[uwaga tłumacza: każda strona pliku źródłowego opatrzona jest nagłówkiem składającym się z logo i tekstu "DUŃSKI INSTYTUT TECHNOLOGICZNY" oraz stopką składającą się logo z tekstem "ilac-MRA" i logo z tekstem "DANK", pod którym umieszczono tekst "nr rejestracyjny badania 300"]
[strona 1:]

RAPORT Z BADAŃ

Nr raportu:
300-KLAB-24-068

Teknologiparken
Kongsvang Allé 29
DK-8000 Aarhus C
+45 72 20 20 00
Info@teknologisk.dk
www.teknologisk.dk

Strona 1 z 12
Skrót: PRES/PKB
Nr pliku: 270336
Załączniki: 1

Klient:	Firma:	NIBE AB	
	Adres:	Hannabadsvägen 5	
	Miasto:	SE-285 21, Markaryd, Szwecja	
Komponent:	Marka:	NIBE	
	Typ:	Pompa ciepła powietrze-woda (Split)	
	Model:	Jednostka zewnętrzna:	AMS20-10
		Jednostka wewnętrzna:	BA-SVM 20-200/12 E
	Nr serii:	Jednostka zewnętrzna:	AP2601007YQ
		Jednostka wewnętrzna:	06795424278001
	Rok prod.:	2024	
Daty:	Badanie komponentu:	listopad 2024 - styczeń 2025	

Procedura: Zobacz cel (strona 2), aby zapoznać się z listą norm.

Uwagi: Urządzenie zostało dostarczone przez klienta. Instalacja i ustawienia testowe zostały wykonane zgodnie z instrukcjami producenta.

Warunki: Badanie zostało przeprowadzone w ramach akredytacji zgodnie z międzynarodowymi wymogami (ISO/IEC 17025:2017) oraz zgodnie z Ogólnymi Warunkami Duńskiego Instytutu Technologicznego. Wyniki badania odnoszą się wyłącznie do badanego produktu. Niniejszy raport z badań może być cytowany fragmentarycznie wyłącznie za pisemną zgodą Duńskiego Instytutu Technologicznego.

Klient nie może wymieniać lub powoływać się na Duński Instytut Technologiczny lub pracowników Duńskiego Instytutu Technologicznego w celach reklamowych lub marketingowych bez pisemnej zgody udzielonej każdorazowo przez Duński Instytut Technologiczny.

Dział/Centrum: Duński Instytut Technologiczny
Dział Energii i Klimatu
Laboratorium Pomp Ciepła, Aarhus

Data: 2025.02.21

Podpis:
Preben Eskerod

B.TecMan & MarEng

Sprawdził:
Gustav Due Poulsen

B.TecMan & MarEng

NR TP. 313 07

[strona 2:]

Cel

Celem niniejszego raportu jest udokumentowanie następujących kwestii:

Sezonowy współczynnik wydajności (SCOP) w niskiej i średniej temperaturze dla klimatu umiarkowanego zgodnie z normą EN 14825:2022.

W celu obliczenia SCOP przeprowadzono testy w warunkach obciążenia częściowego podanych w tabelach na stronie 4 i 5.

Test COP w standardowych warunkach znamionowych A7/W35 i A7/W55 zgodnie z normą EN 14511:2022.

Pomiary mocy akustycznej zgodnie z normą EN 12102-1:2022.

[strona 3:]

Spis treści:

MAŁGORZATA AUSTROMSKA TŁUMACZ PRZYSIĘGŁY JĘZYKA ANGIELSKIEGO NR TP/313/07

[strona 4:]

Warunki badań

Warunki badania SCOP w niskich temperaturach - EN 14825

Warunki częściowego obciążenia dla referencyjnego SCOP i referencyjnego SCOP na potrzeby obliczeń w przypadku jednostek powietrze-woda do zastosowań niskotemperaturowych dla referencyjnego sezonu grzewczego;
"A"= klimat umiarkowany, "W" = klimat cieplejszy i "C" = klimat chłodniejszy.

	Współczynnik obciążenia częściowego w %				Zewnętrzny wymiennik ciepła		Wewnętrzny wymiennik ciepła			
					Temperatura termometru suchego (mokrego) °C		Stały wylot C°	Zmienny wylot[d] °C		
	Wzór	Średnia	Cieplejszy	Chłodniejszy	Powietrze zewnętrzne	Powietrze wylotowe	Wszystkie klimaty	Średnia	Cieplejszy	Chłodniejszy
A	(-7-16) / (Tdesignh - 16)	88,46	n.d.	60,53	-7(-8)	20(12)	[a] / 35	[a] / 34	n.d.	[a] / 30
B	(+2-16) / (Tdesignh - 16)	53,85	100,00	36,84	2(1)	20(12)	[a] / 35	[a] / 30	[a] / 35	[a] / 27
C	(+7-16) / (Tdesignh - 16)	34,62	64,29	23,68	7(6)	20(12)	[a] / 35	[a] / 27	[a] / 31	[a] / 25
D	(+12-16) / (Tdesignh - 16)	15,38	28,57	10,53	12(11)	20(12)	[a] / 35	[a] / 24	[a] / 26	[a] / 24
E	*(TOL[nieczytelne]* - 16) / (Tdesignh - 16)				*TOL [nieczytelne]*	20(12)	[a] / 35	a / b	a / b	a / b
F	*(Tbiv* - 16) / (Tdesignh - 16)				*Tbiv*	20(12)	[a] / 35	a / c	a / c	a / c
G	(-15-16) / (Tdesignh - 16)	n.d.	n.d.	81,58	-15	20(12)	[a] / 35	n.d.	n.d.	[a] / 32

Dodatkowe informacje

Klimat	Tdesignh [°C]	Tbivalent [°C]	TOL [°C]	Temperatura na wylocie	Natężenie przepływu
Umiarkowany	-10	-10	-10	Zmienna	Zmienna

TŁUMACZ PRZYSIĘGŁY JĘZYKA ANGIELSKIEGO
NR TP/313/07

[strona 5:]

Warunki badania SCOP w średnich temperaturach - EN 14825

Warunki częściowego obciążenia dla referencyjnego SCOP i referencyjnego SCOP do obliczeń jednostek powietrze-woda dla zastosowań średniotemperaturowych dla referencyjnego sezonu grzewczego; "A"= klimat umiarkowany, "W" = klimat cieplejszy i "C" = klimat chłodniejszy.

	Współczynnik obciążenia częściowego w %				**Zewnętrzny wymiennik ciepła**		**Wewnętrzny wymiennik ciepła**			
					Temperatura termometru suchego (mokrego) C°		Stały wylot °C	Zmienny wylot [d] °C		
	Wzór	Średnia	Cieplejszy	Chłodniejszy	Powietrze zewnętrzne	Powietrze wylotowe	Wszystkie klimaty	Średnia	Cieplejszy	Chłodniejszy
A	(-7 -16) / (Tdesignh -16)	88.46	n.d.	60,53	-7(-8)	20(12)	[a] / 55	[a] / 52	n.d.	[a] / 44
B	(+2 -16) / (Tdesignh - 16)	53,85	100	36,84	2(1)	20(12)	[a] / 55	[a] / 42	[a] / 55	[a] / 37
C	(+7 - 16) / (Tdesignh -16)	34,62	64,29	23,68	7(6)	20(12)	[a] / 55	[a] / 36	[a] / 46	[a] / 32
D	(+12-16) / (Tdesignh - 16)	15,38	28,57	10,53	12(11)	20(12)	[a] / 55	[a] / 30	[a] / 34	[a] / 28
E	*(TOL[nieczytelne]* - 16) / (Tdesignh - 16)				*TOL[nieczytelne]*	20(12)	[a] / 55	a / b	a / b	a / b
F	*(Tbiv* - 16) / (Tdesignh - 16)				*Tbiv*	20(12)	[a] / 55	a / c	a / c	a / c
G	(-15-16) / (Tdesignh - 16)	n.d.	n.d.	81,58	-15	20(12)	[a] / 55	n.d.	n.d.	[a] / 49

Dodatkowe informacje

Klimat	Tdesignh **[°C]**	Tbivalent **[°C]**	**TOL [°C]**	**Temperatura na wylocie**	**Natężenie przepływu**
Umiarkowany	-10	-10	-10	Zmienna	Zmienna

[strona 6:]

Znamionowe znormalizowane warunki badania COP - EN 14511

Nr	Źródło ciepła		Kaloryfer	
	Temperatura termometru suchego na wlocie (°C)	Temperatura termometru mokrego na wlocie (°C)	Temperatura na wlocie (°C)	Temperatura na wylocie (°C)
1	7	6	30	35
2	7	6	47	55

Warunki pomiaru mocy akustycznej - EN12102-1

Nr	Warunki badania		Ustawienie pompy ciepła			
	Temperatura powietrza otoczenia (°C)	Zewnętrzny/ wewnętrzny wymiennik ciepła (°C)	Prędkość sprężarki (Hz)	Prędkość wentylatora (KROK)	Moc grzewcza (kW)	Moc wejściowa (kW)
1	20	7/55	-	-	2.56	0.94
2		7/55	30	2	2.56	0.94

1) Jednostka wewnętrzna
2) Jednostka zewnętrzna

Wyniki badań

Wyniki badania SCOP w niskich temperaturach - średnia sezonu grzewczego - EN 14825

Model (zewnętrzny)	NIBE AMS20-10
Monoblokowa pompa ciepła powietrze-woda	N
Niskotemperaturowa pompa ciepła	N
Wyposażona w dodatkowy ogrzewacz	T
Wielofunkcyjny ogrzewacz z pompą ciepła	N
Odwracalna	T

Znamionowa moc cieplna[1)]	P_{rated}	**6.3** [kW]
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	η_s	**193.7** [%]
	SCOP	**4.92** [-]

Zmierzona wydajność ogrzewania dla częściowego obciążenia przy temperaturze zewnętrznej Tj	Klimat umiarkowany - Zastosowanie w niskich temperaturach	Tj=-15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	5.65 [kW]
		Tj=2 °C	Pdh	3.45 [kW]
		Tj=7 °C	Pdh	2.39 [kW]
		Tj=12 °C	Pdh	2.70 [kW]
		Tj=temperatura dwuwartościowa	Pdh	5.65 [kW]
		Tj=granica działania	Pdh	6.58 [kW]

Zmierzony współczynnik wydajności w temperaturze zewnętrznej Tj	Klimat umiarkowany - Zastosowanie w niskich temperaturach	Tj=-15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2.89 [-]
		Tj=2 °C	COPd	4.75 [-]
		Tj=7 °C	COPd	6.96 [-]
		Tj = 12 °C	COPd	8.48 [-]
		Tj=temperatura dwuwartościowa	COPd	2.89 [-]
		Tj=granica działania	COPd	2.51 [-]

Temperatura dwuwartościowa	Tbivalent	-10 [°C]
Graniczna temperatura pracy	TOL	-10 [°C]
Graniczna temperatura robocza wody grzewczej	WTOL	- [°C]
Współczynnik strat	Cdh	0.93 [-]

Pobór mocy w trybach innych niż aktywny	Tryb wyłączenia	P_{OFF}	0.021 [kW]
	Tryb wyłączenia termostatu	P_{TO}	0.023 [kW]
	Tryb czuwania	P_{SB}	0.020 [kW]
	Tryb włączonej grzałki karteru	P_{CK}	0.021 [kW]
Ogrzewacz dodatkowy[1)]	Znamionowa moc cieplna	P_{SUP}	0.00 [kw]
	Rodzaj pobieranej energii		Elektryczna

Pozostałe parametry	Regulacja wydajności		Zmienna
	Regulacja przepływu wody		Zmienna
	Natężenie przepływu wody		-
	Roczne zużycie energii	Q_{HE}	2646 [kWh]

[1)]W przypadku ogrzewaczy pomieszczeń z pompą ciepła i ogrzewaczy wielofunkcyjnych z pompą ciepła znamionowa moc cieplna Prated jest równa obciążeniu obliczeniowemu dla trybu ogrzewania Pdesignh, a znamionowa moc cieplna ogrzewacza dodatkowego Psup jest równa dodatkowej wydajności grzewczej dla trybu ogrzewania sup(Tj).

[nieczytelne] Do obliczenia SCOP używana jest wartość PCK - PSB. Patrz punkt "SCOP - obliczenia szczegółowe"

NR TP/313/07

[strona 8:]

Wyniki badania SCOP w średnich temperaturach - średnia sezonu grzewczego - EN 14825

Model (zewnętrzny)	NIBE AMS20-10
Monoblokowa pompa ciepła powietrze-woda	N
Niskotemperaturowa pompa ciepła	N
Wyposażona w dodatkowy ogrzewacz	T
Wielofunkcyjny ogrzewacz z pompą ciepła	N
Odwracalna	T

Znamionowa moc cieplna[1)]	P_{rated}	**6.45** [kW]
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	η_s	**140.8** [%]
	SCOP	**3.60** [-]

Zmierzona wydajność ogrzewania dla częściowego obciążenia przy temperaturze zewnętrznej Tj	Klimat umiarkowany - Zastosowanie w średnich temperaturach	Tj=-15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	5.91 [kW]
		Tj=2 °C	Pdh	3.63 [kW]
		Tj=7 °C	Pdh	2.29 [kW]
		Tj=12 °C	Pdh	2.47 [kW]
		Tj=temperatura dwuwartościowa	Pdh	5.91 [kW]
		Tj=granica działania	Pdh	6.87 [kW]

Zmierzony współczynnik wydajności w temperaturze zewnętrznej Tj	Klimat umiarkowany - Zastosowanie w średnich temperaturach	Tj=-15 °C	COPd	
		Tj=-7 °C	COPd	2.03 [-]
		Tj=2 °C	COPd	3.56 [-]
		Tj=7 °C	COPd	4.92 [-]
		Tj=12 °C	COPd	6.21 [-]
		Tj=temperatura dwuwartościowa	COPd	2.03 [-]
		Tj=granica działania	COPd	1.69 [-]

Temperatura dwuwartościowa	Tbivalent	-7 [°C]
Graniczna temperatura pracy	TOL	-10 [°C]
Graniczna temperatura robocza wody grzewczej	WTOL	-[°C]
Współczynnik strat	Cdh	0.94 [-]

Pobór mocy w trybach innych niż aktywny	Tryb wyłączenia	P_{OFF}	0.021 [kW]
	Tryb wyłączenia termostatu	P_{TO}	0.023 [kW]
	Tryb czuwania	P_{SB}	0.020 [kW]
	Tryb włączonej grzałki karteru	P_{CK}	0.021 [kW]
Ogrzewacz dodatkowy[1)]	Znamionowa moc cieplna	P_{SUP}	0.00 [kW]
	Rodzaj pobieranej energii		Elektryczna

Pozostałe parametry	Regulacja wydajności		Zmienna
	Regulacja przepływu wody		Zmienna
	Natężenie przepływu wody		-
	Roczne zużycie energii	Q_{HE}	3706 [kWh]

[1)]W przypadku ogrzewaczy pomieszczeń z pompą ciepła i ogrzewaczy wielofunkcyjnych z pompą ciepła znamionowa moc cieplna Prated jest równa obciążeniu obliczeniowemu dla trybu ogrzewania Pdesignh, a znamionowa moc cieplna ogrzewacza dodatkowego Psup jest równa dodatkowej wydajności grzewczej dla trybu ogrzewania sup(Tj).

[nieczytelne] Do obliczenia SCOP używana jest wartość PCK - PSB. Patrz punkt "SCOP - obliczenia szczegółowe"

Wyniki badania COP - w warunkach znamionowych znormalizowanych - EN 14511

Nr	Warunki badania	Moc grzewcza [kW]	COP
1	A7/W35	10.963	4.625
2	A7/W55	10.908	2.947

Wyniki pomiaru mocy akustycznej - EN 12102-1

Nr	Poziom mocy akustycznej LW(A) [dB re 1pW]	Niepewność (dB) (wartość ważona)
1	**32.7**	2.1
2	**54.4**	1.6

1) Jednostka wewnętrzna.
2) Jednostka zewnętrzna.

Całkowity poziom mocy akustycznej skorygowany charakterystyką A jest określany dla mierzonego zakresu częstotliwości od 100 Hz do 10 kHz.

Pomiary mocy akustycznej są przeprowadzane przez Kamalathasana Arumugama (KAMA) i współodczytywane przez Patricka Gliberta (PGL) z Duńskiego Instytutu Technologicznego.

[strona 10:]

Zdjęcia

Tabliczka znamionowa (wewnętrzna) Jednostka wewnętrzna

[zdjęcie tabliczki znamionowej z tekstem jak niżej]

[zdjęcie urządzenia z czytelnym tekstem:]

[logo] NIBE [znak CE i inne symbole] IP21

[logo] NIBE

Typ **BA-SVM 20-200/12 E** 067954

	Zbiornik	**Wężownica**
Pojemność:	180l	45l
Maks. ciśnienie robocze:	10 bar (10000hPa)	3 bar (3000hPa)
Maks. temperatura:	80 °C	80 °C

Ochrona przed korozją: Emalia + anoda tytanowa

Napięcie:	$230V_1$~AC 50Hz	/ $400V_{3N}$~AC 50Hz
Maks. prąd roboczy:	40 **A** (230V)	/ 20 **A** (400V)

Maks. moc grzałki zanurzeniowej: 4,5 ***kW*** (230V) / 9 ***kW*** (400V)

Waga: *165 kg*

Numer seryjny: 06795424270001

SE-285 21 Markaryd
Szwecja
Wykonane przez NiBE-Biawar

[kod kreskowy]

Rok produkcji: 2024

30895

[strona 11:]

Tabliczka znamionowa (na zewnątrz)

Jednostka zewnętrzna

[zdjęcie]

[logo] NIBE

TYPU SPLIT (JEDNOSTKA ZEWNĘTRZNA)

MODEL	AMS20-10
<kod serwisowy	AMS20-10/1
OZNACZENIE TYPU	L0012-A-001
ZASILANIE	230V~50Hz
PRĄD MAKS.	18.0 A
CZYNNIK CHŁODNICZY (GWP)	R32 (675)
FABRYCZNE NAPEŁNIENIE CZYNNIKIEM CHŁODNICZYM	1.84 kg
Ekwiwalent CO_2	1.2 t
PS (ciśnienie wysokie)	4.15 MPa (41.5 bar)
PS (ciśnienie niskie)	2.26 MPa (22.6 bar)
STOPIEŃ OCHRONY	IP24
WAGA JEDNOSTKI	62 kg
LRA	5/5 A

Wymiary gabarytowe: (szer./wys./gł.) 968x750x340

WYMIENNIK CIEPŁA JEDNOSTKI WEWNĘTRZNEJ	Warunki otoczenia (°C) (zew./wew.)	Częstotliwość sprężarki (Hz)	Wydajność grzewcza (kW)	COP	Pobór mocy (kW)
ACH-30EQ-80H	(35/30) 2	37	3.46	4.17	0.83
	(35/30) 7	37	4.00	5.33	0.75
	(35/30) 7	64	6.87	5.08	1.35

Temperatura robocza otoczenia

	min	max
Ogrzewanie	-20	43
Chłodzenie	15	43

[symbol graficzny] CE 0035

[symbole graficzne]

NR SERYJNY AP2601007YG

ROK PRODUKCJI 2024

NR PRODUKTU PCA003F164. 064319

[nieczytelne] PS8011F3131S

[zdjęcie urządzenia z czytelnym oznaczeniem modelu:]

[logo] NIBE AMS20

TŁUMACZ PRZYSIĘGŁY JĘZYKA ANGIELSKIEGO
NR TP/313/07

Załącznik 1 - Deklaracja zgodności

List autoryzacyjny

Niniejsza deklaracja zgodności została wydana na wyłączną odpowiedzialność

NIBE AB
Hannabadsvägen 5
285 21 Markaryd
SZWECJA

Oświadczamy, że testowana pompa ciepła NIBE AMS 20-10 + BA-SVM 20-12 jest uważana za identyczną z modelami wymienionymi w poniższej tabeli. Mają one identyczną:

a. wydajność grzewczą
b. cykl czynnika chłodniczego (w tym masę czynnika chłodniczego)
c. źródło ciepła i czynnik chłodniczy
d. główne komponenty / zasadę działania i strategię regulacji
e. rodzaj procesu odszraniania

Producent	Nazwa modelu
NIBE AB	NIBE AMS20-10 + BA-SVM 20-200/12 E
NIBE AB	NIBE AM S20-10 + BA-SVM 20-200/12 E EM
NIBE AB	NIBE AMS20-10 + BA-SVM 20-200/12 R
NIBE AB	NIBE AMS20-10 + HBS 20-10
NIBE AB	NIBE AMS20-10 + SHB 20-12 EM
NIBE AB	NIBE AMS20-10 + SHB 20-12
NIBE AB	NIBE F2050-10
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 E
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 E EM
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 R
NIBE AB	NIBEAMS20-10P + HBS 20-10
NIBE AB	NIBE AMS20-1 OP + SHB 20-12 EM
NIBE AB	NIBE AMS20-1 OP + SHB 20-12
NIBE AB	NIBE F2050-10P
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HMA100-W
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HSB100-W
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HMS100-W

NIBE

Data: [odręcznie:] 2025 02 19

Podpis: [podpis nieczytelny]

Ja, Małgorzata Kostrowska tłumacz przysięgły języka angielskiego (wpisana na listę tłumaczy przysięgłych Ministra Sprawiedliwości pod Nr TP/313/07), zaświadczam zgodność powyższego tłumaczenia z przedłożonym dokumentem sporządzonym w języku angielskim.
Nr rep.: 499/2025
Data: 21.02.2025

NR TP/313/07
TŁUMACZ PRZYSIĘGŁY JĘZYKA ANGIELSKIEGO

TEST REPORT

Report no.:
300-KLAB-24-068

DANISH TECHNOLOGICAL INSTITUTE

Teknologiparken
Kongsvang Allé 29
DK-8000 Aarhus C
+45 72 20 20 00
Info@teknologisk.dk
www.teknologisk.dk

Init: PRES/GDP
File no.: 270336
Enclosures: 1

Customer:	Company:	NIBE AB	
	Address:	Hannabadsvägen 5	
	City:	SE-285 21, Markaryd, Sweden	
Component:	Brand:	NIBE	
	Type:	Air to water heat pump (Split)	
	Model:	Outdoor unit:	AMS20-10
		Indoor unit:	BA-SVM 20-200/12 E
	Series no.:	Outdoor unit:	AP2601007YQ
		Indoor unit:	06795424278001
	Prod. year:	2024	
Dates:	Component tested:	November 2024 – January 2025	

Procedure: See objective (page 2) for list of standards.

Remarks: The unit was delivered by the customer. The installation and test settings were done according to the manufacturer's instructions.

Terms: This test was conducted under accreditation in accordance with international requirements (ISO/IEC 17025:2017) and in accordance with the General Terms and Conditions of Danish Technological Institute. The test results solely apply to the tested item. This test report may be quoted in extract only if Danish Technological Institute has granted its written consent.

The customer may not mention or refer to Danish Technological Institute or Danish Technological Institute's employees for advertising or marketing purposes unless Danish Technological Institute has granted its written consent in each case.

Division/Centre: Danish Technological Institute
Energy and Climate
Heat Pump Laboratory, Aarhus

Date: 2025.02.21

Signature:
Preben Eskerod
B.TecMan & MarEng

Co-reader:
Gustav Due Poulsen
B.TecMan & MarEng

Objective

The objective of this report is to document the following:

The Seasonal Coefficient of Performance (SCOP) at low and medium temperature application for average climate according to EN 14825:2022.

In order to calculate the SCOP, tests were carried out at the part load conditions stated in the tables on page 4 and 5.

COP test at standard rating conditions A7/W35 and A7/W55 according to EN 14511:2022.

Sound power measurements according to EN 12102-1:2022.

Contents:

Test conditions

SCOP test conditions for low temperature – EN 14825

Part load conditions for reference SCOP and reference SCOPon calculation of air to water units for low temperature application for the reference heating season;
"A" = average, "W" = warmer, and "C" = colder.

	Part load ratio in %				**Outdoor heat exchanger**		**Indoor heat exchanger**			
					Dry (wet) bulb temperature °C		Fixed outlet °C	Variable outlet[d] °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] / 35	[a] / 34	n.a.	[a] / 30
B	$(+2 - 16) / (T_{designh} - 16)$	53,85	100,00	36,84	2(1)	20(12)	[a] / 35	[a] / 30	[a] / 35	[a] / 27
C	$(+7 - 16) / (T_{designh} - 16)$	34,62	64,29	23,68	7(6)	20(12)	[a] / 35	[a] / 27	[a] / 31	[a] / 25
D	$(+12 - 16) / (T_{designh} - 16)$	15,38	28,57	10,53	12(11)	20(12)	[a] / 35	[a] / 24	[a] / 26	[a] / 24
E	$(TOL^{e} - 16) / (T_{designh} - 16)$				TOL^{e}	20(12)	[a] / 35	[a] / [b]	[a] / [b]	[a] / [b]
F	$(T_{biv} - 16) / (T_{designh} - 16)$				T_{biv}	20(12)	[a] / 35	[a] / [c]	[a] / [c]	[a] / [c]
G	$(-15 - 16) / (T_{designh} - 16)$	n.a.	n.a.	81,58	-15	20(12)	[a] / 35	n.a.	n.a.	[a] / 32

Additional information

Climate	**$T_{designh}$ [°C]**	**$T_{bivalent}$ [°C]**	**TOL [°C]**	**Outlet temperature**	**Flow rate**
Average	-10	-10	-10	Variable	Variable

SCOP test conditions for medium temperature – EN 14825

Part load conditions for reference SCOP and reference SCOPon calculation of air to water units for medium temperature application for the reference heating season;
"A" = average, "W" = warmer, and "C" = colder.

	Part load ratio in %				**Outdoor heat exchanger**		**Indoor heat exchanger**			
					Dry (wet) bulb temperature °C		Fixed outlet °C	Variable outlet[d] °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	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]	20(12)	[a] / 55	[a] / [b]	[a] / [b]	[a] / [b]
F	(T_{biv} - 16) / ($T_{designh}$ − 16)				T_{biv}	20(12)	[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

Additional information

Climate	$T_{designh}$ [°C]	$T_{bivalent}$ [°C]	TOL [°C]	Outlet temperature	Flow rate
Average	-10	-10	-10	Variable	Variable

COP test conditions for standard rating test – EN 14511

N#	Heat source		Heat sink	
	Inlet dry bulb temperature (°C)	Inlet wet bulb temperature (°C)	Inlet temperature (°C)	Outlet temperature (°C)
1	7	6	30	35
2	7	6	47	55

Test conditions for sound power measurement - EN12102-1

N#	Test condition		Heat pump setting			
	Ambient air temperature (°C)	Out/indoor heat exchanger (°C)	Compressor speed (Hz)	Fan speed (STEP)	Heating capacity (kW)	Power input (kW)
1[1]	20	7/55	-	-	2.56	0.94
2[2]		7/55	30	2	2.56	0.94

1) Indoor unit
2) Outdoor unit

Test results

Test results of SCOP test at low temperature - heating season average – EN 14825

Model (Outdoor)	NIBE AMS20-10
Air-to-water heat pump mono bloc	N
Low-temperature heat pump	N
Equipped with supplementary heater	Y
Heat pump combination heater	N
Reversible	Y

Rated heat output[1)]	P_{rated}	**6.3** [kW]
Seasonal space heating energy efficiency	η_s	**193.7** [%]
	SCOP	**4.92** [-]

Measured capacity for heating for part load at outdoor temperature Tj	Average Climate - Low temperature application	Tj=-15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	5.65 [kW]
		Tj=2 °C	Pdh	3.45 [kW]
		Tj=7 °C	Pdh	2.39 [kW]
		Tj=12 °C	Pdh	2.70 [kW]
		Tj=bivalent temperature	Pdh	5.65 [kW]
		Tj=operation limit	Pdh	6.58 [kW]

Measured coefficient of performance at outdoor temperature Tj	Average Climate - Low temperature application	Tj=-15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2.89 [-]
		Tj=2 °C	COPd	4.75 [-]
		Tj=7 °C	COPd	6.96 [-]
		Tj=12 °C	COPd	8.48 [-]
		Tj=bivalent temperature	COPd	2.89 [-]
		Tj=operation limit	COPd	2.51 [-]

Bivalent temperature	Tbivalent	-10 [°C]
Operation limit temperature	TOL	-10 [°C]
Heating water operation limit temperature	WTOL	- [°C]
Degradation coefficient	Cdh	0.93 [-]

Power consumption in modes other than active mode	Off mode	P_{OFF}	0.021 [kW]
	Thermostat-off mode	P_{TO}	0.023 [kW]
	Standby mode	P_{SB}	0.020 [kW]
	Crankcase heater mode	P_{CK}	0.021 [kW]
Supplementary heater[1)]	Rated heat output	P_{SUP}	0.00 [kW]
	Type of energy input		Electrical

Other items	Capacity control		Variable
	Water flow control		Variable
	Water flow rate		-
	Annual energy consumption	Q_{HE}	2646 [kWh]

[1)] For heat pump space heaters and heat pump combination heaters, the rated heat output, Prated, is equal to the design load for heating, Pdesignh, and the rated heat output of a supplementary heater, Psup, is equal to the supplementary capacity for heating, sup(Tj).

[2)] For SCOP calculation the value PCK - PSB is used. See section "SCOP – detailed calculation"

Test results of SCOP test at medium temperature - heating season average – EN 14825

Model (Outdoor)	NIBE AMS20-10
Air-to-water heat pump mono bloc	N
Low-temperature heat pump	N
Equipped with supplementary heater	Y
Heat pump combination heater	N
Reversible	Y

Rated heat output[1)]	P_{rated}	**6.45** [kW]
Seasonal space heating energy efficiency	η_s	**140.8** [%]
	SCOP	**3.60** [-]

Measured capacity for heating for part load at outdoor temperature Tj	Average Climate - Medium temperature application	Tj=-15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	5.91 [kW]
		Tj=2 °C	Pdh	3.63 [kW]
		Tj=7 °C	Pdh	2.29 [kW]
		Tj=12 °C	Pdh	2.47 [kW]
		Tj=bivalent temperature	Pdh	5.91 [kW]
		Tj=operation limit	Pdh	6.87 [kW]

Measured coefficient of performance at outdoor temperature Tj	Average Climate - Medium temperature application	Tj=-15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2.03 [-]
		Tj=2 °C	COPd	3.56 [-]
		Tj=7 °C	COPd	4.92 [-]
		Tj=12 °C	COPd	6.21 [-]
		Tj=bivalent temperature	COPd	2.03 [-]
		Tj=operation limit	COPd	1.69 [-]

Bivalent temperature	Tbivalent	-7 [°C]
Operation limit temperature	TOL	-10 [°C]
Heating water operation limit temperature	WTOL	- [°C]
Degradation coefficient	Cdh	0.94 [-]

Power consumption in modes other than active mode	Off mode	P_{OFF}	0.021 [kW]
	Thermostat-off mode	P_{TO}	0.023 [kW]
	Standby mode	P_{SB}	0.020 [kW]
	Crankcase heater mode	P_{CK}	0.021 [kW]
Supplementary heater[1)]	Rated heat output	P_{SUP}	0.00 [kW]
	Type of energy input		Electrical

Other items	Capacity control		Variable
	Water flow control		Variable
	Water flow rate		-
	Annual energy consumption	Q_{HE}	3706 [kWh]

[1)]For heat pump space heaters and heat pump combination heaters, the rated heat output, Prated, is equal to the design load for heating, Pdesignh, and the rated heat output of a supplementary heater, Psup, is equal to the supplementary capacity for heating, sup(Tj).

[2)] For SCOP calculation the value PCK - PSB is used. See section "SCOP - detailed calculation"

COP test results of standard rating test – EN 14511

N#	Test conditions	Heating capacity [kW]	COP
1	A7/W35	10.963	4.625
2	A7/W55	10.908	2.947

Test results of sound power measurements - EN 12102-1

N#	Sound power level LW(A) [dB re 1pW]	Uncertainty (dB) (weighted value)
1[1]	**32.7**	2.1
2[2]	**54.4**	1.6

1) Indoor unit.
2) Outdoor unit.

The A-weighted total sound power level is determined for the measured frequency range from 100 Hz to 10 kHz.

The sound power measurements are carried out by Kamalathasan Arumugam (KAMA) and co-read by Patrick Glibert (PGL), Danish Technological Institute.

Photos

Rating plate (indoor)

Indoor unit

Rating plate (Outdoor)

Outdoor unit

Appendix 1 – Declaration of conformity

Authorization Letter

This declaration of conformity is issued under the sole responsibility of

NIBE AB
Hannabadsvägen 5
285 21 Markaryd
SWEDEN

We declare that the tested heat pump NIBE AMS 20-10 + BA-SVM 20-12 is considered identical with the models listed in the table below. They have identical:

a. heating capacity
b. refrigerant cycle (incl. refrigerant mass)
c. heat source and refrigerant
d. main components / operating principle and control strategy
e. type of defrosting process

Manufacturer	Model Name
NIBE AB	NIBE AMS20-10 + BA-SVM 20-200/12 E
NIBE AB	NIBE AMS20-10 + BA-SVM 20-200/12 E EM
NIBE AB	NIBE AMS20-10 + BA-SVM 20-200/12 R
NIBE AB	NIBE AMS20-10 + HBS 20-10
NIBE AB	NIBE AMS20-10 + SHB 20-12 EM
NIBE AB	NIBE AMS20-10 + SHB 20-12
NIBE AB	NIBE F2050-10
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 E
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 E EM
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 R
NIBE AB	NIBE AMS20-10P + HBS 20-10
NIBE AB	NIBE AMS20-10P + SHB 20-12 EM
NIBE AB	NIBE AMS20-10P + SHB 20-12
NIBE AB	NIBE F2050-10P
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HMA100-W
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HSB100-W
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HMS100-W

NIBE

Date: 20250219

Signature:

TEST REPORT

Report no.:
300-KLAB-24-068

DANISH TECHNOLOGICAL INSTITUTE

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DK-8000 Aarhus C
+45 72 20 20 00
Info@teknologisk.dk
www.teknologisk.dk

Init: PRES/GDP
File no.: 270336
Enclosures: 2

Customer:	Company:	NIBE AB	
	Address:	Hannabadsvägen 5	
	City:	SE-285 21, Markaryd, Sweden	
Component:	Brand:	NIBE	
	Type:	Air to water heat pump (Split)	
	Model:	Outdoor unit:	AMS20-10
		Indoor unit:	BA-SVM 20-200/12 E
	Series no.:	Outdoor unit:	AP2601007YQ
		Indoor unit:	06795424278001
	Prod. year:	2024	

Dates: Component tested: November 2024 – January 2025

Procedure: See objective (page 2) for list of standards.

Remarks: The unit was delivered by the customer. The installation and test settings were done according to the manufacturer's instructions.

Terms: This test was conducted under accreditation in accordance with international requirements (ISO/IEC 17025:2017) and in accordance with the General Terms and Conditions of Danish Technological Institute. The test results solely apply to the tested item. This test report may be quoted in extract only if Danish Technological Institute has granted its written consent.

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Division/Centre: Danish Technological Institute
Energy and Climate
Heat Pump Laboratory, Aarhus

Date: 2025.02.27

Signature:
Preben Eskerod
B.TecMan & MarEng

Co-reader:
Gustav Due Poulsen
B.TecMan & MarEng

ilac-MRA DANAK
Test Reg. nr. 300

Objective

The objective of this report is to document the following:

The Seasonal Coefficient of Performance (SCOP) at low and medium temperature application for average climate according to EN 14825:2022.

In order to calculate the SCOP, tests were carried out at the part load conditions stated in the tables on page 4 and 5.

COP test at standard rating conditions A7/W35 and A7/W55 according to EN 14511:2022.

Sound power measurements according to EN 12102-1:2022.

Contents:

Test conditions

SCOP test conditions for low temperature – EN 14825

Part load conditions for reference SCOP and reference SCOPon calculation of air to water units for low temperature application for the reference heating season;
"A" = average, "W" = warmer, and "C" = colder.

	Part load ratio in %				**Outdoor heat exchanger**		**Indoor heat exchanger**			
					Dry (wet) bulb temperature °C		Fixed outlet °C	Variable outlet[d] °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] / 35	[a] / 34	n.a.	[a] / 30
B	(+2 - 16) / ($T_{designh}$ − 16)	53,85	100,00	36,84	2(1)	20(12)	[a] / 35	[a] / 30	[a] / 35	[a] / 27
C	(+7 - 16) / ($T_{designh}$ − 16)	34,62	64,29	23,68	7(6)	20(12)	[a] / 35	[a] / 27	[a] / 31	[a] / 25
D	(+12 - 16) / ($T_{designh}$ − 16)	15,38	28,57	10,53	12(11)	20(12)	[a] / 35	[a] / 24	[a] / 26	[a] / 24
E	(TOL[e] - 16) / ($T_{designh}$ − 16)				TOL[e]	20(12)	[a] / 35	[a] / [b]	[a] / [b]	[a] / [b]
F	(T_{biv} - 16) / ($T_{designh}$ − 16)				T_{biv}	20(12)	[a] / 35	[a] / [c]	[a] / [c]	[a] / [c]
G	(−15 - 16) / ($T_{designh}$ − 16)	n.a.	n.a.	81,58	−15	20(12)	[a] / 35	n.a.	n.a.	[a] / 32

Additional information

Climate	**$T_{designh}$ [°C]**	**$T_{bivalent}$ [°C]**	**TOL [°C]**	**Outlet temperature**	**Flow rate**
Average	-10	-10	-10	Variable	Variable

SCOP test conditions for medium temperature – EN 14825

Part load conditions for reference SCOP and reference SCOPon calculation of air to water units for medium temperature application for the reference heating season;
"A" = average, "W" = warmer, and "C" = colder.

<table>
<tr><th rowspan="3"></th><th colspan="4" rowspan="2">Part load ratio
in %</th><th colspan="2">Outdoor heat exchanger</th><th colspan="4">Indoor heat exchanger</th></tr>
<tr><th colspan="2">Dry (wet) bulb temperature
°C</th><th>Fixed outlet
°C</th><th colspan="3">Variable outlet[d]
°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>$(-7 - 16) / (T_{designh} - 16)$</td><td>88,46</td><td>n.a.</td><td>60,53</td><td>−7(−8)</td><td>20(12)</td><td>[a] / 55</td><td>[a] / 52</td><td>n.a.</td><td>[a] / 44</td></tr>
<tr><td>B</td><td>$(+2 - 16) / (T_{designh} - 16)$</td><td>53,85</td><td>100</td><td>36,84</td><td>2(1)</td><td>20(12)</td><td>[a] / 55</td><td>[a] / 42</td><td>[a] / 55</td><td>[a] / 37</td></tr>
<tr><td>C</td><td>$(+7 - 16) / (T_{designh} - 16)$</td><td>34,62</td><td>64,29</td><td>23,68</td><td>7(6)</td><td>20(12)</td><td>[a] / 55</td><td>[a] / 36</td><td>[a] / 46</td><td>[a] / 32</td></tr>
<tr><td>D</td><td>$(+12 - 16) / (T_{designh} - 16)$</td><td>15,38</td><td>28,57</td><td>10,53</td><td>12(11)</td><td>20(12)</td><td>[a] / 55</td><td>[a] / 30</td><td>[a] / 34</td><td>[a] / 28</td></tr>
<tr><td>E</td><td colspan="4">$(TOL^{e} - 16) / (T_{designh} - 16)$</td><td>$TOL^{e}$</td><td>20(12)</td><td>[a] / 55</td><td>[a] / [b]</td><td>[a] / [b]</td><td>[a] / [b]</td></tr>
<tr><td>F</td><td colspan="4">$(T_{biv} - 16) / (T_{designh} - 16)$</td><td>$T_{biv}$</td><td>20(12)</td><td>[a] / 55</td><td>[a] / [c]</td><td>[a] / [c]</td><td>[a] / [c]</td></tr>
<tr><td>G</td><td>$(-15 - 16) / (T_{designh} - 16)$</td><td>n.a.</td><td>n.a.</td><td>81,58</td><td>−15</td><td>20(12)</td><td>[a] / 55</td><td>n.a.</td><td>n.a.</td><td>[a] / 49</td></tr>
</table>

Additional information

Climate	$T_{designh}$ [°C]	$T_{bivalent}$ [°C]	TOL [°C]	Outlet temperature	Flow rate
Average	-10	-7	-10	Variable	Variable

COP test conditions for standard rating test – EN 14511

N#	Heat source		Heat sink	
	Inlet dry bulb temperature (°C)	Inlet wet bulb temperature (°C)	Inlet temperature (°C)	Outlet temperature (°C)
1	7	6	30	35
2	7	6	47	55

Test conditions for sound power measurement - EN12102-1

N#	Test condition		Heat pump setting			
	Ambient air temperature (°C)	Out/indoor heat exchanger (°C)	Compressor speed (Hz)	Fan speed (STEP)	Heating capacity (kW)	Power input (kW)
1[1]	20	7/55	-	-	2.56	0.94
2[2]		7/55	30	2	2.56	0.94

1) Indoor unit
2) Outdoor unit

Test results

Test results of SCOP test at low temperature - heating season average – EN 14825

Model (Outdoor)	NIBE AMS20-10
Air-to-water heat pump mono bloc	N
Low-temperature heat pump	N
Equipped with supplementary heater	Y
Heat pump combination heater	N
Reversible	Y

Rated heat output[1)]	P_{rated}	**6.3** [kW]
Seasonal space heating energy efficiency	η_s	**193.7** [%]
	SCOP	**4.92** [-]

Measured capacity for heating for part load at outdoor temperature Tj	Average Climate - Low temperature application	Tj=-15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	5.65 [kW]
		Tj=2 °C	Pdh	3.45 [kW]
		Tj=7 °C	Pdh	2.39 [kW]
		Tj=12 °C	Pdh	2.70 [kW]
		Tj=bivalent temperature	Pdh	6.58 [kW]
		Tj=operation limit	Pdh	6.58 [kW]

Measured coefficient of performance at outdoor temperature Tj	Average Climate - Low temperature application	Tj=-15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2.89 [-]
		Tj=2 °C	COPd	4.75 [-]
		Tj=7 °C	COPd	6.96 [-]
		Tj=12 °C	COPd	8.48 [-]
		Tj=bivalent temperature	COPd	2.51 [-]
		Tj=operation limit	COPd	2.51 [-]

Bivalent temperature	Tbivalent	-10 [°C]
Operation limit temperature	TOL	-10 [°C]
Heating water operation limit temperature	WTOL	- [°C]
Degradation coefficient	Cdh	0.93 [-]

Power consumption in modes other than active mode	Off mode	P_{OFF}	0.021 [kW]
	Thermostat-off mode	P_{TO}	0.023 [kW]
	Standby mode	P_{SB}	0.020 [kW]
	Crankcase heater mode	P_{CK}	0.021 [kW]
Supplementary heater[1)]	Rated heat output	P_{SUP}	0.00 [kW]
	Type of energy input		Electrical

Other items	Capacity control		Variable
	Water flow control		Variable
	Water flow rate		-
	Annual energy consumption	Q_{HE}	2646 [kWh]

[1)]For heat pump space heaters and heat pump combination heaters, the rated heat output, Prated, is equal to the design load for heating, Pdesignh, and the rated heat output of a supplementary heater, Psup, is equal to the supplementary capacity for heating, sup(Tj).

[2)] For SCOP calculation the value PCK - PSB is used. See section "SCOP - detailed calculation"

Test results of SCOP test at medium temperature - heating season average – EN 14825

Model (Outdoor)	NIBE AMS20-10
Air-to-water heat pump mono bloc	N
Low-temperature heat pump	N
Equipped with supplementary heater	Y
Heat pump combination heater	N
Reversible	Y

Rated heat output[1)]	P_{rated}	**6.45** [kW]
Seasonal space heating energy efficiency	η_s	**140.8** [%]
	SCOP	**3.60** [-]

Measured capacity for heating for part load at outdoor temperature Tj	Average Climate - Medium temperature application	Tj=-15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	5.91 [kW]
		Tj=2 °C	Pdh	3.63 [kW]
		Tj=7 °C	Pdh	2.29 [kW]
		Tj=12 °C	Pdh	2.47 [kW]
		Tj=bivalent temperature	Pdh	5.91 [kW]
		Tj=operation limit	Pdh	6.87 [kW]

Measured coefficient of performance at outdoor temperature Tj	Average Climate - Medium temperature application	Tj=-15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2.03 [-]
		Tj=2 °C	COPd	3.56 [-]
		Tj=7 °C	COPd	4.92 [-]
		Tj=12 °C	COPd	6.21 [-]
		Tj=bivalent temperature	COPd	2.03 [-]
		Tj=operation limit	COPd	1.69 [-]

Bivalent temperature	Tbivalent	-7 [°C]
Operation limit temperature	TOL	-10 [°C]
Heating water operation limit temperature	WTOL	- [°C]
Degradation coefficient	Cdh	0.94 [-]

Power consumption in modes other than active mode	Off mode	P_{OFF}	0.021 [kW]
	Thermostat-off mode	P_{TO}	0.023 [kW]
	Standby mode	P_{SB}	0.020 [kW]
	Crankcase heater mode	P_{CK}	0.021 [kW]
Supplementary heater[1)]	Rated heat output	P_{SUP}	0.00 [kW]
	Type of energy input		Electrical

Other items	Capacity control		Variable
	Water flow control		Variable
	Water flow rate		-
	Annual energy consumption	Q_{HE}	3706 [kWh]

[1)] For heat pump space heaters and heat pump combination heaters, the rated heat output, Prated, is equal to the design load for heating, Pdesignh, and the rated heat output of a supplementary heater, Psup, is equal to the supplementary capacity for heating, sup(Tj).

[2)] For SCOP calculation the value PCK - PSB is used. See section "SCOP - detailed calculation"

COP test results of standard rating test – EN 14511

N#	Test conditions	Heating capacity [kW]	COP
1	A7/W35	10.963	4.625
2	A7/W55	10.908	2.947

Test results of sound power measurements - EN 12102-1

N#	Sound power level LW(A) [dB re 1pW]	Uncertainty (dB) (weighted value)
1[1]	**32.7**	2.1
2[2]	**54.4**	1.6

1) Indoor unit.
2) Outdoor unit.

The A-weighted total sound power level is determined for the measured frequency range from 100 Hz to 10 kHz. For the calculation of uncertainty, see appendix 1.

The sound power measurements are carried out by Kamalathasan Arumugam (KAMA) and co-read by Patrick Glibert (PGL), Danish Technological Institute.

Photos

Rating plate (indoor)

Indoor unit

Rating plate (Outdoor) **Outdoor unit**

SCOP - detailed calculation

Detailed SCOP calculation of low temperature and average climate conditions – EN 14825

Calculation of reference SCOP

$$SCOP = \frac{P_{designh} \times H_{he}}{\frac{P_{designh} \times H_{he}}{SCOP_{on}} + H_{TO} \times P_{TO} + H_{SB} \times P_{SB} + H_{CK} \times P_{CK} + H_{OFF} \times P_{OFF}}$$

Where

P_{design} =	Heating load of the building at design temperature, kW
H_{he} =	Number of equivalent heating hours, 2066 h
H_{TO}, H_{SB}, H_{CK}, H_{OFF} =	Number of hours for which the unit is considered to work in thermostat off mode, standby mode, crankcase heater mode and off mode, h, respectively
P_{TO}, P_{SB}, P_{CK}, P_{OFF} =	Electricity consumption during thermostat off mode, standby mode, crankcase heater mode and off mode, kW, respectively

Data for SCOP

	Outdoor temperature [°C]	Part load ratio [%]	Part load [kW]	Declared capacity [kW]	Declared COP [-]	cdh [-]	CR [-]	COPbin [-]
A	-7	88	5.57	5.65	2.89	0.99	1.00	2.89
B	2	54	3.39	3.45	4.75	0.97	1.00	4.75
C	7	35	2.18	2.39	6.96	0.93	1.00	6.96
D	12	15	0.97	2.70	8.48	0.93	0.36	7.50
E	-10	100	6.30	6.58	2.51	0.99	1.00	2.51
F - BIV	-10	100	6.30	6.58	2.51	0.99	1.00	2.51

Energy consumption for thermostat off, standby, off mode, crankcase heater mode

	Hours [h]	Power input [kW]	Applied to SCOP calculation [kW]	Energy consumption [kWh]
Off mode	0	0.0205	0.0205	0
Thermostat off	178	0.0234	0.0234	4.1652
Standby	0	0.0204	0.0204	0
Crankcase heater	178	0.0205	0.0001	0.0178

Calculation Bin for SCOPon

	Bin [-]	Outdoor temperature [°C]	Hours [h]	Heat load [kW]	Heat load covered by heat pump [kW]	Electrical back up heater [kW]	Annual backup heater energy input [kWh]	COPbin [-]	Annual heating demand [kWh]	Annual energy input [kWh]	Net annual heating capacity [kWh]	Net annual power input [kWh]
E / F - BIV	21	-10	1	6.30	6.30	0.00	0.00	2.51	6.30	2.51	6.30	2.51
	22	-9	25	6.06	6.06	0.00	0.00	2.63	151.44	57.48	151.44	57.48
	23	-8	23	5.82	5.82	0.00	0.00	2.76	133.75	48.46	133.75	48.46
A	24	-7	24	5.57	5.57	0.00	0.00	2.89	133.75	46.35	133.75	46.35
	25	-6	27	5.33	5.33	0.00	0.00	3.09	143.93	46.54	143.93	46.54
	26	-5	68	5.09	5.09	0.00	0.00	3.30	346.02	104.85	346.02	104.85
	27	-4	91	4.85	4.85	0.00	0.00	3.51	441.00	125.73	441.00	125.73
	28	-3	89	4.60	4.60	0.00	0.00	3.71	409.74	110.30	409.74	110.30
	29	-2	165	4.36	4.36	0.00	0.00	3.92	719.65	183.50	719.65	183.50
	30	-1	173	4.12	4.12	0.00	0.00	4.13	712.63	172.59	712.63	172.59
	31	0	240	3.88	3.88	0.00	0.00	4.34	930.46	214.57	930.46	214.57
	32	1	280	3.63	3.63	0.00	0.00	4.54	1017.69	223.98	1017.69	223.98
B	33	2	320	3.39	3.39	0.00	0.00	4.75	1085.54	228.49	1085.54	228.49
	34	3	357	3.15	3.15	0.00	0.00	5.19	1124.55	216.61	1124.55	216.61
	35	4	356	2.91	2.91	0.00	0.00	5.63	1035.14	183.78	1035.14	183.78
	36	5	303	2.67	2.67	0.00	0.00	6.07	807.61	132.98	807.61	132.98
	37	6	330	2.42	2.42	0.00	0.00	6.51	799.62	122.75	799.62	122.75
C	38	7	326	2.18	2.18	0.00	0.00	6.96	710.93	102.22	710.93	102.22
	39	8	348	1.94	1.94	0.00	0.00	7.06	674.58	95.50	674.58	95.50
	40	9	335	1.70	1.70	0.00	0.00	7.17	568.21	79.22	568.21	79.22
	41	10	315	1.45	1.45	0.00	0.00	7.28	457.96	62.89	457.96	62.89
	42	11	215	1.21	1.21	0.00	0.00	7.39	260.48	35.24	260.48	35.24
D	43	12	169	0.97	0.97	0.00	0.00	7.50	163.80	21.84	163.80	21.84
	44	13	151	0.73	0.73	0.00	0.00	7.61	109.77	14.43	109.77	14.43
	45	14	105	0.48	0.48	0.00	0.00	7.72	50.88	6.59	50.88	6.59
	46	15	74	0.24	0.24	0.00	0.00	7.83	17.93	2.29	17.93	2.29

SUM	13013.38	2641.68	13013.38	2641.68
SCOPon		4.93	**SCOPnet**	4.93

Detailed SCOP calculation of medium temperature and average climate conditions – EN 14825

Calculation of reference SCOP

$$SCOP = \frac{P_{designh} \times H_{he}}{\frac{P_{designh} \times H_{he}}{SCOP_{on}} + H_{TO} \times P_{TO} + H_{SB} \times P_{SB} + H_{CK} \times P_{CK} + H_{OFF} \times P_{OFF}}$$

Where

P_{design} =	Heating load of the building at design temperature, kW
H_{he} =	Number of equivalent heating hours, 2066 h
H_{TO}, H_{SB}, H_{CK}, H_{OFF} =	Number of hours for which the unit is considered to work in thermostat off mode, standby mode, crankcase heater mode and off mode, h, respectively
P_{TO}, P_{SB}, P_{CK}, P_{OFF} =	Electricity consumption during thermostat off mode, standby mode, crankcase heater mode and off mode, kW, respectively

Data for SCOP

	Outdoor temperature [°C]	Part load ratio [%]	Part load [kW]	Declared capacity [kW]	Declared COP [-]	cdh [-]	CR [-]	COPbin [-]
A	-7	88	5.71	5.91	2.03	0.99	1.00	2.03
B	2	54	3.47	3.63	3.56	0.98	1.00	3.56
C	7	35	2.23	2.29	4.92	0.95	1.00	4.92
D	12	15	0.99	2.47	6.21	0.94	0.40	5.71
E	-10	100	6.45	6.87	1.69	0.99	1.00	1.69
F - BIV	-7	88	5.71	5.91	2.03	0.99	1.00	2.03

Energy consumption for thermostat off, standby, off mode, crankcase heater mode

	Hours [h]	Power input [kW]	Applied to SCOP calculation [kW]	Energy consumption [kWh]
Off mode	0	0.0205	0.0205	0
Thermostat off	178	0.0234	0.0234	4.1652
Standby	0	0.0204	0.0204	0
Crankcase heater	178	0.0205	0.0001	0.0178

Calculation Bin for SCOPon

	Bin [-]	Outdoor temperature [°C]	Hours [h]	Heat load [kW]	Heat load covered by heat pump [kW]	Electrical back up heater [kW]	Annual backup heater energy input [kWh]	COPbin [-]	Annual heating demand [kWh]	Annual energy input [kWh]	Net annual heating capacity [kWh]	Net annual power input [kWh]
E	21	-10	1	6.45	6.45	0.00	0.00	1.69	6.45	3.82	6.45	3.82
	22	-9	25	6.20	6.20	0.00	0.00	1.80	155.05	86.13	155.05	86.13
	23	-8	23	5.95	5.95	0.00	0.00	1.91	136.94	71.57	136.94	71.57
A / F - BIV	24	-7	24	5.71	5.71	0.00	0.00	2.03	136.94	67.58	136.94	67.58
	25	-6	27	5.46	5.46	0.00	0.00	2.20	147.36	67.07	147.36	67.07
	26	-5	68	5.21	5.21	0.00	0.00	2.37	354.25	149.63	354.25	149.63
	27	-4	91	4.96	4.96	0.00	0.00	2.54	451.50	177.88	451.50	177.88
	28	-3	89	4.71	4.71	0.00	0.00	2.71	419.50	154.86	419.50	154.86
	29	-2	165	4.47	4.47	0.00	0.00	2.88	736.79	255.87	736.79	255.87
	30	-1	173	4.22	4.22	0.00	0.00	3.05	729.59	239.20	729.59	239.20
	31	0	240	3.97	3.97	0.00	0.00	3.22	952.62	295.77	952.62	295.77
	32	1	280	3.72	3.72	0.00	0.00	3.39	1041.92	307.22	1041.92	307.22
B	33	2	320	3.47	3.47	0.00	0.00	3.56	1111.38	312.00	1111.38	312.00
	34	3	357	3.23	3.23	0.00	0.00	3.83	1151.33	300.24	1151.33	300.24
	35	4	356	2.98	2.98	0.00	0.00	4.11	1059.78	258.03	1059.78	258.03
	36	5	303	2.73	2.73	0.00	0.00	4.38	826.84	188.79	826.84	188.79
	37	6	330	2.48	2.48	0.00	0.00	4.65	818.65	175.97	818.65	175.97
C	38	7	326	2.23	2.23	0.00	0.00	4.92	727.86	147.79	727.86	147.79
	39	8	348	1.98	1.98	0.00	0.00	5.08	690.65	135.89	690.65	135.89
	40	9	335	1.74	1.74	0.00	0.00	5.24	581.74	111.01	581.74	111.01
	41	10	315	1.49	1.49	0.00	0.00	5.40	468.87	86.86	468.87	86.86
	42	11	215	1.24	1.24	0.00	0.00	5.56	266.68	48.00	266.68	48.00
D	43	12	169	0.99	0.99	0.00	0.00	5.71	167.70	29.35	167.70	29.35
	44	13	151	0.74	0.74	0.00	0.00	5.87	112.38	19.14	112.38	19.14
	45	14	105	0.50	0.50	0.00	0.00	6.03	52.10	8.64	52.10	8.64
	46	15	74	0.25	0.25	0.00	0.00	6.19	18.36	2.97	18.36	2.97

SUM	13323.22	3701.28	13323.22	3701.28
SCOPon		3.60	**SCOPnet**	3.60

Detailed test results

Detailed SCOP part load test results - low temperature application - average climate – EN 14825

Detailed result for 'EN14825:2022' Average Low (A) A -7 /W34		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		A
Condition temperature:	°C	-7
Part load:	%	88%
Chosen Tbivalent	°C	-10
Tdesign	°C	-10
Pdesign	kW	6.30
Heating demand:	kW	5.57
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**5.646**
COP	-	**2.886**
Power consumption	kW	**1.957**
Measured		
Heating capacity	kW	5.661
COP	-	2.870
Power consumption	kW	1.973
During heating		
Air_inlet temperature dry bulb	°C	-7.02
Air temperature wet bulb	°C	-8.18
Water_inlet temperature	°C	29.05
water_outlet temperature	°C	34.19
Water_outlet temperature (Time averaged)	°C	**34.19**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	8962
Calculated Hydraulic power	W	3
Calculated global efficiency	η	0.15
Calculated Capacity correction	W	15
Calculated Power correction	W	18
Water Flow	m^3/s	0.000288

Detailed result for 'EN14825:2022' Average Low (B) A 2 /W30		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		B
Condition temperature:	°C	2
Part load:	%	54%
Chosen Tbivalent	°C	-10
Tdesign	°C	-10
Pdesign	kW	6.30
Heating demand:	kW	3.39
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**3.454**
COP	-	**4.751**
Power consumption	kW	**0.727**
Measured		
Heating capacity	kW	3.462
COP	-	4.737
Power consumption	kW	0.731
During heating		
Air_inlet temperature dry bulb	°C	2.01
Air temperature wet bulb	°C	0.76
Water_inlet temperature	°C	25.01
water_outlet temperature	°C	29.92
Water_outlet temperature (Time averaged)	°C	**29.92**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	7108
Calculated Hydraulic power	W	1
Calculated global efficiency	η	0.13
Calculated Capacity correction	W	8
Calculated Power correction	W	9
Water Flow	m^3/s	0.000169

Detailed result for 'EN14825:2022' Average Low (C) A 7 /W27		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		C
Condition temperature:	°C	7
Part load:	%	35%
Chosen Tbivalent	°C	-10
Tdesign	°C	-10
Pdesign	kW	6.30
Heating demand:	kW	2.18
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**2.392**
COP	-	**6.955**
Power consumption	kW	**0.344**
Measured		
Heating capacity	kW	2.398
COP	-	6.689
Power consumption	kW	0.359
During heating		
Air_inlet temperature dry bulb	°C	7.03
Air temperature wet bulb	°C	5.90
Water_inlet temperature	°C	22.00
water_outlet temperature	°C	26.99
Water_outlet temperature (Time averaged)	°C	**26.99**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	7666
Calculated Hydraulic power	W	1
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	6
Calculated Power correction	W	7
Water Flow	m^3/s	0.000115

Detailed result for 'EN14825:2022' Average Low (D) A 12 /W24		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		D
Condition temperature:	°C	12
Part load:	%	15%
Chosen Tbivalent	°C	-10
Tdesign	°C	-10
Pdesign	kW	6.30
Heating demand:	kW	0.97
CR:	-	0.4
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**2.698**
COP	-	**8.484**
Power consumption	kW	**0.318**
Measured		
Heating capacity	kW	2.705
COP	-	8.397
Power consumption	kW	0.322
During heating		
Air_inlet temperature dry bulb	°C	12.01
Air temperature wet bulb	°C	10.95
Water_inlet temperature	°C	22.30
water_outlet temperature	°C	27.38
Water_outlet temperature (Time averaged)	°C	**24.13**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	7112
Calculated Hydraulic power	W	1
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	6
Calculated Power correction	W	7
Water Flow	m^3/s	0.000128

Detailed result for 'EN14825:2022' Average Low (E and F) A -10 /W35		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		E and F
Condition temperature:	°C	-10
Part load:	%	100%
Chosen Tbivalent	°C	-10
Tdesign	°C	-10
Pdesign	kW	6.30
Heating demand:	kW	6.30
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**6.580**
COP	-	**2.510**
Power consumption	kW	**2.622**
Measured		
Heating capacity	kW	6.583
COP	-	2.511
Power consumption	kW	2.622
During heating		
Air_inlet temperature dry bulb	°C	-10.06
Air temperature wet bulb	°C	-11.19
Water_inlet temperature	°C	30.13
water_outlet temperature	°C	35.25
Water_outlet temperature (Time averaged)	°C	**35.25**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	1189
Calculated Hydraulic power	W	0
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	3
Calculated Power correction	W	4
Water Flow	m^3/s	0.000354

Detailed SCOP part load test results - medium temperature application - average climate – EN 14825

Detailed result for 'EN14825:2022' Average Medium (A and F) A -7 /W52		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		A and F
Condition temperature:	°C	-7
Part load:	%	88%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	6.45
Heating demand:	kW	5.71
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**5.911**
COP	-	**2.026**
Power consumption	kW	**2.917**
Measured		
Heating capacity	kW	5.920
COP	-	2.023
Power consumption	kW	2.926
During heating		
Air_inlet temperature dry bulb	°C	-6.88
Air temperature wet bulb	°C	-8.02
Water_inlet temperature	°C	44.01
water_outlet temperature	°C	52.08
Water_outlet temperature (Time averaged)	°C	**52.08**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	8322
Calculated Hydraulic power	W	1
Calculated global efficiency	η	0.13
Calculated Capacity correction	W	10
Calculated Power correction	W	11
Water Flow	m^3/s	0.000178

Detailed result for 'EN14825:2022' Average Medium (B) A 2 /W42		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		B
Condition temperature:	°C	2
Part load:	%	54%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	6.45
Heating demand:	kW	3.47
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**3.628**
COP	-	**3.562**
Power consumption	kW	**1.019**
Measured		
Heating capacity	kW	3.636
COP	-	3.531
Power consumption	kW	1.030
During heating		
Air_inlet temperature dry bulb	°C	2.04
Air temperature wet bulb	°C	0.93
Water_inlet temperature	°C	34.02
water_outlet temperature	°C	42.05
Water_outlet temperature (Time averaged)	°C	**42.05**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	10225
Calculated Hydraulic power	W	1
Calculated global efficiency	η	0.13
Calculated Capacity correction	W	8
Calculated Power correction	W	9
Water Flow	m^3/s	0.000109

Detailed result for 'EN14825:2022' Average Medium (C) A 7 /W36		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		C
Condition temperature:	°C	7
Part load:	%	35%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	6.45
Heating demand:	kW	2.23
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**2.293**
COP	-	**4.925**
Power consumption	kW	**0.466**
Measured		
Heating capacity	kW	2.298
COP	-	4.837
Power consumption	kW	0.475
During heating		
Air_inlet temperature dry bulb	°C	7.00
Air temperature wet bulb	°C	6.03
Water_inlet temperature	°C	27.99
water_outlet temperature	°C	36.11
Water_outlet temperature (Time averaged)	°C	**36.11**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	9269
Calculated Hydraulic power	W	1
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	5
Calculated Power correction	W	5
Water Flow	m^3/s	0.000068

Detailed result for 'EN14825:2022' Average Medium (D) A 12 /W30		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		D
Condition temperature:	°C	12
Part load:	%	15%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	6.45
Heating demand:	kW	0.99
CR:	-	0.4
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**2.466**
COP	-	**6.214**
Power consumption	kW	**0.397**
Measured		
Heating capacity	kW	2.471
COP	-	6.130
Power consumption	kW	0.403
During heating		
Air_inlet temperature dry bulb	°C	12.00
Air temperature wet bulb	°C	11.00
Water_inlet temperature	°C	26.78
water_outlet temperature	°C	34.82
Water_outlet temperature (Time averaged)	°C	**30.02**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	9168
Calculated Hydraulic power	W	1
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	5
Calculated Power correction	W	6
Water Flow	m^3/s	0.000074

Detailed result for 'EN14825:2022' Average Medium (E) A -10 /W55		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		E
Condition temperature:	°C	-10
Part load:	%	100%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	6.45
Heating demand:	kW	6.45
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**6.873**
COP	-	**1.687**
Power consumption	kW	**4.073**
Measured		
Heating capacity	kW	6.890
COP	-	1.682
Power consumption	kW	4.096
During heating		
Air_inlet temperature dry bulb	°C	-10.00
Air temperature wet bulb	°C	-11.10
Water_inlet temperature	°C	46.99
water_outlet temperature	°C	55.16
Water_outlet temperature (Time averaged)	°C	**55.16**
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	14252
Calculated Hydraulic power	W	3
Calculated global efficiency	η	0.15
Calculated Capacity correction	W	17
Calculated Power correction	W	20
Water Flow	m^3/s	0.000205

Detailed COP test results of standard rating test – EN 14511

Detailed result for 'EN14511:2022' A7/W35		
Tested according to:		EN14511:2022
Minimum flow reached:		No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**6.715**
COP	-	**4.923**
Power consumption	kW	**1.364**
Measured		
Heating capacity	kW	6.731
COP	-	4.869
Power consumption	kW	1.382
During heating		
Air_inlet temperature dry bulb	°C	7.04
Air temperature wet bulb	°C	6.01
Water_inlet temperature	°C	30.00
water_outlet temperature	°C	34.99
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	8381
Calculated Hydraulic power	W	3
Calculated global efficiency	η	0.15
Calculated Capacity correction	W	16
Calculated Power correction	W	19
Water Flow	m^3/s	0.000325

Detailed result for 'EN14511:2022' A7/W55		
Tested according to:		EN14511:2022
Minimum flow reached:		No
Measurement type:		Steady State
Integrated liquid pump:		Yes
Integrated liquid pump able to generate a positve ext. static pressure difference:		Yes
Included corrections (Final result)		
Heating capacity	kW	**6.039**
COP	-	**3.034**
Power consumption	kW	**1.991**
Measured		
Heating capacity	kW	6.055
COP	-	3.013
Power consumption	kW	2.010
During heating		
Air_inlet temperature dry bulb	°C	7.03
Air temperature wet bulb	°C	6.00
Water_inlet temperature	°C	47.02
water_outlet temperature	°C	54.98
Circulation pump		
Measured external static pressure difference, liquid pump	Pa	15610
Calculated Hydraulic power	W	3
Calculated global efficiency	η	0.15
Calculated Capacity correction	W	16
Calculated Power correction	W	19
Water Flow	m^3/s	0.000185

Detailed test results of sound power measurement – EN 12102-1

Test N#1

DANAK TEST Reg. nr. 300

Sound power levels according to ISO 3743-1:2010

TEKNOLOGISK INSTITUT

Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms

Client: Nibe AB — Date of test: 27-01-2025

Object: Type: Air to water heat pump Model_IDU : BA-SVM 20-200/12 E

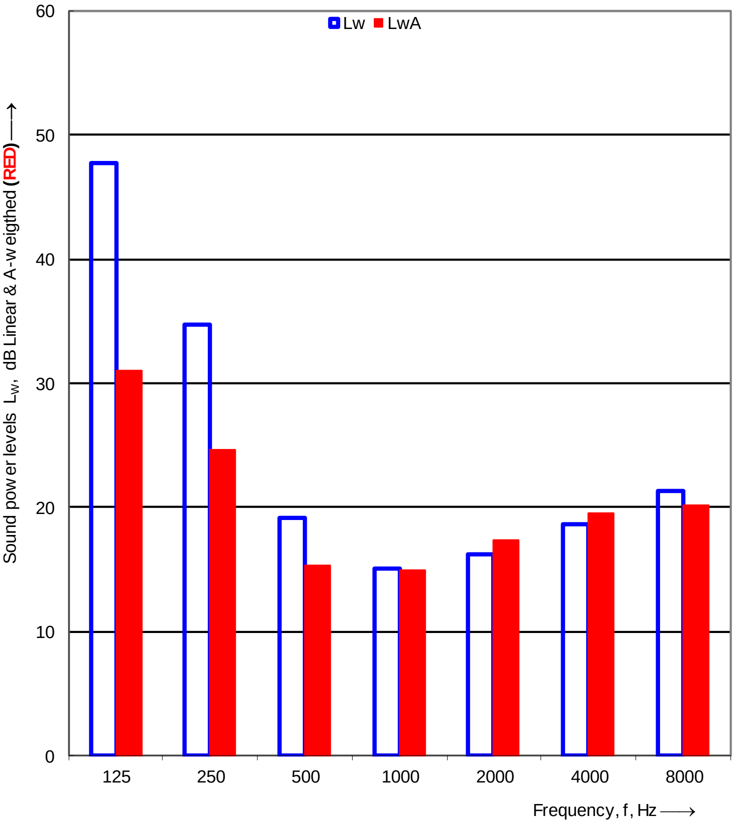
Mounting conditions: The indoor unit is mounted on the supporting metal support frame using four pieces of feets and placed on four pices of concrete tiles (49x49x5 cm). All of these are placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the indoor unit has been measured in Test room 1.

Operating conditions: A20/A7/W55, Compressor speed: 30[Hz], Fan speed: STEP 2, Heating capacity: 2.56 [kW], Power_input: 0.94[kW], Water flow rate: 290 [l/h] and dP_water: 97 [mbar]

Static pressure:	988 hPa			Reference box:		
Air temperature:	20,0 °C			L1:	0,6	m
Relative air humidity:	38,0 %			L2:	0,6	m
Test room volume:	102,8 m³	Room:	Room 1	L3:	1,6	m
Area, S, of test room:	138,9 m²			Volume:	0,6	m³

Frequency f [Hz]	L_W 1/3 octave [dB]	1/1 oct [dB]
100	45,1	
125	42,4	47,7 [1]
160	39,8	
200	33,2	
250	28,6	34,6 [2]
315	20,1	
400	16,9	
500	12,9	19,1 [1]
630	11,0	
800	11,4	
1000	9,4	15,0 [1]
1250	9,6	
1600	12,8	
2000	10,6	16,2 [1]
2500	10,3	
3150	12,7	
4000	12,7	18,7 [1]
5000	15,6	
6300	16,2	
8000	16,1	21,3 [1]
10000	17,3	

[1] Diff. to backgr. noise < 6dB
[2] Correction



Sound power level L_W(A): 32,7 dB [re 1pW] Uncertainty σtot: 2,1 dB

Name of test institute: DTI — Date: 27-01-2025

No. of test report: 300-KLAB-24-068

In conformity with ISO 3743-1, except for some frequencies where the sound level is close to the background noise, see table. Difference less than 8,04 dB. The result thus represent the upper bound.

Test N#2

DANAK TEST Reg. nr. 300

Sound power levels according to ISO 3743-1:2010

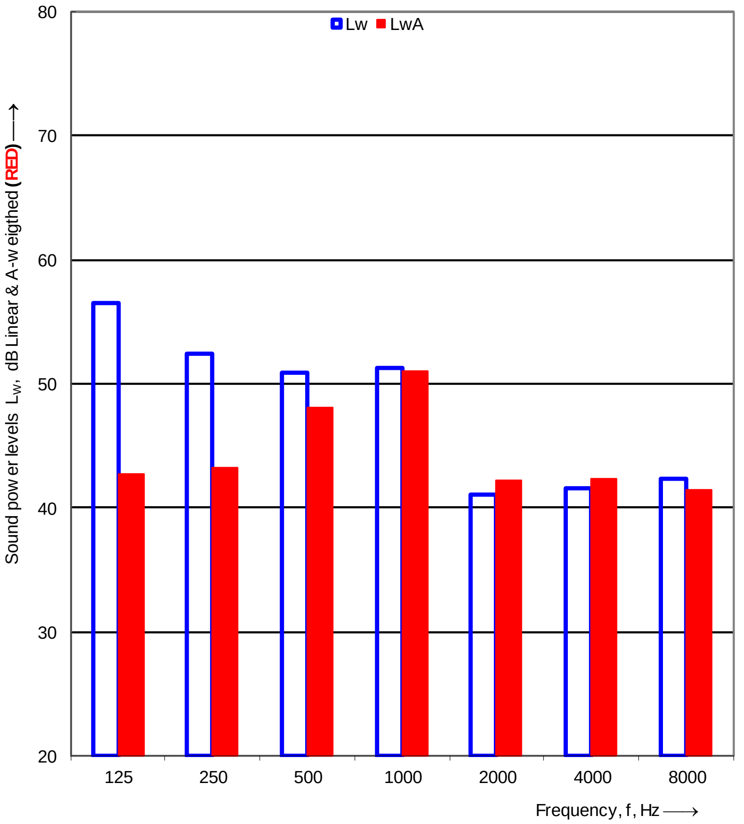
TEKNOLOGISK INSTITUT

Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms

Client:	NIBE AB	Date of test:	06-12-2024
Object:	Type: Split air to water heat pump Model: AMS20-10		
Mounting conditions:	The outdoor unit is mounted on the supporting metal support frame using two pieces of vibration isolation mounts and placed on four pices of concrete tiles (49x49x5 cm). All of these are placed in a water drop dray on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 1.		
Operating conditions:	A7/W55, Compressor speed: 30[Hz], Fan speed_step: 2, Heating capacity: 2.56 [kW], Power_input: 0.94[kW], Water flow rate: 290 [l/h] and dP_water: 97 [mbar]		

Static pressure:	1001 hPa			Reference box:	
Air temperature:	7,0 °C			L1:	0,9 m
Relative air humidity:	84,0 %			L2:	0,4 m
Test room volume:	102,8 m³	Room:	Room 1	L3:	0,7 m
Area, S, of test room:	138,9 m²			Volume:	0,3 m³

Frequency f [Hz]	L_W 1/3 octave [dB]	1/1 oct [dB]
100	43,4	
125	46,5	56,5
160	55,8	
200	49,5	
250	47,9	52,4
315	43,6	
400	43,4	
500	46,4	50,8
630	47,4	
800	49,1	
1000	44,1	51,3
1250	44,3	
1600	38,0	
2000	34,5	41,1
2500	35,7	
3150	35,7	
4000	36,9	41,5
5000	37,4	
6300	38,9	
8000	37,4	42,3
10000	35,9	



Sound power level L_W(A): **54,4 dB [re 1pW]** **Uncertainty σtot: 1,6 dB**

Name of test institute:	DTI	Date:	06-12-2024
No. of test report:	300-KLAB-24-068		

Measurements are in full conformity with ISO 3743-1

Appendix 1

Unit specification

Type of unit: Air to water heat pump (Split)
Manufacturer: NIBE AB
Size of the indoor unit: 0.6 x 0.6 x 1.6m (W x L x H)
Size of the outdoor unit: 0.9 x 0.4 x 0.7m (W x L x H)
Year of production: 2024.

Operating conditions and environment

The operating conditions of the unit under test fulfill the requirements for Class A.

The acoustic test chamber is a hard wall reverberant room (103 m^3) and equipped with relevant sound diffusing reflector panels. The acoustic test chamber fulfills the requirements of ISO3743-1 accuracy grade 2 (engineering grade).

Measurements of the average sound pressure levels in 1/3 octave frequency bands are carried out using three microphones in the test chamber. During the measurements, the microphones are traversed up and down for one meter in the arc of a quarter circle.

The pictures below show the installation of the units during test, position of microphones, sound diffusing reflector panels, and reference sound source.

Figure 1: Indoor unit during test.

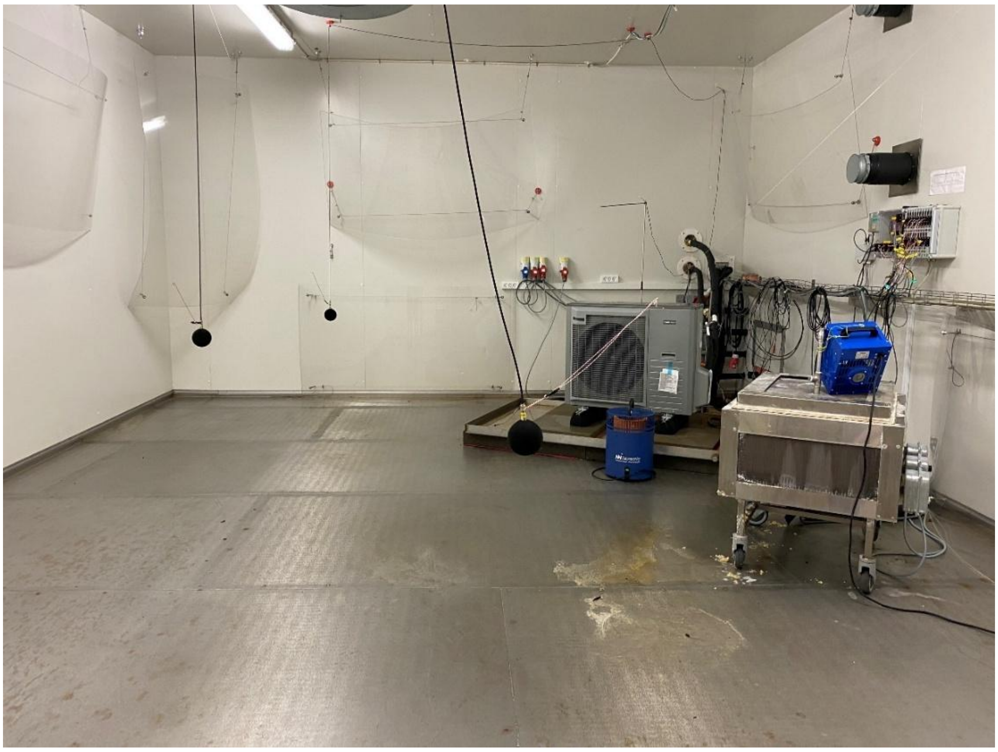


Figure 2: Outdoor unit during test.

Measurement instruments

Id nr.	Manufacturer	Description	Calibration company
100864*	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 1	Norsonic A/S, Norway
100865*	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 1	Norsonic A/S, Norway
100866*	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 1	Norsonic A/S, Norway
100867	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 2	Norsonic A/S, Norway
100868	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 2	Norsonic A/S, Norway
100869	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 2	Norsonic A/S, Norway
100870	GRAS	Gras 40AE_26CA, ½" free field microphone, Roof monitor	Norsonic A/S, Norway
100873*	Brüel & Kjær	Acoustical calibrator, Brüel & Kjær 4231	Element Metech, Denmark
100859*	Norsonic	Reference sound source, Norsonic Nor278 Room 1	RISE, Sweden
100872	Norsonic	Reference sound source, Norsonic Nor278 Room 2	RISE, Sweden
100620*	Norsonic	Multi-channel measurement system Nor850	Norsonic A/S, Norway

*The i~~I~~nstruments are used for the actual measurements for the calculation of the test results.

The other instruments are used for control measurements.
All microphones are equipped with windshields.

Test Procedure

The measurements of the emitted sound power level from the heat pump are carried out according to the following standards:

- DS/EN 14511:2022
- EN 12102-1:2022
- ISO/EN 3743-1:2010.

The basic acoustic measurement standard DS/EN 3743-1 is a comparison method using a calibrated reference sound source. Two series of sound pressure measurements are made under exactly the same acoustic conditions, e.g., the same microphone positions, temperature, and air humidity. The calibrated sound power levels are known for the reference sound source at each frequency band, and they are used in the estimation of the acoustical correction factor for the calculation of the sound power emitted from the unit under test. The background noise levels are measured and used for relevant corrections.

The final total A-weighted sound power level is based on measurements and calculations in 1/3-octave levels, which then are summed into 1/1-octave levels. The A-weighted total sound power level is determined for the measured frequency range from 100 Hz to 10 kHz.

The actual microphone positions and correction values are saved in data files linked to the complete project documentation according to the DANAK accreditation.

The complete measurement system is documented and regularly calibrated according to DANAK.

The detailed description of the measurement method is given in Danish in the quality database system "QA Web" at Danish Technological Institute, which is accessible by DANAK.

Measurement uncertainty

The uncertainty of sound power level in decibel is determined in accordance with ISO 3743-1, equation 22 $\sigma_{tot} = \sqrt{\sigma_{RO}{}^2 + \sigma_{omc}{}^2}$ where:

- σ_{RO} is the standard deviation of the reproducibility of the method
- σ_{omc} is the standard deviation describing the uncertainty associated with the instability of the operating and mounting conditions for the particular noise source during test.

σ_{RO} expresses the uncertainty in test results delivered by the different accredited test laboratories due to different instrumentation and implementation of measurement procedure as well as different radiation characteristics of the noise source during test.

σ_{omc} expresses the uncertainty associated with the instability of the operating and mounting conditions for the particular noise source during test. The mounting and installation conditions in two DTI acoustic test chambers are well defined in the test procedure. Possible instability of the operating conditions is monitored and assessed prior to each noise test.

The test uncertainty σ_{omc} is calculated according to ISO3743-1 Annex C, formula C.1, and is typically below 1.0dB. However, the uncertainty is rounded up to the nearest 0.5 or 1.0dB increment in the report. As pr. Table C.1 (accuracy grade 2), the uncertainty σ_{RO} is set to 1.5.

The expanded uncertainty U is calculated according to ISO 3743-1 equation 23:
$U = k\,\sigma_{tot}$ where k = 2 for 95% confidence.

EXAMPLE: $\sigma_{tot}: \sqrt{1.5^2 + 0.5^2} = 1.6\ dB$ and $U(95\%) = 3.2\ dB$

Note: The expanded uncertainty does not include the standard deviation of production which is used in ISO4871 for the purpose of making noise declaration for batches of machines.

Appendix 2 – Declaration of conformity

Authorization Letter

This declaration of conformity is issued under the sole responsibility of

NIBE AB
Hannabadsvägen 5
285 21 Markaryd
SWEDEN

We declare that the tested heat pump NIBE AMS 20-10 + BA-SVM 20-12 is considered identical with the models listed in the table below. They have identical:

a. heating capacity
b. refrigerant cycle (incl. refrigerant mass)
c. heat source and refrigerant
d. main components / operating principle and control strategy
e. type of defrosting process

Manufacturer	Model Name
NIBE AB	NIBE AMS20-10 + BA-SVM 20-200/12 E
NIBE AB	NIBE AMS20-10 + BA-SVM 20-200/12 E EM
NIBE AB	NIBE AMS20-10 + BA-SVM 20-200/12 R
NIBE AB	NIBE AMS20-10 + HBS 20-10
NIBE AB	NIBE AMS20-10 + SHB 20-12 EM
NIBE AB	NIBE AMS20-10 + SHB 20-12
NIBE AB	NIBE F2050-10
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 E
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 E EM
NIBE AB	NIBE AMS20-10P + BA-SVM 20-200/12 R
NIBE AB	NIBE AMS20-10P + HBS 20-10
NIBE AB	NIBE AMS20-10P + SHB 20-12 EM
NIBE AB	NIBE AMS20-10P + SHB 20-12
NIBE AB	NIBE F2050-10P
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HMA100-W
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HSB100-W
Mitsubishi Heavy Industries Ltd	FDCW71VNX-W + HMS100-W

NIBE

Date: 20250219

Signature:

OŚWIADCZENIE

Producent NIBE-BIAWAR Sp. z o.o. oświadcza, iż pompy ciepła

1) AMS20-6 + BA-SVM 20-200/6 E
Oznaczenie/typ/identyfikator modelu

1) AMS20-6 + BA-SVM 20-200/6 E EM
Oznaczenie/typ/identyfikator modelu

1) AMS20-6 + BA-SVM 20-200/6 R
Oznaczenie/typ/identyfikator modelu

1) AMS20-6 + HBS 20-6
Oznaczenie/typ/identyfikator modelu

1) AMS20-6 + SHB 20-6
Oznaczenie/typ/identyfikator modelu

1) AMS20-6 + SHB 20-6 EM
Oznaczenie/typ/identyfikator modelu

1) F2050-6
Oznaczenie/typ/identyfikator modelu

2) AMS20-10 + BA-SVM 20-200/12 E
Oznaczenie/typ/identyfikator modelu

2) AMS20-10 + BA-SVM 20-200/12 E EM
Oznaczenie/typ/identyfikator modelu

2) AMS20-10 + BA-SVM 20-200/12 R
Oznaczenie/typ/identyfikator modelu

2) AMS20-10 + HBS 20-10
Oznaczenie/typ/identyfikator modelu

2) AMS20-10 + SHB 20-12
Oznaczenie/typ/identyfikator modelu

2) AMS20-10 + SHB 20-12 EM
Oznaczenie/typ/identyfikator modelu

2) F2050-10
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.

CZŁONEK ZARZĄDU
DYREKTOR TECHNICZNY
Roman Chomczuk

24.02.2025 Białystok
Miejscowość, data

Podpis osoby upoważnionej

Wyjaśnienie nazw modeli urządzeń:

Pompy ciepła powietrze/woda AMS20 oraz F2050.	
Nazwa modelu	**Opis:**
AMS20-xx + BA-SVM 20-200/xx	**AMS20-xx** – jednostka zewnętrzna powietrznej pompy ciepła typu SPLIT. **BA-SVM 20-200/xx** - jednostka wewnętrzna wyposażona w zasobnik c.w.u., skraplacz, sterownik, pompę obiegową, grzałkę, zawory przełączający itp. Jednostka wewnętrzna kompatybilna z czynnikiem R32 oraz R410A.
AMS20-xx + HBS 20-xx	**AMS20-xx** – jednostka zewnętrzna powietrznej pompy ciepła typu SPLIT. **HBS 20-xx** – moduł wewnętrzny HYDROBOX (skraplacz). HBS 20-xx – kompatybilna z czynnikiem R410A i R32.
AMS20-xx + SHB 20-xx	**AMS20-xx** – jednostka zewnętrzna powietrznej pompy ciepła typu SPLIT. **SHB 20-xx** - jednostka wewnętrzna wyposażona w skraplacz, sterownik, pompę obiegową, grzałkę, zawór przełączający itp. Jednostka wewnętrzna kompatybilna z czynnikiem R410A i R32.
F2050-xx	**F2050-xx** - powietrzna pompa ciepła typu MONOBLOK (jednostka zewnętrzna z wbudowanym skraplaczem). Skraplacz jak i pozostałe parametry pracy są takie same jak w przypadku jednostek AMS20-xx z jednostką wewnętrzną HBS/SHB/BA-SVM.
E w nazwie modelu *	Jednostka wewnętrzna z wbudowanym zasobnikiem c.w.u. emaliowanym (np. BA-SVM 20-200/12 E).
R w nazwie modelu *	Jednostka wewnętrzna z wbudowanym zasobnikiem c.w.u. ze stali nierdzewnej (np. BA-SVM 20-200/12 R).
EM w nazwie modelu	Jednostka wewnętrzna z wbudowanym licznikiem energii cieplnej (np. BA-SVM 20-200/12 E EM).

** R, E odnosi się do materiału, z którego wykonany został zasobnik c.w.u. (zabezpieczenie antykorozyjne)*