr><td>C</td><td><math>(7-16) / (T_{\text{designh}}-16)</math></td><td>34,62</td><td>64,29</td><td>23,68</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / 36</td><td><sup>a</sup> / 46</td><td><sup>a</sup> / 32</td></tr><tr><td>D</td><td><math>(12-16) / (T_{\text{designh}}-16)</math></td><td>15,38</td><td>28,57</td><td>10,53</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / 30</td><td><sup>a</sup> / 34</td><td><sup>a</sup> / 28</td></tr><tr><td>E</td><td><math>(T_{\text{designh}}-16) / (T_{\text{designh}}-16)</math></td><td colspan="3">100,00</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / 55</td></tr><tr><td>F</td><td colspan="4"><math>(T_{\text{blv}}-16) / (T_{\text{designh}}-16)</math></td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 55</td><td><sup>a</sup> / <sup>c</sup></td><td><sup>a</sup> / <sup>c</sup></td><td><sup>a</sup> / <sup>c</sup></td></tr></table> <div><sup>a</sup> With the flow rate as determined at the standard rating test conditions given in Table 9 of EN 14511-2:2018 or in Table 3 of EN 15879-1:2011 at 47/55 conditions for units with a fixed water flow rate and with a fixed delta T of 8K for units with a variable water flow rate. If the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the outlet temperature.<br/><sup>b</sup> With the flow rate as determined at the standard rating test conditions given in Table 9 of EN 14511-2:2018 for units with a fixed flow rate or with a fixed delta T of 3K for units with a variable flow rate. If for any of the test conditions the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the inlet temperature for this test condition.<br/><sup>c</sup> Variable outlet shall be calculated by interpolation between the upper and lower temp. which are closest to the bivalent temperature<br/><sup>d</sup> If the variable outlet temp. is below the minimum operation range of the unit, this minimum is used.</div> | condition | Part load ratio |        |                    |                  | Outdoor heat exchanger |                   |                              | Indoor heat exchanger       |                             |  |  | Inlet/Outlet temp. |  | Bath | Fixed outlet | Variable outlet <sup>d</sup> |  | In % |  |  |  | °C |  |  |  |  |  |  | Formula | Average | Warmer | Colder | Water | Brine | DX | All climates | Average | Warmer | Colder | A | $(-7-16) / (T_{\text{designh}}-16)$ | 88,46 | n.a | 60,53 | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 55 | <sup>a</sup> / 52 | n.a. | <sup>a</sup> / 44 | B | $(2-16) / (T_{\text{designh}}-16)$ | 53,85 | 100,00 | 36,84 | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 55 | <sup>a</sup> / 42 | <sup>a</sup> / 55 | <sup>a</sup> / 37 | C | $(7-16) / (T_{\text{designh}}-16)$ | 34,62 | 64,29 | 23,68 | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 55 | <sup>a</sup> / 36 | <sup>a</sup> / 46 | <sup>a</sup> / 32 | D | $(12-16) / (T_{\text{designh}}-16)$ | 15,38 | 28,57 | 10,53 | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 55 | <sup>a</sup> / 30 | <sup>a</sup> / 34 | <sup>a</sup> / 28 | E | $(T_{\text{designh}}-16) / (T_{\text{designh}}-16)$ | 100,00 |  |  | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 55 | <sup>a</sup> / 55 | <sup>a</sup> / 55 | <sup>a</sup> / 55 | F | $(T_{\text{blv}}-16) / (T_{\text{designh}}-16)$ |  |  |  | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 55 | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup> | <div>Not Tested</div> <div>Outdoor heat exchanger:</div> <div><input type="checkbox"/> Water<br/><input type="checkbox"/> Brine<br/><input type="checkbox"/> DX (can't be tested)</div> <div>Outlet temp:</div> <div><input type="checkbox"/> Fixed<br/><input type="checkbox"/> Variable</div> <div>Climate tested:</div> <div><input type="checkbox"/> Average<br/><input type="checkbox"/> Warmer<br/><input type="checkbox"/> Colder</div> <div><input type="checkbox"/> fixed flow<br/><input type="checkbox"/> ΔT = 8K</div>  |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------|--------|--------------------|------------------|------------------------|-------------------|------------------------------|-----------------------------|-----------------------------|--|--|--------------------|--|------|--------------|------------------------------|--|------|--|--|--|----|--|--|--|--|--|--|---------|---------|--------|--------|-------|-------|----|--------------|---------|--------|--------|---|-------------------------------------|-------|-----|-------|-------------------|------------------|---|-------------------|-------------------|------|-------------------|---|------------------------------------|-------|--------|-------|-------------------|------------------|---|-------------------|-------------------|-------------------|-------------------|---|------------------------------------|-------|-------|-------|-------------------|------------------|---|-------------------|-------------------|-------------------|-------------------|---|-------------------------------------|-------|-------|-------|-------------------|------------------|---|-------------------|-------------------|-------------------|-------------------|---|-----------------------------------------------------|--------|--|--|-------------------|------------------|---|-------------------|-------------------|-------------------|-------------------|---|-------------------------------------------------|--|--|--|-------------------|------------------|---|-------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| condition | Part load ratio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                 |        |                    |                  | Outdoor heat exchanger |                   |                              | Indoor heat exchanger       |                             |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                 |        | Inlet/Outlet temp. |                  | Bath                   | Fixed outlet      | Variable outlet <sup>d</sup> |                             |                             |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|           | In %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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            |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|           | Formula                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Average   | Warmer          | Colder | Water              | Brine            | DX                     | All climates      | Average                      | Warmer                      | Colder                      |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| A         | $(-7-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 88,46     | n.a             | 60,53  | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 55 | <sup>a</sup> / 52            | n.a.                        | <sup>a</sup> / 44           |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| B         | $(2-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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            |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| C         | $(7-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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            |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| D         | $(12-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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            |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| E         | $(T_{\text{designh}}-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 100,00    |                 |        | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 55 | <sup>a</sup> / 55            | <sup>a</sup> / 55           | <sup>a</sup> / 55           |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| F         | $(T_{\text{blv}}-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                 |        | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 55 | <sup>a</sup> / <sup>c</sup>  | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup> |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 6.5.5     | <div>High Temperature Application</div> <div>Table 15 – Part load conditions for Water(Brine)-to-Water(Brine) units in High temperature application for the reference heating seasons</div> <table><tr><th rowspan="4">condition</th><th colspan="4" rowspan="2">Part load ratio</th><th colspan="3">Outdoor heat exchanger</th><th colspan="4">Indoor heat exchanger</th></tr><tr><th colspan="2">Inlet/Outlet temp.</th><th>Bath</th><th>Fixed outlet</th><th colspan="2">Variable outlet<sup>d</sup></th></tr><tr><th colspan="4">In %</th><th colspan="7">°C</th></tr><tr><th>Formula</th><th>Average</th><th>Warmer</th><th>Colder</th><th>Water</th><th>Brine</th><th>DX</th><th>All climates</th><th>Average</th><th>Warmer</th><th>Colder</th></tr><tr><td>A</td><td><math>(-7-16) / (T_{\text{designh}}-16)</math></td><td>88,46</td><td>n.a</td><td>60,53</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / 61</td><td>n.a.</td><td><sup>a</sup> / 50</td></tr><tr><td>B</td><td><math>(2-16) / (T_{\text{designh}}-16)</math></td><td>53,85</td><td>100,00</td><td>36,84</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / 49</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / 41</td></tr><tr><td>C</td><td><math>(7-16) / (T_{\text{designh}}-16)</math></td><td>34,62</td><td>64,29</td><td>23,68</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / 41</td><td><sup>a</sup> / 53</td><td><sup>a</sup> / 36</td></tr><tr><td>D</td><td><math>(12-16) / (T_{\text{designh}}-16)</math></td><td>15,38</td><td>28,57</td><td>10,53</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / 32</td><td><sup>a</sup> / 39</td><td><sup>a</sup> / 30</td></tr><tr><td>E</td><td><math>(T_{\text{designh}}-16) / (T_{\text{designh}}-16)</math></td><td colspan="3">100,00</td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / 65</td></tr><tr><td>F</td><td colspan="4"><math>(T_{\text{blv}}-16) / (T_{\text{designh}}-16)</math></td><td>10 / <sup>b</sup></td><td>0 / <sup>b</sup></td><td>4</td><td><sup>a</sup> / 65</td><td><sup>a</sup> / <sup>c</sup></td><td><sup>a</sup> / <sup>c</sup></td><td><sup>a</sup> / <sup>c</sup></td></tr></table> <div><sup>a</sup> With the flow rate as determined at the standard rating test conditions given in Table 10 of EN 14511-2:2018 or Table 3 of EN 15879-1:2011 at 55/65 conditions for units with a fixed water flow rate and with a fixed delta T of 10K for units with a variable water flow rate. If the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the outlet temperature.<br/><sup>b</sup> With the flow rate as determined at the standard rating test conditions given in Table 10 of EN 14511-2:2018 for units with a fixed flow rate or with a fixed delta T of 3K for units with a variable flow rate. If for any of the test conditions the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the inlet temperature for this test condition.<br/><sup>c</sup> Variable outlet shall be calculated by interpolation between the upper and lower temp. which are closest to the bivalent temperature.<br/><sup>d</sup> If the variable outlet temp. is below the minimum operation range of the unit, this minimum is used.</div>    | condition | Part load ratio |        |                    |                  | Outdoor heat exchanger |                   |                              | Indoor heat exchanger       |                             |  |  | Inlet/Outlet temp. |  | Bath | Fixed outlet | Variable outlet <sup>d</sup> |  | In % |  |  |  | °C |  |  |  |  |  |  | Formula | Average | Warmer | Colder | Water | Brine | DX | All climates | Average | Warmer | Colder | A | $(-7-16) / (T_{\text{designh}}-16)$ | 88,46 | n.a | 60,53 | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 65 | <sup>a</sup> / 61 | n.a. | <sup>a</sup> / 50 | B | $(2-16) / (T_{\text{designh}}-16)$ | 53,85 | 100,00 | 36,84 | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 65 | <sup>a</sup> / 49 | <sup>a</sup> / 65 | <sup>a</sup> / 41 | C | $(7-16) / (T_{\text{designh}}-16)$ | 34,62 | 64,29 | 23,68 | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 65 | <sup>a</sup> / 41 | <sup>a</sup> / 53 | <sup>a</sup> / 36 | D | $(12-16) / (T_{\text{designh}}-16)$ | 15,38 | 28,57 | 10,53 | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 65 | <sup>a</sup> / 32 | <sup>a</sup> / 39 | <sup>a</sup> / 30 | E | $(T_{\text{designh}}-16) / (T_{\text{designh}}-16)$ | 100,00 |  |  | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 65 | <sup>a</sup> / 65 | <sup>a</sup> / 65 | <sup>a</sup> / 65 | F | $(T_{\text{blv}}-16) / (T_{\text{designh}}-16)$ |  |  |  | 10 / <sup>b</sup> | 0 / <sup>b</sup> | 4 | <sup>a</sup> / 65 | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup> | <div>Not Tested</div> <div>Outdoor heat exchanger:</div> <div><input type="checkbox"/> Water<br/><input type="checkbox"/> Brine<br/><input type="checkbox"/> DX (can't be tested)</div> <div>Outlet temp:</div> <div><input type="checkbox"/> Fixed<br/><input type="checkbox"/> Variable</div> <div>Climate tested:</div> <div><input type="checkbox"/> Average<br/><input type="checkbox"/> Warmer<br/><input type="checkbox"/> Colder</div> <div><input type="checkbox"/> fixed flow<br/><input type="checkbox"/> ΔT = 10K</div> |
| condition | Part load ratio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                 |        |                    |                  | Outdoor heat exchanger |                   |                              | Indoor heat exchanger       |                             |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                 |        | Inlet/Outlet temp. |                  | Bath                   | Fixed outlet      | Variable outlet <sup>d</sup> |                             |                             |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|           | In %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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            |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|           | Formula                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Average   | Warmer          | Colder | Water              | Brine            | DX                     | All climates      | Average                      | Warmer                      | Colder                      |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| A         | $(-7-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 88,46     | n.a             | 60,53  | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 65 | <sup>a</sup> / 61            | n.a.                        | <sup>a</sup> / 50           |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| B         | $(2-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 53,85     | 100,00          | 36,84  | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 65 | <sup>a</sup> / 49            | <sup>a</sup> / 65           | <sup>a</sup> / 41           |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| C         | $(7-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 34,62     | 64,29           | 23,68  | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 65 | <sup>a</sup> / 41            | <sup>a</sup> / 53           | <sup>a</sup> / 36           |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| D         | $(12-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 15,38     | 28,57           | 10,53  | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 65 | <sup>a</sup> / 32            | <sup>a</sup> / 39           | <sup>a</sup> / 30           |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| E         | $(T_{\text{designh}}-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 100,00    |                 |        | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 65 | <sup>a</sup> / 65            | <sup>a</sup> / 65           | <sup>a</sup> / 65           |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| F         | $(T_{\text{blv}}-16) / (T_{\text{designh}}-16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                 |        | 10 / <sup>b</sup>  | 0 / <sup>b</sup> | 4                      | <sup>a</sup> / 65 | <sup>a</sup> / <sup>c</sup>  | <sup>a</sup> / <sup>c</sup> | <sup>a</sup> / <sup>c</sup> |  |  |                    |  |      |              |                              |  |      |  |  |  |    |  |  |  |  |  |  |         |         |        |        |       |       |    |              |         |        |        |   |                                     |       |     |       |                   |                  |   |                   |                   |      |                   |   |                                    |       |        |       |                   |                  |   |                   |                   |                   |                   |   |                                    |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                     |       |       |       |                   |                  |   |                   |                   |                   |                   |   |                                                     |        |  |  |                   |                  |   |                   |                   |                   |                   |   |                                                 |  |  |  |                   |                  |   |                   |                             |                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

|            |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                       |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>7</b>   | <b>Calculation methods for seasonal space heating efficiency <math>\eta_{s,h}</math>, SCOP, SCOP<sub>on</sub> and SCOP<sub>net</sub></b>                                                                                                                                                                                                                                                                     |                                                                       |
| <b>7.1</b> | <b>General</b><br>For units, except multi-split Air-to-Air >12 kW cooling capacity (or heating capacity for heating only units) and multi-split Water(Brine)-to-Air units, the calculation method as described below shall be used. The calculations are made with a designated calculation tool as available on the HP Keymark website (version: SCOP_SEER_water based HP_V7.1.xlsm – published 11-05-2021) | <div> <div>YES</div> <div>NA</div> <div>NT</div> <div>NO</div> </div> |

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| Version: 001<br>Date: 21-1-2025 | <b>TEST SHEETS</b><br><b>EN 14825; Requirements</b>              |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | 9/19                                                                                |

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|            | <i>NOTE The calculations are only available for low and medium temperature application for all climates</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                  |
| <b>7.2</b> | <p><b>Calculation of the seasonal space heating efficiency <math>\eta_s</math></b><br/>The seasonal space heating efficiency <math>\eta_{s,h}</math> expressed in % is calculated with Formula (11) and (12).</p> $\eta_s = \frac{1}{CC} \times SCOP - \sum F(i) \quad (11)$ $\sum F(i) = F(1) + F(2) \quad (12)$ <p>Where<br/>CC is the coefficient for electricity generation efficiency<br/>SCOP is the seasonal coefficient of performance, see 7.3<br/><math>\sum F(i)</math> is the correction calculates according to Formula (12)<br/>F(1) is the correction that accounts for a negative contribution of the seasonal space heating energy efficiency of space heaters due to adjusted contributions of temperature controls, equal to 3%<br/>F(2) is the correction that accounts for a negative contribution of the seasonal space heating energy efficiency by electricity consumption of brine and water pumps. This factor is only for water/brine-to-water and water/brine-to-air units and is equal to 5%</p>  | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| <b>7.3</b> | <p><b>General formula for calculation of SCOP</b><br/>The SCOP is defined as reference annual heating demand <math>Q_{H,r}</math> divided by the annual energy consumption <math>Q_{HE}</math> according to Formula (13).</p> $SCOP = \frac{Q_H}{Q_{HE}} \quad (13)$ <p>Where<br/><math>Q_H</math> is the reference annual heating demand in, expressed in kWh<br/><math>Q_{HE}</math> is the annual energy consumption for heating, expressed in kWh</p> <p><i>Note 1 Climate conditions and hours to be used in the SCOP calculations for air-to-air units <math>\leq 12</math> kW are given in Annex A.</i><br/><i>Note 2 Climate conditions and hours to be used in the SCOP calculations for Air-to-Water(Brine) and Water(Brine)-to-Water(Brine) and DX-to-Water(Brine) units <math>\leq 400</math> kW are given in Annex B.</i><br/><i>Note 3 Climate conditions and hours to be used for SCOP calculations for air-to-air units <math>&gt; 12</math> kW and Water(Brine)-to-Air units can be found in Annex D.</i></p> | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| <b>7.4</b> | <p><b>Calculation of the reference annual heating demand <math>Q_H</math></b><br/>The reference annual heating demand <math>Q_H</math> is expressed in kWh and is calculated with Formula (14).</p> $Q_H = P_{designh} \times H_{HE} \quad (14)$ <p>Where<br/><math>P_{designh}</math> is the design heating load of the building the unit is suitable for as declared by the manufacturer expressed in kW<br/><math>H_{HE}</math> is the number of equivalent active mode hours for heating.</p> <p><i>Note 1 For air-to-air units <math>\leq 12</math> kW, the value of <math>H_{HE}</math> can be found in Annex A.</i><br/><i>Note 2 For air-to-water(brine), water (brine)-to-water(brine) and DX-to-water(brine) units <math>\leq 400</math> kW, the value of <math>H_{HE}</math> can be found in Annex B.</i><br/><i>Note 3 For air-to-air units <math>&gt; 12</math> kW and for water(brine)-to-air units, the value of <math>H_{HE}</math> can be found in Annex D.</i></p>                                           | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |

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| <b>7.5</b> | <p><b>Calculation of the annual electricity consumption <math>Q_{HE}</math></b><br/>The annual energy consumption for heating <math>Q_{HE}</math> includes the power consumption during active mode, thermostat-off mode, standby mode, off mode and that of the crankcase heater calculated with Formula (15).</p> $Q_{HE} = \frac{Q_H}{SCOP_{on}} + H_{TO} \times P_{TO} + H_{SB} \times P_{SB} + H_{CK} \times P_{CK} + H_{OFF} \times P_{OFF} \quad (15)$ <p>Where<br/><math>SCOP_{on}</math> is the active mode seasonal coefficient of performance (see 7.6), expressed in kWh/kWh<br/><math>Q_H</math> is the reference annual heating demand as calculated with Formula (14) (see 7.4);<br/><math>H_{TO}, H_{SB}, H_{CK}, H_{OFF}</math> are the numbers of hours in thermostat-off mode, standby mode, crankcase heater mode and off mode respectively, expressed in h;<br/><math>P_{TO}, P_{SB}, P_{CK}, P_{OFF}</math> are the power inputs in thermostat-off mode, standby mode, crankcase heater mode and off mode respectively, expressed in kW;</p> <p><i>Note 1 For air-to-air units <math>\leq 12</math> kW, the number of hours can be found in Annex A.</i><br/><i>Note 2 For air-to-water(brine), water (brine)-to-water(brine) and DX-to-water(brine) units <math>\leq 400</math> kW, the number of hours can be found in Annex B.</i></p> | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>Air-to-Air and Water(Brine)-to-Air can't be tested</p> |
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|            | <i>Note 3 For air-to-air units &gt; 12 kW and for water(brine)-to-air units, the number of hours can be found in Annex D.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>7.6</b> | <p><b>Calculation of SCOP<sub>on</sub> and SCOP<sub>net</sub></b><br/> The SCOP<sub>on</sub> and SCOP<sub>net</sub> are determined:<br/> – For units with real or assumed electric supplementary heater according to Formula (16) and Formula (17) respectively</p> $SCOP_{on} = \frac{\sum_{j=1}^n h_j [P_h(T_j)]}{\sum_{j=1}^n h_j \left[ \frac{P_h(T_j) - elbu(T_j)}{COP_{bin}(T_j)} + elbu(T_j) \right]} \quad (16)$ $SCOP_{net} = \frac{\sum_{j=1}^n h_j [P_h(T_j) - elbu(T_j)]}{\sum_{j=1}^n h_j \left[ \frac{P_h(T_j) - elbu(T_j)}{COP_{bin}(T_j)} \right]} \quad (17)$ <p>– For units with supplied fuel supplementary heater according to Formula (18) and Formula (19) respectively</p> $SCOP_{on} = \frac{\sum_{j=1}^n h_j [P_h(T_j)]}{\sum_{j=1}^n h_j \left[ \frac{P_h(T_j) - sup(T_j)}{COP_{bin}(T_j)} + \frac{sup(T_j)}{\eta_{s,fb} \times CC} \right]} \quad (18)$ $SCOP_{net} = \frac{\sum_{j=1}^n h_j [P_h(T_j) - sup(T_j)]}{\sum_{j=1}^n h_j \left[ \frac{P_h(T_j) - sup(T_j)}{COP_{bin}(T_j)} \right]} \quad (19)$ <p>Where<br/> T<sub>j</sub> is the bin temperature<br/> j is the bin number<br/> n is the total number of bins<br/> P<sub>h</sub>(T<sub>j</sub>) is the heating load of the building for the corresponding bin temperature T<sub>j</sub>, expressed in kW<br/> h<sub>j</sub> is the number of bin hours for the corresponding bin temperature T<sub>j</sub><br/> COP<sub>bin</sub>(T<sub>j</sub>) is the COP value for the corresponding bin temperature T<sub>j</sub><br/> elbu(T<sub>j</sub>) is the required capacity of the electric backup heater for the corresponding temperature T<sub>j</sub>, expressed in kW<br/> sup(T<sub>j</sub>) is the required capacity of the fossil fuel backup heater for the corresponding temperature T<sub>j</sub>, expressed in kW<br/> η<sub>s,fb</sub> is the seasonal space heating energy efficiency of the fuel supplementary heater<br/> CC is the coefficient for electricity generation efficiency.</p> <p>For Air-to-Water(Brine) and Water(Brine)-to-Water(Brine) units below 400 kW, the values to be used for j, T<sub>j</sub> and h<sub>j</sub> can be found in Annex B.</p> <p>The heating load P<sub>h</sub>(T<sub>j</sub>) is determined by multiplying the full load value (P<sub>designh</sub>) with the part load ratio for each corresponding bin. This part load ratio is calculated as follows:</p> <ul style="list-style-type: none"> <li>• average climate: <math>pl(T_j) = (T_j - 16)/(-10 - 16)</math></li> <li>• warmer climate: <math>pl(T_j) = (T_j - 16)/(+2 - 16)</math></li> <li>• colder climate: <math>pl(T_j) = (T_j - 16)/(-22 - 16)</math></li> </ul> <p>The COP<sub>bin</sub>(T<sub>j</sub>) values and capacity values at each bin are determined via linear interpolation of the COP<sub>bin</sub> and capacity values at the part load conditions A to G where applicable. Interpolation is done between the COP<sub>bin</sub> and capacities of the two closest part load conditions (as mentioned in the tables of chapter 6).</p> <p>The COP<sub>bin</sub>(T<sub>j</sub>) values and capacity values for part load conditions above D are linearly extrapolated from COP<sub>bin</sub> values and capacity values at part load conditions C and D.</p> <p>In case of the colder climate, and if TOL (operation limit) is below -20°C, an additional calculation point has to be taken from the capacity and COP<sub>bin</sub> at -15°C (condition G) for Air-to-Water(Brine) units.</p> <p>If the capacity of the unit is lower than the value of P<sub>h</sub>(T<sub>j</sub>), correction needs to be made for the missing capacity either with an electric supplementary heater with a COP of 1 or with the supplied fuel supplementary heater having an efficiency η<sub>s,fb</sub>.</p> <p>Below TOL (operation limit) the unit is not running. The capacity of the unit at outside air temperatures below TOL is 0 kW and correction needs to be made for the missing capacity either with an electric supplementary heater with a COP of 1 or with the supplied fuel supplementary heater having an efficiency of η<sub>s,fb</sub>.</p> | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES ■ NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES ■ NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES ■ NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| <b>7.7</b> | <b>Calculation procedure for determination of COP<sub>bin</sub> values at part load conditions A to G</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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| <b>7.7.1</b>   | <p><b>General</b></p> <p>In part load conditions A to G, where applicable, there are two possibilities:</p> <ul style="list-style-type: none"> <li>if the declared capacity of a unit is matching with or lower than the required heating load, the corresponding <math>COP_d</math> value of the unit shall be used as <math>COP_{bin}</math>;</li> <li>if the declared capacity of a unit is higher than the required heating load by more than 10%, the unit has to cycle on/off. This may occur with fixed capacity or staged or variable units. In such cases, a degradation coefficient (<math>C_d</math>) has to be used to calculate the <math>COP_{bin}</math> value from the <math>COP_d</math>.</li> </ul> <p>In that case, the capacity ratio (CR) is required. CR is the ratio of the heating load over the declared capacities (<math>P_{dh}</math>) of the unit at the same temperature conditions, according to Formula (21).</p> $CR = pl(T_j) \times \frac{P_{designh}}{P_{dh}} \quad (21)$ <p>Where<br/> <math>P_{designh}</math> is the design heating load of the building the unit is suitable for as declared by the manufacturer, expressed in kW;<br/> <math>pl(T_j)</math> is the part load ratio as given in 7.6 Formula (20)<br/> <math>P_{dh}</math> is the declared capacity of the unit at the same temperature conditions as for part load conditions A to G where applicable, expressed in kW</p> <p>If the calculated result from (21) is higher than 1, then CR shall be set to 1.</p>                                                                                                                                                                                                                                                                                                                                                                                      | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                  |
| <b>7.7.2</b>   | <b>Calculation procedure for fixed capacity units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>7.7.2.1</b> | <b>Air-to-Air and Water(Brine)-to-Air units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>7.7.2.2</b> | <p><b>Air-to-Water(Brine) and Water(Brine)-to-Water(Brine) units</b></p> <p>In part load conditions A to G, where applicable, the <math>COP_{bin}</math> is calculated with Formula (23).</p> $COP_{bin} = COP_d \times \frac{CR}{C_d \times CR(1 - C_d)} \quad (23)$ <p>Where<br/> <math>COP_d</math> is the COP corresponding to the declared capacity (<math>P_{dh}</math>) of the unit at the same temperature conditions as for part load conditions A to G, where applicable<br/> <math>C_d</math> is the degradation coefficient as determined according to 11.5.3. If not determined 0,9 is used by default;<br/> CR is the capacity ratio (see Formula (21) in paragraph 7.7.1)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>7.7.3</b>   | <b>Calculation procedure for staged and variable capacity units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>7.7.3.1</b> | <p><b>For temperatures above or equal to <math>T_{biv}</math></b></p> <p>The capacity, effective power input and COP shall be determined at the closest step or increment of the capacity control of the unit to reach the required heating load.</p> <p>If the resulting capacity is within <math>\pm 10\%</math> of the required heating load (e.g. between 9,9 kW and 8,1 kW for a required heating load of 9 kW), the required heating load is considered achieved. The resulting capacity and COP are considered as <math>P_{dh}</math> and <math>COP_d</math>. <math>COP_d</math> shall be used as <math>COP_{bin}</math> and no supplementary heat is to be considered.</p> <p>If the resulting capacity is deviating from the required heating load by more than <math>\pm 10\%</math>, then another capacity and effective power input shall be determined at the same part load conditions for the step or increment of the capacity control on the opposite side of the required heating load. The part load effective power input at the required heating load is determined by linear interpolation between the two effective power input values obtained at these two steps. The <math>COP_{bin}</math> is determined by dividing the required heating load and the interpolated part load effective power input. The declared capacity <math>P_{dh}</math> is equal to the required heating load.</p> <p>If the resulting capacity achieved with the smallest step of the capacity control exceeds the required heating load by more than 10 % then the procedure for the determination of <math>COP_{bin}</math> described in 7.7.2 shall apply. The resulting capacity is considered as <math>P_{dh}</math>.</p> <p><i>Note For temperatures above or equal to <math>T_{biv}</math> the declared capacity <math>P_{dh}</math> cannot be lower than 90 % of the required heating load.</i></p> | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| <b>7.7.3.2</b> | <p><b>For temperatures below <math>T_{biv}</math></b></p> <p>The capacity, effective power input and COP shall be determined at the closest step or increment of the capacity control of the unit to reach the required heating load.</p> <p>The required heating load cannot be achieved by the heat pump.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>■ YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                                                                                   |

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|  | The resulting capacity and COP are considered as $P_{dh}$ and $COP_d$ . $P_{dh}$ shall be supplemented by $sup(T_i)$ in the calculation of the annual energy consumption. The declared $COP_d$ shall be used as $COP_{bin}$ .<br><br><i>Note For temperatures below <math>T_{biv}</math> the declared capacity <math>P_{dh}</math> cannot exceed the required heating load.</i> |  |
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| <b>7.8</b> | <b>Method for <math>P_{sup}</math> calculation</b><br>$P_{sup}$ calculation does not apply to hybrid units.<br>$P_{sup}$ is to be calculated individually for each climate using the following Formula (24)<br><br>$P_{sup} = P_{designh} - P_{dh}(T_{designh}) \quad (24)$<br>Where<br>$P_{designh}$ is the design heating load the unit is suitable for as declared by the manufacturer, expressed in kW.<br>$P_{dh}(T_{designh})$ is the declared heating capacity at design condition $T_{designh}$ , expressed in kW. In case TOL is higher than $T_{designh}$ , $P_{dh}(T_{designh})$ is equal to 0. | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
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| <b>8</b>       | <b>Test and calculation methods for hybrid units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>8.1</b>     | <b>General</b><br>Two test methods are available for determining the seasonal space heating efficiency of hybrid units: <ul style="list-style-type: none"> <li>– the separate method.</li> <li>– the combined method.</li> </ul> These methods are based on the two temperatures $T_{fb,off}$ and $T_{hp,on}$ as defined in 3.1.85 and 3.1.86 respectively.<br>When setting $T_{hp,on}$ and $T_{fb,off}$ temperatures the allowable deviations as specified in Table 4 and/or Table 5 of EN 14511-3:2018 are limited as follows: <ul style="list-style-type: none"> <li>– to the positive side of the deviation for <math>T_{hp,on}</math>;</li> <li>– to the positive side of the deviation for <math>T_{fb,off}</math>.</li> </ul> The manufacturer shall provide laboratories with the necessary information on the setting of the unit (settings for both the heat pump, and gas or liquid fuel boiler if necessary) for operating at the required capacity conditions upon request. | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> separate method (see 8.2)<br><input type="checkbox"/> combined method (see 8.3)                                                                                                                                                                                                                                                                                      |
| <b>8.2</b>     | <b>Separated method</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>8.2.1</b>   | <b>General</b><br>The separated method consists in determining the heating capacity delivered by the heat pump and by the gas or liquid fuel boiler separately.<br><br>In case the heat pump is not provided with any defrost device (e.g. reversing valve or hot gas injection) but defrosting is provided by the gas or liquid fuel boiler, the separated method shall not be used.<br><br>The separate method shall not be applied to hybrid units with: <ul style="list-style-type: none"> <li>– <math>T_{fb,off}</math> greater than 7°C</li> </ul> AND <ul style="list-style-type: none"> <li>– a fixed water flow rate.</li> </ul> For the calculation of $\eta_{s,h}$ , the energy efficiency $\eta_{s,fb}$ of the gas or liquid fuel boiler is used at each bin temperature for the heating capacity to be provided by the boiler.                                                                                                                                              | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                |
| <b>8.2.2</b>   | <b>Heat pump testing</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>8.2.2.1</b> | <b>Test conditions</b><br>The tests are conducted with the heat pump only in operation and according to Clause 6 part load conditions. Only outdoor temperature conditions greater or equal to $T_{hp,on}$ shall be tested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>8.2.2.2</b> | <b>Test installation and measurements</b><br>The hybrid unit shall be installed according to 4.2 of EN 14511-3:2018 and to the technical documentation.<br><br>In addition, the gas or liquid fuel boiler: <ul style="list-style-type: none"> <li>– shall be hydraulically connected</li> <li>– shall not be connected to gas and liquid fuel supply</li> </ul> If the gas or liquid fuel boiler has an independent electrical connection, then the gas or liquid fuel boiler shall not be electrically connected.<br>The tests shall be performed according to the requirements of Clause 11 of this document.                                                                                                                                                                                                                                                                                                                                                                          | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>8.2.3</b>   | <b>Boiler testing</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                  |

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| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | 15/19                                                                               |

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|         | <p>At tested part load conditions:</p> <ul style="list-style-type: none"> <li>– If the heating capacity of the hybrid unit is matching with the required heating load within <math>\pm 10\%</math>, the <math>COP_d</math> is to be used as <math>COP_{bin}</math> value.</li> <li>– If the heating capacity of the hybrid unit is greater than the required heating load by more than <math>10\%</math>, the <math>COP_{bin}</math> shall be calculated according to the following calculation procedure.</li> </ul> <p>When the heating capacity of the hybrid unit is greater than the required heating load, this means that the unit will operate on/off cycles to reach the heating load. The capacity ratio CR will be lower than 1.</p> <p>For each of the part load conditions for which this occurs, the <math>COP_{bin}</math> value shall take into account a degradation of the <math>COP_d</math> due to cycling and shall be calculated using Formula (31):</p> $COP_{bin} = \frac{P_{designh} \times pl(T_j)}{CR \times \left( \frac{Q_{fb}}{CC} + P_{elec} \right) + (1 - CR) \times P_{hybrid\_off}} \quad (31)$ <p>where</p> <p><math>P_{designh}</math> is the heating design load of the building the hybrid unit is suitable for as declared by the manufacturer, expressed in kW;</p> <p><math>pl(T_j)</math> is the part load ratio for the corresponding temperature <math>T_j</math>;</p> <p>CR is the capacity ratio of the required heating load and the heating capacity of the unit at the part load conditions;</p> <p><math>P_{elec}</math> is the electrical power input at the temperature <math>T_j</math>, for the considered part load conditions expressed in kW;</p> <p><math>Q_{fb}</math> is the gas or liquid fuel power input at the temperature <math>T_j</math>, for the considered part load conditions, expressed in kW;</p> <p><math>P_{hybrid\_off}</math> is the electric power input at the temperature <math>T_j</math>, for the considered part load conditions when the hybrid unit is off, expressed in kW;</p> <p>CC is the coefficient for electricity generation efficiency.</p> <p>After each part load test, the temperature set point is lowered until the hybrid unit switches off. The electrical power input to the unit <math>P_{hybrid\_off}</math> is measured during 5 min after the hybrid unit has been switched off for 10 min.</p> <p>If at part load test conditions for which the outdoor air temperature is greater than <math>T_{fb,off}</math>, the capacity ratio CR is lower than 1 then, the <math>COP_{bin}</math> can also be determined by applying 7.7 and considering a Cd default value of 0,9, where relevant.</p> <p><i>Note When the heat pump and the boiler both operate at a specific outdoor air temperature, as the control strategy between the two generators is unknown, it is assumed that the on/off cycling is affecting both generators. Therefore, the hybrid_off power input is measured in a similar way as for the heat pump only. This will probably overestimate the effect of cycling and thus will slightly reduce the energy efficiency for the considered part load operation. In case the heat pump operates continuously and the boiler cycles on/off for the required heat load, the energy efficiency will be slightly greater than the one calculated.</i></p> | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| 8.3.7.3 | <p><b>Calculation of <math>SCOP_{on}</math></b></p> <p>The <math>SCOP_{on}</math> is calculated according to Formula (32)</p> $SCOP_{on} = \frac{\sum_{j=1}^n h_j \times P_h(T_j)}{\sum_{j=1}^n h_j \times P_{bin}(T_j)} \quad (32)$ <p>Where</p> <p><math>T_j</math> is the bin temperature</p> <p><math>j</math> is the bin number</p> <p><math>n</math> is the total number of bins</p> <p><math>h_j</math> is the number of bin hours at occurring the corresponding temperature <math>T_j</math></p> <p><math>P_h(T_j)</math> is the heating load for the corresponding temperature <math>T_j</math> in kW</p> <p><math>h_j</math> is the number of bin hours for the corresponding temperature <math>T_j</math></p> <p><math>COP_{bin}(T_j)</math> is the COP value of the unit for the corresponding temperature <math>T_j</math>, expressed in kW/kW</p> <p>The values of <math>j</math>, <math>T_j</math> and <math>h_j</math> are given in Annex B.</p> <p>The heating load <math>P_h(T_j)</math> is determined by multiplying the design load value (<math>P_{designh}</math>) with the part load ratio for each corresponding bin. This part load ratio <math>pl(T_j)</math> is calculated according to Formula (20).</p> <p>The <math>COP_{bin}</math> values and capacity at each bin are determined via linear interpolation of the <math>COP_{bin}</math> and capacity values at part load conditions A to G and <math>T_{designh}</math>, where applicable.</p> <p>Interpolation of <math>COP_{bin}</math> and capacities are done between the closest part load conditions (as mentioned in tables of Clause 6).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                                                                                                                                                       |

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|                | In case of colder climate, and if $T_{hp,on}$ is below $-20^{\circ}\text{C}$ , an additional calculation point has to be taken from the capacity and $COP_{bin}$ at $-15^{\circ}\text{C}$ outdoor temperature (condition G) for air-source units. | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>8.3.7.4</b> | <b>Calculation of the seasonal space heating efficiency, <math>\eta_{s,h}</math></b><br>For the determination of $\eta_{s,h}$ , subclauses 7.2 to 7.5 apply.                                                                                      | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>9</b>       | <b>Part load conditions for process cooling</b>                                                                                                                                                                                                   | Can't be tested                                                                                                             |
| <b>10</b>      | <b>Calculation method for SEPR</b>                                                                                                                                                                                                                | Can't be tested                                                                                                             |

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| <b>11</b>   | <b>Test methods for testing capacities, <math>EER_{bin}</math> and <math>COP_{bin}</math> values during active mode at part load conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>11.1</b> | <b>General</b><br>For the purposes of this document, testing for capacities, $EER_d$ and $COP_d$ shall be done without including any integral supplementary heating.<br><br>For testing at part load conditions, the test apparatus and the requirements given in Clause 4 of EN 14511-3:2018 shall apply, except when modified by the following clauses.<br><br>Multi split units and DX-to-water(brine) can't be tested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>11.2</b> | <b>Refrigerant piping</b><br>According to EN 14511-3, the length of the refrigerant lines shall be 5m, which if needed can be extended up to 7,5 m.<br><br>The maximum height difference is kept to 2,5 m according to 4.2.2 of EN 14511-3:2018.<br><br>Multi split units and units with multiple indoor units and air-to-air units can't be tested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Length of piping<br><input type="checkbox"/> 5 m<br><input type="checkbox"/> ... m<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>11.3</b> | <b>Basic principles</b><br>The tests shall be carried out with the electrical power supply as defined in 4.1 of EN 14511-2:2018 and under the environmental conditions given in 4.1 of EN 14511-2:2018. All the tests shall be conducted according to Clause 4 of EN 14511-3:2018 procedure.<br><br>In order to determine the effective power input, the available external or internal static pressure difference shall also be measured.<br><br>If the liquid pump or the fan is an integral part of the unit and in operation, the total measured power input shall be corrected from the fraction of the liquid pump or fan. The correction shall be made using the formulas given in 4.1.5 of EN 14511-3:2018 with the flow rate and available external static pressure difference measured during the test at part load conditions.<br><br>If the liquid pump or fan is not an integral part of the unit, the total measured power input shall be corrected from the fraction of the liquid pump or fan power input that is necessary to overcome the internal static pressure difference. The correction shall be made using the formulas given in 4.1.5 of EN 14511-3:2018 with the flow rate and the internal static pressure difference measured during the test at part load conditions.<br><br>In case of on/off cycling of the compressor, to determine if the liquid pump or fan is operating, the control signal shall be measured. If no control signal is available, it shall be assumed that the liquid pump or fan is operating.<br><br>Measured capacities shall also be corrected from indoor fan or liquid pump power input according to 4.1.4 of EN 14511-3:2018. | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br>Signal can't be measured<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |
| <b>11.4</b> | <b>Uncertainties of measurements</b><br>The heating and cooling capacities measured on the liquid side shall be determined within a maximum uncertainty of $(2+3/\text{part load ratio})\%$ .<br><br>All uncertainties of measurement are independent of the individual uncertainties of measurement including the uncertainties on the properties of fluids.<br><br>The maximum uncertainty of the measurement of the power input for off, thermostat off, standby and crankcase heater modes shall be<br><ul style="list-style-type: none"> <li><math>\pm 0.3\text{ W}</math> up to <math>10\text{ W}</math></li> <li><math>\pm 3\%</math> for powers greater than <math>10\text{ W}</math></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO<br><br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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| <b>11.5</b>   | <b>Test procedures for units with fixed capacity</b>                                                                                                                                                                                                                                                                                                                            |                                                                                                                             |
| <b>11.5.1</b> | <b>General</b><br>To account for on/off cycling that will occur in real operation, $EER_d$ or $COP_d$ determined during the capacity test shall be corrected by applying a $C_d$ degradation coefficient as obtained in 11.5.2 or 11.5.3. The appropriate Formula (9), (10), (22), (23), (31) or (37) shall be used to calculate the corresponding $EER_{bin}$ or $COP_{bin}$ . | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO |

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|                 | <p>For air-to-water(brine), water(brine)-to-water(brine) and DX-to-water(brine) units with variable outlet temperature, the inlet and/or outlet water temperatures for testing shall be recalculated in order to obtain an average outlet temperature (<math>T_{out,av}</math>) equal to the variable outlet temperature as specified in the table of part load conditions, as applicable.</p> <p>The inlet and outlet water temperatures, <math>T_{in,test}</math> and <math>T_{out,ytest}</math> respectively are determined using Formula (38) in an iterative process until a convergence of less than or equal to the value of permissible deviation of the average outlet temperature <math>t_{out,test}</math> defined in table 4 or table 5 of EN 14511-3:2018 is reached.</p> $T_{out,av} = T_{in,test} + (T_{out,test} - T_{in,test}) \times CR \quad (35)$ <p>Where<br/> <math>T_{in,test}</math> is the inlet water temperature at the indoor heat exchanger measured during testing, in °C;<br/> <math>T_{out,test}</math> is the outlet water temperature at the indoor heat exchanger measured during testing, in °C;<br/> CR is the capacity ratio, expressed in kW/kW</p> <p>The iterative process is as follows:</p> <ul style="list-style-type: none"> <li>- Test with <math>T_{out,test}</math> equal to the variable outlet temperature as specified in the table of part load conditions and determine the capacity of the unit.</li> <li>- Calculate the resulting CR.</li> <li>- Use Formula (38) for calculating the corrected <math>T_{out,test}</math> at which the test shall be performed in order to obtain <math>T_{out,av}</math>.</li> <li>- Repeat previous steps until the required convergence is reached.</li> </ul> <p>For units with variable flow rate, at any iteration, if the fixed temperature difference leads to a water flow rate lower than the minimum specified by the manufacturer, then this minimum flow rate shall be set.</p> <p>For fixed flow units, <math>T_{in,test}</math> and <math>T_{out,test}</math> can be directly calculated without any iteration with Formula (39).</p> $T_{out,av} = T_{in,test} - \Delta T_{rated} \times pl(T_j) \times \frac{P_{designh}}{P_{rated}} \quad (36)$ <p>Where<br/> <math>\Delta T_{rated}</math> is the temperature difference at the standard rating conditions, expressed in K.<br/> <math>pl(T_j)</math> is the part load ratio;<br/> <math>P_{designh}</math> is the capacity at <math>T_{designh}</math>, expressed in kW<br/> <math>P_{rated}</math> is the rated capacity at standard rating conditions, expressed in kW.</p> | <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                     |
| <b>11.5.2</b>   | <b>Air-to-air and water(brine)-to-air units – Determination of the degradation coefficient Cd</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>11.5.2.1</b> | <b>General</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>11.5.2.2</b> | <b>Air-to-air units – Cooling mode</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>11.5.2.3</b> | <b>Air-to-air units – Heating mode</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>11.5.2.4</b> | <b>Water(brine)-to-air units – Cooling mode</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>11.5.2.5</b> | <b>Water(brine)-to-air units – Heating mode</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Can't be tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>11.5.3</b>   | <p><b>Air-to-water(brine) and water(brine)-to-water(brine) units – Determination of the degradation coefficient Cd</b></p> <p>For these units, the degradation due to the pressure equalisation effect when the unit restarts can be considered as negligible.</p> <p>The only effect that will impact the EER/COP at cycling is the remaining power input when the compressor is switching off.</p> <p>The electrical power input during the compressor off state of the unit is measured during 5 min after the compressor has been switched off for 10 min after the end of the part load test for which the Cd degradation coefficient shall be determined. The compressor shall be switched off by lowering the setpoint in the heating mode and increasing the setpoint in cooling mode.</p> <p><i>Note: the change of setpoint can be achieved by changing the heat curve or the indoor temperature setpoint</i></p> <p>The degradation coefficient (Cd) is determined for each part load ratio by Formula (42).</p> $Cd = 1 - \frac{P_{Coff}}{P_{Con}} \quad (42)$ <p>Where<br/> <math>P_{Coff}</math> is the effective power input during compressor-off state;<br/> <math>P_{Con}</math> is the effective power input measured during the corresponding part load test.</p> <p>In order to measure a power input that is consistent with the definition of the effective power input, if the liquid pump or the fan is an integral part of the unit and in operation during the compressor-off state, the</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p><input type="checkbox"/> Measured<br/> <input checked="" type="checkbox"/> Default (0,9)</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO</p> |

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| Version: 001<br>Date: 21-1-2025 | <b>TEST SHEETS</b><br><b>EN 14825; Requirements</b>              |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | 18/19                                                                               |

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                             |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | <p>available static pressure shall also be measured and the total compressor-off power input shall be corrected for the power input of the fan or liquid pump to provide this static pressure, as described in 4.1.5 of EN 14511-3:2018. In case the correction obtains a larger value than the measured value for the electric power input during the compressor off state, then the electric power input during the compressor-off state is set to zero.</p> <p>In order to measure a power input that is consistent with the definition of the effective power input, if the liquid pump or the fan is not an integral part of the unit and in operation during the compressor-off state, the static pressure difference shall also be measured and the total compressor-off power input shall be corrected for the power input of the fan or liquid pump to overcome this static pressure, as described in 4.1.5 of EN 14511-3:2018. To determine if the liquid pump or fan is operating the control signal shall be measured. If no control signal is available, it shall be assumed that the liquid pump or fan is operating.</p> <p>If the degradation coefficient Cd is not measured, a default value of 0.9 shall be used.</p> | <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                       |
| <b>11.6</b>   | <b>Test procedure for staged and variable capacity units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                             |
| <b>11.6.1</b> | <p><b>General</b></p> <p>There are two alternative methods</p> <ul style="list-style-type: none"> <li>- The settings for operating then unit at the required capacity are made available by the manufacturer upon request</li> <li>- Using a compensation method when these settings are not made available by the manufacturer when requested</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> Capacity ratio (see 11.6.2).</p> <p><input type="checkbox"/> compensation method (see 11.6.3) can't be tested</p> |
| <b>11.6.2</b> | <p><b>Settings for the required capacity ratio</b></p> <p>The manufacturer shall provide laboratories with the necessary information on the settings of the unit for operating at the required capacity for each part load condition upon request. Contact information to obtain such information shall be provided in both user's manual and website of the manufacturer or importer.</p> <p>These settings shall be used according to the instructions of the manufacturer.</p> <p>The unit shall operate continuously during the part load test. The only discontinuity allowed is the defrost cycle of a unit.</p> <p>To set up system with staged or variable capacity control, skilled personnel with knowledge of control software may be required. The manufacturer or his nominated agent should be in attendance when the system is being installed and prepared for tests.</p>                                                                                                                                                                                                                                                                                                                                               | <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                       |
| <b>11.6.3</b> | <p><b>Compensation method</b></p> <p>Alternatively when it is not possible to get the information necessary for the test compensation system may be used.</p> <p>For air-to-water(brine), water(brine)-to-water(brine) and DX-to-water(brine) units, the compensation system shall allow setting of the required capacity ratio within <math>\pm 10\%</math>. Examples of such compensation systems for part load tests in heating and cooling mode are given in Annex M.</p> <p>The setting of the thermostat on the indoor water side shall be as given by the manufacturer. The test shall be performed in accordance with EN 14511-3 considering the admissible deviations, individual uncertainties of measurement and data acquisition. Cooling/heating capacity and power input are obtained by time integration over a number of complete stabilized cycles of energy balance and energy consumption. The measured cooling capacity or heating capacity shall be corrected for the heat from the circulating pump, in accordance with EN 14511-3. The effective power input shall be obtained from the measured power input and the corrections from the heat from the circulating pump(s) and/or fan, if any.</p>              | Can't be tested                                                                                                                                                                                                                                                                             |
| <b>12</b>     | <b>Test methods for electric power consumption during thermostat off mode, standby mode and crankcase heater mode</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                             |
| <b>12.1</b>   | <p><b>Uncertainties of measurement</b></p> <p>The maximum uncertainty of the measurement of the power input for off, thermostat off, standby and crankcase heater modes shall be</p> <ul style="list-style-type: none"> <li>• <math>\pm 0.3\text{ W}</math> up to <math>10\text{ W}</math></li> <li>• <math>\pm 3\%</math> for powers greater than <math>10\text{ W}</math></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO                                                                                                                                                                 |
| <b>12.2</b>   | <p><b>Measurement of electric power consumption during thermostat off mode</b></p> <p>In cooling mode, after the unit has been running for 30 min in "D" test condition, the thermostat set point related to the indoor temperature sensor is increased until all compressors stop. The time-averaged power input of the unit is measured over a time period of 60 min starting 10 min after the compressor stops. The standby power input (see 12.3) is deducted from this measured power input to determine the thermostat-off power input.</p> <p>In heating mode, the same principle applies but the thermostat set point should be decreased until all compressors stop after the unit has been running for 30 min in "D" test condition. No deduction of the standby power input shall be made for the heating mode, but the measured total power input shall be considered as the thermostat-off power input.</p>                                                                                                                                                                                                                                                                                                                | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO</p>                       |

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| Version: 001<br>Date: 21-1-2025 | <b>TEST SHEETS</b><br><b>EN 14825; Requirements</b>              |  |
| Report Number:<br>1(P000373413) | <b>Air conditioners, liquid chilling packages and heat pumps</b> | 19/19                                                                               |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <p>In case the unit is not controlled by an indoor sensor but by a heat curve related to the outdoor temperature, an increase in the outdoor temperature shall be simulated. This can either be done by increasing the local temperature around the outdoor sensor, e.g. putting it into a water bath, or by replacing it by a resistor of suitable size. The simulated outdoor temperature shall be increased until all compressors stop.</p> <p>In order to measure a power input that is consistent with the definition of the effective power input, if the liquid pump or the fan is an integral part of the unit and in operation during thermostat off mode, the available static pressure shall also be measured and the total thermostat-off power be corrected from the power input of the liquid pump or fan to provide this available static pressure, as described in EN 14511-3. In case the correction obtains a larger value than the measured value for the electric power consumption during thermostat-off mode, then the electric power consumption during thermostat-off mode is set to zero.</p> <p>If the liquid pump or fan is not an integral part of the unit, the thermostat-off power shall be corrected from the fraction of the pump or fan power that is necessary to overcome the internal static pressure difference as described in 4.1.5 of EN 14511-3:2018. To determine if the liquid pump or fan is operating, the control signal shall be measured. If no control signal is available, it shall be assumed that the liquid pump or fan is operating.</p> | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>Signal can't be measured<br/><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> |
| 12.3 | <p><b>Measurement of the electric power consumption during standby mode</b><br/>In cooling mode, after the unit has been running for 30 min in "D" test condition, the unit is stopped with the control device. After 10 min, the residual energy consumption is measured during the next 10 minutes and assumed to be the standby mode consumption. The standby mode power input is the ratio of the measured energy consumption and the duration of test.</p> <p>In heating mode, the measurements are done in the same way after the unit has been running for 30 min in "D" test condition.</p> <p>In case it is not possible to stop the unit by any control device, the standby mode power input is set equal to the thermostat-off mode power input.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                                                 |
| 12.4 | <p><b>Measurement of the electric power consumption during crankcase heater mode</b><br/>In cooling mode after the unit has been running for 30 min in "D" test condition the unit is stopped with the control device, and the energy consumption of the unit shall be measured for 8 h starting 10 min after all compressors stop. The power input in crankcase heater mode is the ratio of the measured energy consumption and the duration of the test.</p> <p>In heating mode, after the unit has been running for 30 min in "D" test condition the unit is stopped with the control device, and the energy consumption of the unit shall be measured for 8 h starting 10 min after all compressors stop. The power input in crankcase heater mode is the ratio of the measured energy consumption and the duration of the test.</p> <p>For both the cooling mode and the heating mode, the standby power input is deducted from this measured power input to determine the crankcase heater power input.</p> <p>If there is no control device the energy consumption shall be measured in the continuity of the thermostat off mode test for a total duration of 8 h. In this case the thermostat off power input is deducted from this measured power input to determine the crankcase heater power input.</p>                                                                                                                                                                                                                                                                            | <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                              |
| 12.5 | <p><b>Measurement of the electric power consumption during off mode</b><br/>Following the standby mode test, the unit shall be switched in off mode while remaining plugged. After 10 min, the residual energy power is measured during the next 10 min and the average value during this period is assumed to be the off mode consumption.</p> <p>In case no off mode switch is available on the unit (e.g. on the indoor unit(s) for split units), the off mode power is supposed to be equal to the standby mode power. In case it is neither possible to set the unit in off mode nor in standby mode then the off mode power is assumed to be equal to the thermostat off mode power.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p><input type="checkbox"/> YES <input type="checkbox"/> NA <input checked="" type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                                                                                                                                                                                                    |
| 13   | <p><b>Test report</b><br/>The test report shall contain general and additional information specified in Clause 8 of EN 14511-3:2018 or Clause 8 of EN 15879-1:2011. In addition for hybrid heat pumps the test method that has been applied shall be stated.<br/>All data for gas or liquid fuel boilers (e.g. <math>\eta_{son}</math>, <math>\eta_{s,fb}</math>) shall be reported.</p> <p>It shall also include the results of the part load test(s) and the calculation of EER or COP.</p> <p>If calculation of seasonal space heating/cooling efficiency <math>\eta_{s,c}/\eta_{s,h}</math>, SEER/SCOP and <math>SEER_{on}/SCOP_{on}/SCOP_{net}</math>, or seasonal energy performance ratio SEPR are included, they shall be based on the results of these tests.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>No testing<br/><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p>Can't be tested<br/><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NA <input type="checkbox"/> NT <input type="checkbox"/> NO</p>                                                                                                                              |

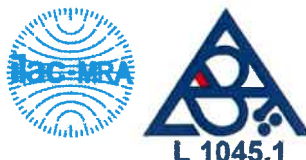
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Testing Laboratory 1045.1 accredited by the Czech Accreditation Institute pursuant to  
ČSN EN ISO/IEC 17025:2018

**Strojírenský zkušební ústav, s.p. Zkušební laboratoř**  
**(Engineering Test Institute, Public Enterprise, Testing Laboratory)**  
**Hudcova 424/56b, Medlánky, 621 00 Brno**

Page 1 of 14



## **TEST REPORT**

### **39-17675/2/H**

**Product:** Outdoor Air/Water Heat Pumps - monobloc

**Type designation:** **AE080CXYDGK/EU**

**Customer:** Samsung Electronics Air Conditioning Europe B.V  
Evert van de Beekstraat 310  
1118 CX Schiphol  
NETHERLANDS

**Manufacturer:** Samsung Electronics Air Conditioning Europe B.V  
Evert van de Beekstraat 310  
1118 CX Schiphol  
NETHERLANDS

**Report issue date:** 2024-07-23

**Distribution list:** 1 copy to the Customer  
1 copy to the Engineering Test Institute

This document may be copied in its entirety without written consent of the Engineering Test Institute. Partial copies are subject to approval. The results of the tests and verifications shall relate only to the products tested as received or presented. The testing laboratory is not responsible for the data provided by the customer specified in the report.

SP-2021-000012\_1\_12

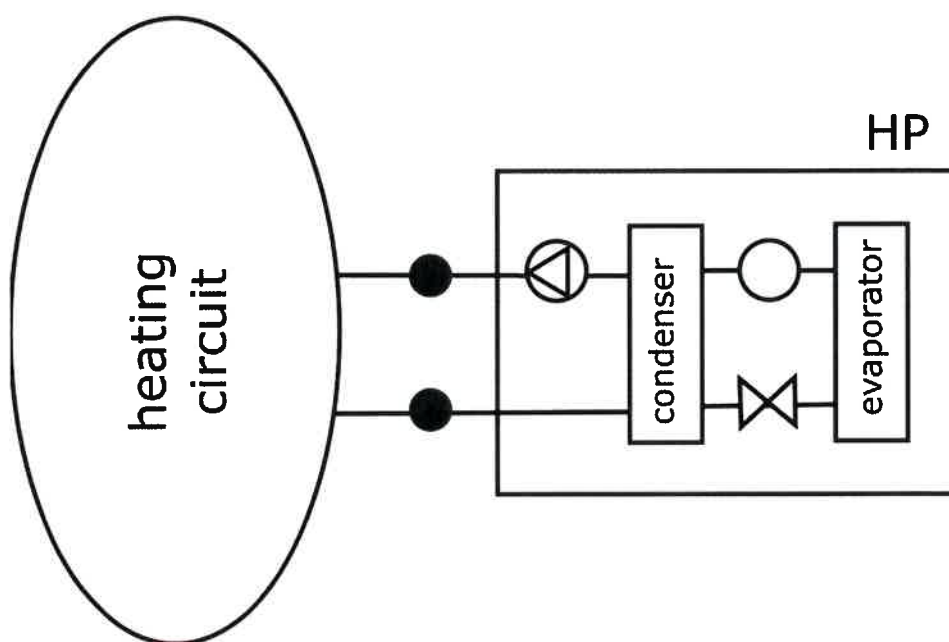
## I. Description of product tested

The Heat pump **AE080CXYDGK/EU** supplied by the company **Samsung Electronics Air Conditioning Europe B.V** is structurally adapted to operate in air/water system. Device is designed as monobloc placed outside. Refrigerant R290 is used with charge 0.87 kg. Power supply is a three -phase. Heat pump is able to work in heating and cooling mode. Heat pump is working with variable flow rate.

Main components of the outdoor unit **AE080CXYDGK/EU**:

- Serial number 0ZEFPFW900016F
- Cubic shape with dimensions 1000 × 500 × 840 mm (W × D × H)
- Frame and casing made of varnished steel sheets
- L-shaped evaporator, 3 rows, dimensions 1000 × 60 × 800 mm (W × D × H), spacing 1.6 mm
- Plate condenser 14DZJADB9626559A, dimensions 100 × 100 × 350 mm (W × D × H) including insulation
- Compressor Samsung UF5HC5260FEX
- Refrigerant R290 (0.87 kg)
- Electric expansion valve Sanhua DPF(0)3 2G-03-SXK-12
- 4-way reversing valve Sanhua SHF-11H-45D1-SS1
- Refrigerant accumulator
- Axial fan  $\varnothing = 52$  cm with motor SCD FMDC531SSJ
- Pressure sensors
- Temperature sensors
- Refrigerant pipes
- Air vent

Scheme:



Photodocumentation:



Heat pump **AE080CXYDGK/EU** – outdoor unit  
– Front view –



Heat pump **AE080CXYDGK/EU** – outdoor unit  
– Back view –



Heat pump **AE080CXYDGK/EU** – outdoor unit  
– Compressor label –

| <b>SAMSUNG</b><br>AIR TO WATER HEAT PUMP                                                                                                                                                                                                                              |                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| MODEL NAME / MODELO / NOMBRE DEL MODELO /<br>MODELLO / MODELO / MODELLBEZEICHNUNG                                                                                                                                                                                     | AE080CXYDGK                              |
| MODEL CODE                                                                                                                                                                                                                                                            | AE080CXYDGK/EU                           |
| CAPACITY (COOL/HEAT) / CAPACITÄT (KÜHL/WÄRMEN)<br>CAPACIDAD (FRÍO/CALDO) / CAPACITÀ (FREDDO/CALDO)<br>CAPACIDADE (FRIJO/QUENTE) / CAPACITATE (FRIED/CALEZ)                                                                                                            | 8.00 kW / 8.00 kW                        |
| RATED VOLTAGE & FREQUENCY /<br>TENSION & FRECUENCIA / TENSÃO E FREQUÊNCIA<br>TENSIONE E FRECUENZA NOMINALE /<br>FREQUÊNCIA E TENSÃO NOMINAL /<br>NOMINALE TENSION AND FREQUENCY                                                                                       | 380-415 V 3N- 50 Hz                      |
| RATED CURRENT (COOL/HEAT) /<br>CORRIENTE NOMINAL (FRÍO/CALDO) /<br>CORRENTE NOMINALE (FREDDO/CALDO) /<br>CORRENTE NOMINALE (FRIJO/QUENTE) /<br>NOMINALE STROOM (FRIED/CALEZ)                                                                                          | 3.22 A / 2.56 A                          |
| MAX CURRENT / MAX CORRIENTE / MÁXIMO ACTUAL /<br>MAX CORRENTE / MAX STROOM                                                                                                                                                                                            | 16.1 A                                   |
| RATED POWER INPUT (COOL/HEAT) /<br>POTENCIA NOMINAL DE ENTRADA (FRÍO/CALDO) /<br>POTENCIA ASSORBITA NOMINALE (FREDDO/CALDO) /<br>ENTRADA DE POTENCIA NOMINAL (FRIJO/QUENTE) /<br>NOMINALE LEISTUNG (FRIED/CALEZ)                                                      | 2.05 kW / 1.63 kW                        |
| REFRIGERANT PRESSURE (HIGH / LOW) /<br>PRESSION DU FLUIDE FRIGORIGÈNE (ÉLEVÉE / FAIBLE) /<br>PRESSION DEL REFRIGERANTE (ALTO / BAJO) /<br>PRESSIONE DEL REFRIGERANTE (ALTA / BASSA) /<br>PRESSÃO DO REFRIGERANTE (ALTA / BAIXA) /<br>KÄLTMITTELDRUCK (HOCH / NIEDRIG) | H: 3.3 MPa<br>L: 2.2 MPa                 |
| MAXIMUM WATER PRESSURE / PRESSION MAXIMALE DE L'EAU /<br>PRESIÓN MÁXIMA DEL AGUA / PRESIONE MASSIMA L'ACQUA /<br>PRESÃO MÁXIMA DA ÁGUA / MAXIMALE WASSERDRUCK                                                                                                         | 0.3 MPa                                  |
| REFRIGERANT / REFRIGERANTE / REFRIGERANTE /<br>REFRIGERANTE / REFRIGERANTE / KÄLTMITTEL                                                                                                                                                                               | R-290 0.87 kg / 0.003 tCO <sub>2</sub> e |
| NET WEIGHT / POND NET / PESO NETTO / PESO NETTO /<br>PESO LÍQUIDO / NETTOWICHT                                                                                                                                                                                        | 96 kg                                    |
| EEER / COP                                                                                                                                                                                                                                                            | 3.90 / 4.91                              |
| CLIMATE CLASS / CLASSE CLIMATICA / CLASSE CLIMATICA /<br>CLASIFICACIÓN CLIMÁTICA / CLASSE CLIMATICA /<br>CLASSE CLIMATICA / KLIMA-KLASSE                                                                                                                              | T1                                       |
| IP NUMBER / NOMBRE IP / NÚMERO DE IP /<br>NÚMERO IP / NÚMERO IP / IP-NUMMER                                                                                                                                                                                           | IPX4                                     |
| PRODUCTION YEAR / ANNÉE DE PRODUCTION /<br>AÑO DE PRODUCCIÓN / ANNO DI FABBRICAZIONE /<br>ANNO DI FABBRICAZIONE / PRODUKTIONSJAHR                                                                                                                                     | 2023                                     |
| <b>AE080CXYDGK/EU</b><br>SERIAL NUMBER<br><br>S/N: BZEPPAFW300016F 2023.                                                                                                                                                                                              |                                          |
| Contains fluorinated greenhouse gases.<br>No. 501, Subong East Road, Suzhou Industrial Park, Jiangsu Province, P.R. China<br>Samsung, PO Box 12987, Dublin 12 or Yateley, GU46 6GG, UK<br>MADE IN CHINA<br><b>CE 1155</b> <b>A3</b><br><b>0120</b>                    |                                          |

Heat pump **AE080CXYDGK/EU** – outdoor unit  
– Label –



Heat pump **AE080CXYDGK/EU** – outdoor unit  
– Without cover –

## II. Sample tested

| SZU reg. no.      | Product name          | Date of submission |
|-------------------|-----------------------|--------------------|
| 1212.24.39808.002 | <b>AE080CXYDGK/EU</b> | 2024-04-05         |
| 1212.24.40030.001 |                       | 2024-05-13         |

The visual inspection, tests and verification were carried out by Ing. Ondřej Bilkovič at the test station of SZU. The tests were performed using measuring and testing equipment with valid calibration.

| No. | Description                                    | Inventory number                             |
|-----|------------------------------------------------|----------------------------------------------|
| 1.  | Electrical energy meter                        | E2.1                                         |
| 2.  | Digital watt meter                             | 1.2.2 ENERGIE ANALYZATOR_2                   |
| 3.  | Flow meter Krohne Optiflux                     | 8.1.2 TECH_K2_V_DN15<br>8.1.3 TECH_K2_V_DN25 |
| 4.  | Barometer                                      | 2.4 MAR18_1_PB                               |
| 5.  | Differential pressure gauge                    | 3.2 MAR18_2_dP                               |
| 6.  | Thermometers                                   | 3.4 MAR18_T                                  |
| 7.  | Thermo-hydro meter 608-H1                      | 117043                                       |
| 8.  | Tape measure                                   | ME 475                                       |
| 9.  | Multi-analyser SINUS SoundBook MK2             | 000-000-000-875/1                            |
| 10. | Microphone pair G.R.A.S. 40 AK, wind deflector | 000-000-000-875/2                            |
| 11. | Calibrator G.R.A.S. 42AG                       | 000-000-000-875/3                            |

| No. | Test objective                            | Requirement | Method of test      | Documentation | Test evaluation/ verification * |
|-----|-------------------------------------------|-------------|---------------------|---------------|---------------------------------|
| 1.  | Calculation of sound power level          | Art. 9      | ČSN ISO 9614-2:1997 | Page No. 7-13 | +                               |
| 2.  | Acoustic measurements – Sound power level | Art. 8      | ČSN EN 12102-1:2023 | Page No. 6-13 | +                               |

\*1) **Evaluation / statement of conformity:**

|                                   |                       |
|-----------------------------------|-----------------------|
| + ..... Requirement fulfilled     | 0 .....Not applicable |
| - ..... Requirement not fulfilled | x .....Not evaluated  |

The stated extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient  $k=2$ , corresponding to the coverage certainty of 95% as regards standard classification.

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|                                          |                                                              |
|------------------------------------------|--------------------------------------------------------------|
| <b>Test objective:</b>                   | Heating and cooling equipment                                |
| <b>Exact name of the test procedure:</b> | 2.136* - Measurement of noise characteristics                |
| <b>Test method:</b>                      | ČSN EN 12102-1:2023; ČSN ISO 9614-2:1997                     |
| <b>Sample tested:</b>                    | Air/Water Heat pump AE080CXYDGK/EU                           |
| <b>Measuring equipment used:</b>         | see Chapter III                                              |
| <b>Place of test:</b>                    | Engineering Test Institute, Hudcova 424/56b, 621 00 Brno, CZ |

**Measurement uncertainty:**

| Measured quantity                                                                                                                                                                                                                         | Unit                 | Uncertainty of measurement                                                | Evaluation  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------|-------------|
| Liquid                                                                                                                                                                                                                                    |                      |                                                                           |             |
| - temperature difference (dT)                                                                                                                                                                                                             | [K]                  | $\pm 0.15$ K                                                              | fulfilled   |
| - temperature inlet/outlet                                                                                                                                                                                                                | [°C]                 | $\pm 0.15$ K                                                              | fulfilled   |
| - volume flow                                                                                                                                                                                                                             | [m <sup>3</sup> /s]  | $\pm 1$ %                                                                 | fulfilled   |
| - static pressure difference                                                                                                                                                                                                              | [kPa]                | $\pm 1$ kPa ( $\Delta p \leq 20$ kPa) or $\pm 5$ % ( $\Delta p > 20$ kPa) | fulfilled   |
| Air                                                                                                                                                                                                                                       |                      |                                                                           |             |
| - dry bulb temperature                                                                                                                                                                                                                    | [°C]                 | $\pm 0.2$ K                                                               | fulfilled   |
| - wet bulb temperature                                                                                                                                                                                                                    | [°C]                 | $\pm 0.4$ K                                                               | fulfilled   |
| - volume flow                                                                                                                                                                                                                             | [m <sup>3</sup> /s]  | $\pm 5$ %                                                                 | not applied |
| - static pressure difference                                                                                                                                                                                                              | [Pa]                 | $\pm 5$ Pa ( $\Delta p \leq 100$ Pa) or $\pm 5$ % ( $\Delta p > 100$ Pa)  | not applied |
| Refrigerant                                                                                                                                                                                                                               |                      |                                                                           |             |
| - pressure at compressor outlet                                                                                                                                                                                                           | [kPa]                | $\pm 1$ %                                                                 | not applied |
| - temperature                                                                                                                                                                                                                             | [°C]                 | $\pm 0.5$ K                                                               | not applied |
| Concentration (in volume)                                                                                                                                                                                                                 |                      |                                                                           |             |
| - heat transfer medium                                                                                                                                                                                                                    | [%]                  | $\pm 2$                                                                   | not applied |
| Electrical quantities                                                                                                                                                                                                                     |                      |                                                                           |             |
| - electric power                                                                                                                                                                                                                          | [W]                  | $\pm 1$ %                                                                 | fulfilled   |
| - voltage                                                                                                                                                                                                                                 | [V]                  | $\pm 0.5$ %                                                               | fulfilled   |
| - current                                                                                                                                                                                                                                 | [A]                  | $\pm 0.5$ %                                                               | fulfilled   |
| - electric energy                                                                                                                                                                                                                         | [kWh]                | $\pm 1$ %                                                                 | not applied |
| Compressor rotational speed                                                                                                                                                                                                               | [min <sup>-1</sup> ] | $\pm 0.5$ %                                                               | not applied |
| The heating or cooling capacities measured on the liquid side shall be determined within a maximum uncertainty of 5 % independent of the individual uncertainties of measurement including the uncertainties on the properties of fluids. |                      |                                                                           | fulfilled   |

**Note:**

Comment to abbreviated marking: e.g. A7/W55

A (air) 7 (input source air temperature in °C) / W (water), 55 (output heating water temperature in °C)

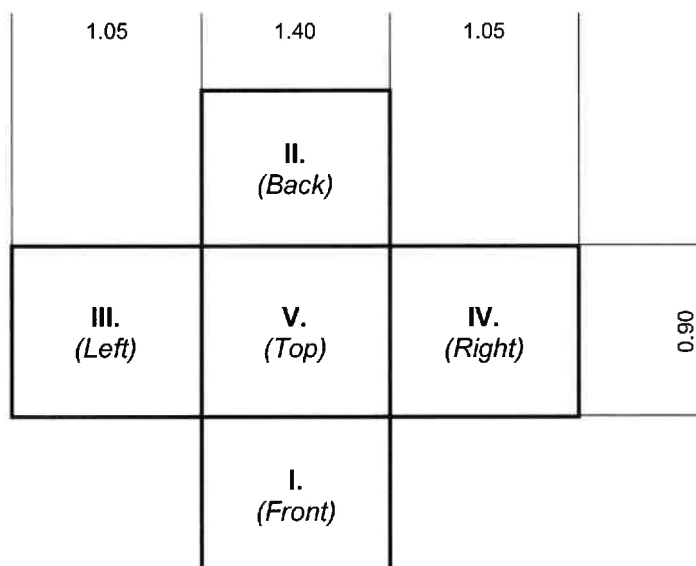
**a) Measurement surface**

Tested samples were surrounded by a cuboid-shaped measurement surface set at the distance  $d$  [m].

| <b>Test Sample: Air/Water Heat pump AE080CXYDGK/EU</b> |       |                   |       |
|--------------------------------------------------------|-------|-------------------|-------|
| Distance from the test sample                          | $d$   | [m]               | 0.20  |
| Height of measurement surface                          | $h$   | [m]               | 1.05  |
| Width of measurement surface                           | $w$   | [m]               | 1.40  |
| Depth of measurement surface                           | $l$   | [m]               | 0.90  |
| Total measurement surface area                         | $S$   | [m <sup>2</sup> ] | 6.09  |
| Minimal measuring time per surface                     | $t_M$ | [s]               | 90.00 |

Sketch of measurement surface (not to scale):

Air/Water Heat pump **AE080CXYDGK/EU**  
– Outdoor unit –



**b) Acoustic environment**

The device under test was placed inside a climate chamber (dimensions shown below). The chamber was acoustically treated to be compliant with ČSN EN ISO 3745:2012 requirements for hemi-anechoic chambers. The background noise was stable with the main noise source being the air conditioning of the climate chamber which was set to lower power or momentarily turned off for sufficient signal to noise ratio. The device under test was placed in a position offset from the middle of the chamber, at a sufficient distance from the surrounding walls, and was rotated by about 5÷10 °. Care was taken to ensure low air flow at the measurement surface by adjusting the measurement distance and positions.

| <b>Climate-acoustic chamber</b><br>(corresponds to free field over a reflecting plane) |       |     |      |
|----------------------------------------------------------------------------------------|-------|-----|------|
| Width of testing room                                                                  | $l_1$ | [m] | 3.75 |
| Length of testing room                                                                 | $l_2$ | [m] | 4.50 |
| Height of testing room                                                                 | $l_3$ | [m] | 4.25 |

**c) Measured and calculated data – General overview:**

|                                                                      |           |                |                                              |
|----------------------------------------------------------------------|-----------|----------------|----------------------------------------------|
| Test sample                                                          |           |                | Air/Water Heat pump<br><b>AE080CXYDGK/EU</b> |
| The measured values are in accordance with<br>ČSN EN 12102-1:2023    |           |                | YES                                          |
| The measured values are in accordance with<br>ČSN EN ISO 9614-2:1997 |           |                | YES                                          |
| Operation mode                                                       |           |                | Heating                                      |
| Specification of the assessment condition                            |           |                | A7/W55*                                      |
| Type of HP capacity regulation                                       |           |                | Inverter                                     |
| Compressor speed settings                                            |           |                | 20 Hz                                        |
| Fan speed settings                                                   |           |                | AUTO                                         |
| Date of testing (YYYY-MM-DD)                                         |           |                | 2024-06-18                                   |
| Reference air temperature                                            | $t_{amb}$ | [°C]           | 7.0                                          |
| Relative humidity of air                                             | $RH$      | [%]            | 86.7                                         |
| Ambient pressure                                                     | $p_{amb}$ | [hPa]          | 981.5                                        |
| Overall sound power level (linear)                                   | $L_W$     | [dB]           | 63.8 ± 1.5                                   |
| <b>Overall A-weighted sound power level</b>                          | $L_{WA}$  | <b>[dB(A)]</b> | <b>52.0 ± 1.5</b>                            |
| <b>Accuracy class</b>                                                |           |                | <b>Engineering<br/>(grade 2)</b>             |

\* Comment to abbreviated marking: i.e. A7/W55

A (water), 7 (input source liquid temperature in °C) / W (water), 55 (outlet heating water temperature in °C)

**1A) Measurement results – octave bands**

|                                                                                                       |                                  |
|-------------------------------------------------------------------------------------------------------|----------------------------------|
| Air/Water Heat pump <b>AE080CXYDGK/EU</b><br>Outdoor unit at A7/W55; Compressor at 20 Hz; Fan at AUTO | <b>Engineering<br/>(Grade 2)</b> |
|-------------------------------------------------------------------------------------------------------|----------------------------------|

| $f_m$<br>[Hz]      | Criterion 1 |          |                | Criterion 2 |                  | Criterion 3                  | All criteria passed? | $L_w$<br>[dB] | $L_{WA}$<br>[dB(A)] | U<br>[dB]                   | Evaluation |
|--------------------|-------------|----------|----------------|-------------|------------------|------------------------------|----------------------|---------------|---------------------|-----------------------------|------------|
|                    | $L_d$       | $F_{pl}$ | $L_d > F_{pl}$ | $F_{+/-}$   | $F_{+/-} \leq 3$ | $L_{w(1)} - L_{w(2)} \leq 5$ |                      |               |                     |                             |            |
| 125                | 20.7        | 3.2      | YES            | 0.0         | YES              | YES                          | YES                  | 63.3          | 49.3                | $\pm 3.0$                   | passed     |
| 250                | 21.3        | 3.2      | YES            | 0.0         | YES              | YES                          | YES                  | 50.5          | 42.7                | $\pm 2.0$                   | c          |
| 500                | 22.4        | 3.0      | YES            | 0.0         | YES              | YES                          | YES                  | 49.9          | 45.8                | $\pm 1.5$                   | c          |
| 1000               | 21.5        | 3.9      | YES            | 0.0         | YES              | YES                          | YES                  | 41.7          | 41.5                | $\pm 1.5$                   | c          |
| 2000               | 21.7        | 12.5     | YES            | 3.0         | YES              | YES                          | YES                  | 30.7          | 31.8                | $\pm 1.5$                   | c          |
| 4000               | 20.8        | 20.0     | YES            | 3.0         | YES              | YES                          | YES                  | 22.9          | 23.9                | $\pm 1.5$                   | c          |
| 8000 <sup>*)</sup> | 20.8        | 15.6     | YES            | 3.0         | YES              | NO                           | NO                   | 14.4          | 14.3                | $\pm 2.5$                   | nc         |
| <b>Total</b>       |             |          |                |             |                  |                              |                      | <b>63.8</b>   | <b>52.0</b>         | <b><math>\pm 1.5</math></b> |            |

<sup>\*)</sup> Due to the sound intensity method limitations, the frequency of 6300 Hz was measured only.

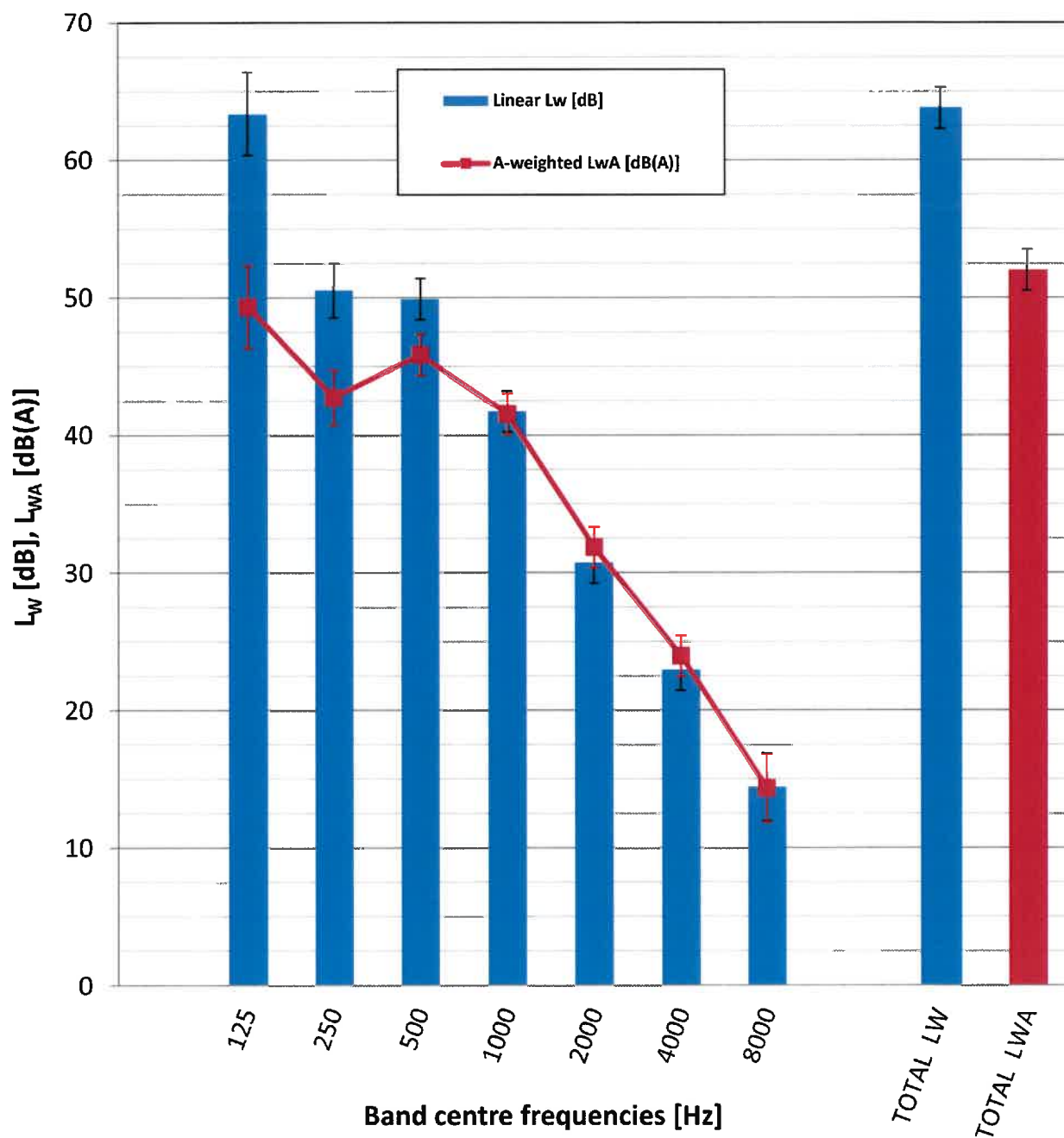
**Legend:**

|                   |                                                                                                                                                                                               |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>passed</i>     | Frequency bands with this description are significant for the calculation of A-weighted total sound power level $L_{WA}$ . Required accuracy class is fulfilled in this band.                 |
| <i>not passed</i> | Frequency bands with this description are significant for the calculation of A-weighted total sound power level $L_{WA}$ . Required accuracy class is not fulfilled in this band.             |
| <i>c</i>          | Frequency bands with this description are not significant for the calculation of A-weighted total sound power level $L_{WA}$ . These bands are evaluated in the calculation of $L_{WA}$ .     |
| <i>nc</i>         | Frequency bands with this description are not significant for the calculation of A-weighted total sound power level $L_{WA}$ . These bands are not evaluated in the calculation of $L_{WA}$ . |

**Spectrum of Sound power level  $L_w$  – octave bands**

Air/Water Heat pump **AE080CXYDGK/EU**  
Outdoor unit at A7/W55; Compressor at 20 Hz; Fan at AUTO

**Engineering  
(Grade 2)**



**1B) Measurement results – one-third octave bands**

|                                                                                                       |                                  |
|-------------------------------------------------------------------------------------------------------|----------------------------------|
| Air/Water Heat pump <b>AE080CXYDGK/EU</b><br>Outdoor unit at A7/W55; Compressor at 20 Hz; Fan at AUTO | <b>Engineering<br/>(Grade 2)</b> |
|-------------------------------------------------------------------------------------------------------|----------------------------------|

| $f_m$<br>[Hz] | Criterion 1 |            |                | Criterion 2 |                  | Criterion 3                  | All criteria passed? | $L_w$<br>[dB] | $L_{WA}$<br>[dB(A)] | U<br>[dB]                   | Evaluation |
|---------------|-------------|------------|----------------|-------------|------------------|------------------------------|----------------------|---------------|---------------------|-----------------------------|------------|
|               | $L_d$       | $F_{pl}$   | $L_d > F_{pl}$ | $F_{+/-}$   | $F_{+/-} \leq 3$ | $L_{w(1)} - L_{w(2)} \leq 5$ |                      |               |                     |                             |            |
| 100           | 20.7        | 5.4        | YES            | 0.0         | YES              | YES                          | YES                  | 48.4          | 29.3                | $\pm 3.0$                   | c          |
| 125           | 20.7        | 3.2        | YES            | 0.0         | YES              | YES                          | YES                  | 57.0          | 40.9                | $\pm 3.0$                   | passed     |
| <b>160</b>    | <b>21.0</b> | <b>1.9</b> | <b>YES</b>     | <b>0.0</b>  | <b>YES</b>       | <b>YES</b>                   | <b>YES</b>           | <b>62.0</b>   | <b>48.6</b>         | <b><math>\pm 3.0</math></b> | passed     |
| 200           | 21.2        | 3.0        | YES            | 0.0         | YES              | YES                          | YES                  | 44.9          | 34.0                | $\pm 2.0$                   | c          |
| 250           | 21.3        | 3.2        | YES            | 0.0         | YES              | YES                          | YES                  | 43.4          | 34.8                | $\pm 2.0$                   | c          |
| 315           | 21.8        | 2.7        | YES            | 0.0         | YES              | YES                          | YES                  | 47.8          | 41.2                | $\pm 2.0$                   | passed     |
| 400           | 22.0        | 3.4        | YES            | 0.0         | YES              | YES                          | YES                  | 48.6          | 43.8                | $\pm 1.5$                   | passed     |
| 500           | 22.4        | 3.0        | YES            | 0.0         | YES              | YES                          | YES                  | 40.4          | 37.2                | $\pm 1.5$                   | c          |
| 630           | 22.6        | 3.3        | YES            | 0.0         | YES              | YES                          | YES                  | 41.5          | 39.6                | $\pm 1.5$                   | passed     |
| 800           | 23.1        | 5.1        | YES            | 0.0         | YES              | YES                          | YES                  | 37.7          | 36.9                | $\pm 1.5$                   | c          |
| 1000          | 21.5        | 3.9        | YES            | 0.0         | YES              | YES                          | YES                  | 38.3          | 38.3                | $\pm 1.5$                   | c          |
| 1250          | 22.8        | 3.6        | YES            | 0.0         | YES              | YES                          | YES                  | 33.5          | 34.1                | $\pm 1.5$                   | c          |
| 1600          | 23.1        | 4.3        | YES            | 0.0         | YES              | YES                          | YES                  | 28.8          | 29.8                | $\pm 1.5$                   | c          |
| 2000          | 21.7        | 12.5       | YES            | 3.0         | YES              | YES                          | YES                  | 20.6          | 21.8                | $\pm 1.5$                   | c          |
| 2500          | 20.4        | 20.0       | YES            | 2.8         | YES              | YES                          | YES                  | 25.0          | 26.3                | $\pm 1.5$                   | c          |
| 3150          | 20.6        | 18.9       | YES            | 3.0         | YES              | YES                          | YES                  | 21.3          | 22.5                | $\pm 1.5$                   | c          |
| 4000          | 20.8        | 20.0       | YES            | 3.0         | YES              | YES                          | YES                  | 8.1           | 9.1                 | $\pm 1.5$                   | c          |
| 5000          | 20.6        | 6.9        | YES            | 0.0         | YES              | NO                           | NO                   | 17.6          | 18.1                | $\pm 1.5$                   | nc         |
| 6300          | 20.8        | 15.6       | YES            | 3.0         | YES              | NO                           | NO                   | 9.7           | 9.6                 | $\pm 2.5$                   | nc         |
| <b>Total</b>  |             |            |                |             |                  |                              |                      | <b>63.8</b>   | <b>52.0</b>         | <b><math>\pm 1.5</math></b> |            |

**Legend:**

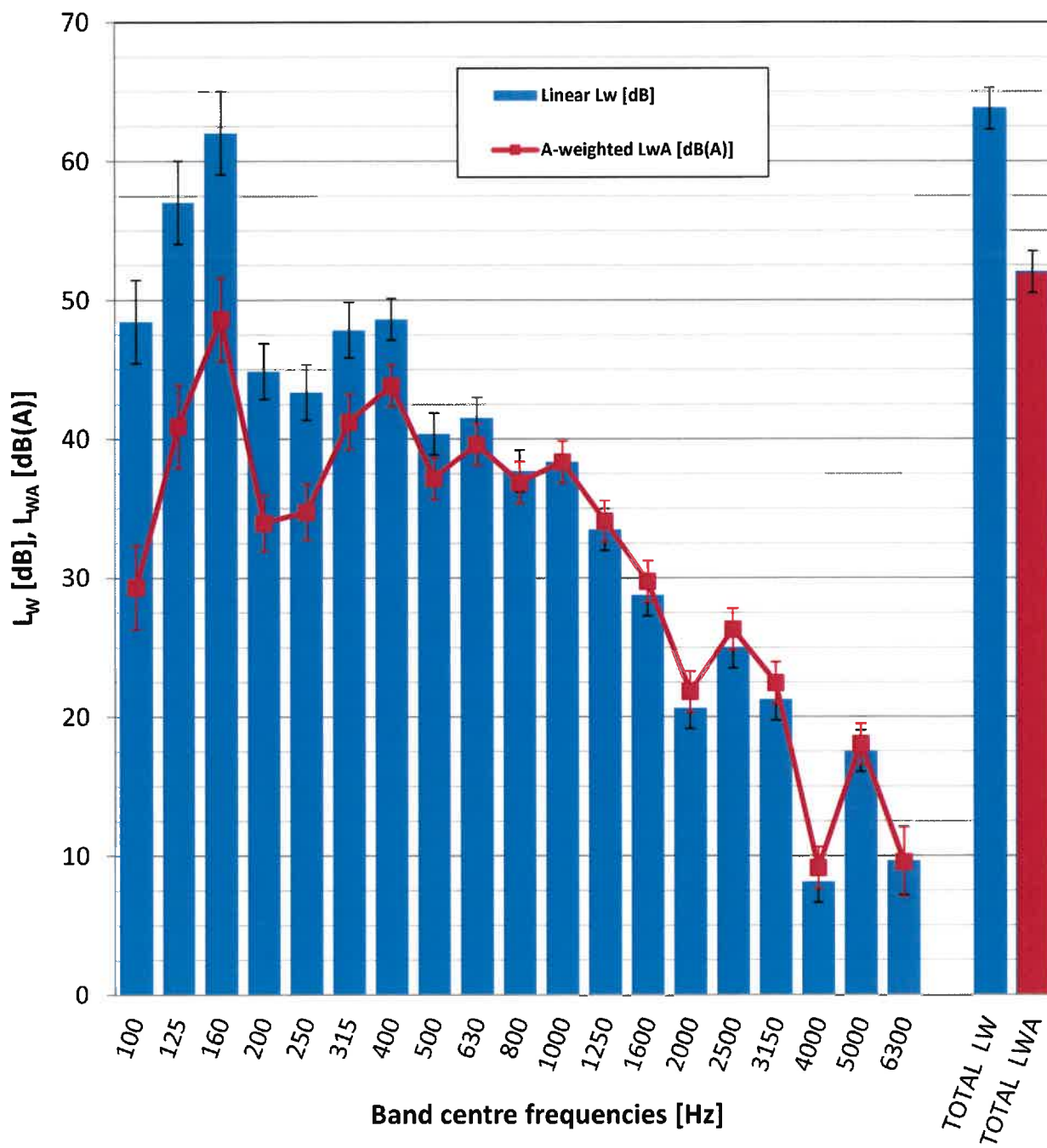
|                   |                                                                                                                                                                                               |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>passed</i>     | Frequency bands with this description are significant for the calculation of A-weighted total sound power level $L_{WA}$ . Required accuracy class is fulfilled in this band.                 |
| <i>not passed</i> | Frequency bands with this description are significant for the calculation of A-weighted total sound power level $L_{WA}$ . Required accuracy class is not fulfilled in this band.             |
| <i>c</i>          | Frequency bands with this description are not significant for the calculation of A-weighted total sound power level $L_{WA}$ . These bands are evaluated in the calculation of $L_{WA}$ .     |
| <i>nc</i>         | Frequency bands with this description are not significant for the calculation of A-weighted total sound power level $L_{WA}$ . These bands are not evaluated in the calculation of $L_{WA}$ . |

**Spectrum of Sound power level  $L_W$  – one-third octave bands**

Air/Water Heat pump **AE080CXYDGK/EU**

Outdoor unit at A7/W55; Compressor at 20 Hz; Fan at AUTO

**Engineering  
(Grade 2)**



Tested by: Ing. Ondrej Bilkovič

Date: 2024-07-23

Signed:

Reviewed and approved by: Ing. Antonín Kolbábek, Ph.D.

Date: 2024-07-23

Signed:

**V. A list of referenced documents**

- Order of 2024-04-04 (Order reg. no. B-81950, received on 2024-04-04)
- Contract B-81950/39
- ČSN EN 12102-1:2023 - Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors - Determination of the sound power level - Part 1: Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers
- ČSN ISO 9614-2:1997 - Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning
- ČSN EN 14511-2:2023 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 2: Test conditions
- ČSN EN 14511-3:2023 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 3: Test methods
- ČSN EN 14511-4:2023 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 4: Requirements
- ČSN EN 14825:2023 - Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling, commercial and process cooling - Testing and rating at part load conditions and calculation of seasonal performance
- Background of the SZU task no. 39-17675
- Record measurement file 39-17675-H.zip

Test Report compiled by:

**Ing. Ondřej Bilkovič**  
Test engineer

Test Report approved by:

**Ing. Antonín Kolbábek, Ph.D.**  
Hydraulic and Pressure Equipment Manager

– End of Test Report –