Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe, Brno, Republika Czeska
Engineering Test Institute. Public Enterprise. Brno. Czech Republic

CERTYFIKAT Z BADAŃ
TEST CERTIFICATE

Number **O-B-00354-25**

Klient *Customer*	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Produkt *Product*	Pompa Ciepła powietrze/woda – monoblok *Outdoor Air/Water Heat pump - monobloc*
Rodzaj oznaczenie / znak towarowy *Type designation / Trade mark*	**HPOM006Z0* + HPOM020W#*** **HPOM009Z0* + HPOM020W#*** **HPOM011Z0* + HPOM020W#***
Metoda testowa *Test methods*	ČSN EN 14511-2:2023, ČSN EN 14511-3:2023, ČSN EN 14511-4:2023, ČSN EN 12102-1:2023
Podstawy zaświadczenia *Basis of certificate*	Raport z badań - *Test reports*: 39-18240/T z dnia - *of* 2025-02-20 39-17945/H z dnia - *of* 2025-01-09 Dokumentacja techniczna przedstawiona przez - *Technical documents of HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.*
Zastosowanie *Temperature application*	**NISKOTEMPERATUROWA - *LOW*,** **WYSOKOTEMPERATUROWA - *MEDIUM*** referencyjna temperatura wody 35 °C i 55 °C - *Reference water temperature 35 °C and 55 °C*

Specyfikacja warunków - *Specification of conditions*:

Kontrola prędkości kompresora *Compressor speed control*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (wewnętrzny wymiennik ciepła) - *Rated liquid flow rate (indoor heat exchanger)*	**Zmienna** ***Variable***
Wylotowa temperatura wody (wewnętrzny wymiennik ciepła) - *Outlet water temperature (indoor heat exchanger)*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (zewnętrzny wymiennik ciepła) - *Rated liquid flow rate (outdoor heat exchanger)*	–
Funkcja *Function*	**Odwracalna** ***Reversible***		

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. 03

Wyniki - *Results*:

Nazwa modelu – *Model names*			**HPOM006Z0* + HPOM020W#***	**HPOM009Z0* + HPOM020W#***	**HPOM011Z0* + HPOM020W#***
Jednostka zewnętrzna – *Outdoor units*			**HPOM006Z0***	**HPOM009Z0***	**HPOM011Z0***
Jednostka wewnętrzna – *Indoor units*			**HPOM020W#***	**HPOM020W#***	**HPOM020W#***
Warunki cieplne* – *Temperature conditions**			(Badana / *Tested*)	(Nie badana / *Not tested*)	(Badana / *Tested*)
A7/W35	Skorygowana moc grzewcza *Corrected heat capacity*	[kW]	6.325	9.220	11.370
	Efektywny pobór mocy elektrycznej *Effective electric power input*	[kW]	1.396	1.889	2.680
	Współczynnik efektywności *Coefficient of performance*	[–]	4.531	4.880	4.242
	Ustawienia sterowania *Control settings*	[Hz]	85	–	85
A7/W55	Skorygowana moc grzewcza *Corrected heat capacity*	[kW]	6.093	8.500	10.090
	Efektywny pobór mocy elektrycznej *Effective electric power input*	[kW]	2.251	3.148	3.911
	Współczynnik efektywności *Coefficient of performance*	[–]	2.707	2.700	2.580
	Ustawienia sterowania *Control settings*	[Hz]	90	–	90
Poziom mocy akustycznej dla danych warunków temperaturowych A7/W55` (at 36 Hz) – *Sound power level at condition A7/W55* (at 36 Hz):*					
L_{WA}	Jednostka wewnętrzna – *Indoor unit*	[dB(A)]	27.6 ± 1.5	27.6 ± 1.5	27.6 ± 1.5
	Jednostka zewnętrzna – *Outdoor unit*	[dB(A)]	50.6 ± 1.5	53.0 ± 1.5	55.1 ± 1.5
Klasa dokładności *Accuracy class*	Jednostka wewnętrzna – *Indoor unit*		Techniczna (2) – *Engineering (2)*		
	Jednostka zewnętrzna – *Outdoor unit*		Techniczna (2) – *Engineering (2)*		

(*) Uwagi do skróconych oznaczeń: np. A7/W35: A (powietrze), 7 (temperatura wejściowa - temperatura termometru suchego) w °C, W (woda), 35 (temperatura wyjściowa) w °C. *Comment to abbreviated marking: e.g. A7/W35: A (air), 7 (input air – dry bulb temperature in °C) / W (water), 35 (output heating water temperature in °C).*

(Badana - *Tested*) Tę próbkę analityczną/warunek zbadano w Laboratorium Badawczym. *This test sample was tested at the Testing Laboratory.*

(Nie badana - *Not tested*) Techniczne dane zostały zgłoszone przez Producenta zgodnie ze specyfikacją linii modeli i nie zostały zbadane przez Laboratorium Badawcze. *The technical data were declared by the Manufacturer according to the model range specifications and were not tested by the Testing Laboratory.*

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe potwierdza niniejszym certyfikatem z badań, że badanie produktu, którego dotyczy dało wyniki wskazane powyżej. Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe jest akredytowanym Laboratorium 1045.1.

Engineering Test Institute, Public Enterprise, confirms by this Test Certificate that the testing of the product in question was performed with the results as stated above. Engineering Test Institute, Public Enterprise, is an accredited Testing Laboratory 1045.1.

Brno, 2025-03-03

Ing. Mario Jankola

Kierownik ds. Urządzeń Grzewczych i Wyrobów Budowlanych
Heating Equipment and Construction Products Manager

- KONIEC CERTYFIKATU Z BADAŃ -
- END OF TEST CERTIFICATE -

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe, Brno, Republika Czeska
Engineering Test Institute. Public Enterprise. Brno. Czech Republic

CERTYFIKAT Z BADAŃ
TEST CERTIFICATE

Number **O-B-00148-25-rev. 1**

Klient *Customer*	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Produkt *Product*	Pompa Ciepła powietrze/woda – monoblok *Outdoor Air/Water Heat pump - monobloc*
Rodzaj oznaczenie / znak towarowy *Type designation / Trade mark*	**HPOM011Z0* + HPOM020W#***
Metoda testowa *Test methods*	ČSN EN 14511-2:2023, ČSN EN 14511-3:2024, ČSN EN 14825:2023
Podstawy zaświadczenia *Basis of certificate*	Raport z badań - *Test reports*: 39-18240/T z dnia - *of* 2025-02-20 39-17945/H z dnia - *of* 2025-01-09 Dokumentacja techniczna przedstawiona przez - *Technical documents of* HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.
Teplotní aplikace *Temperature application*	**NISKOTEMPERATUROWA - *LOW*,** Referencyjna temperatura wody 35 °C - *Reference water temperature 35 °C*
Referencyjny okres grzewczy *Reference heating season*	**„A“ = Umiarkowany - *„A“ = average* / „W“ = ciepły - *„W“ = warmer* / „C“ = chłodny - *„C“ = cold*** (Warunki obliczeniowe odniesienia dla ogrzewania – *Reference design conditions for heating* $T_{designh}$ = -10 °C / +2 °C / -22 °C)

Specyfikacja warunków - *Specification of conditions*:

Kontrola prędkości kompresora *Compressor speed control*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (wewnętrzny wymiennik ciepła) - *Rated liquid flow rate (indoor heat exchanger)*	**Zmienna** ***Variable***
Wylotowa temperatura wody (wewnętrzny wymiennik ciepła) - *Outlet water temperature (indoor heat exchanger)*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (zewnętrzny wymiennik ciepła) - *Rated liquid flow rate (outdoor heat exchanger)*	–
Funkcja *Function*	**Odwracalna** ***Reversible***		

STROJIRENSKÝ ZKUŠEBNÍ ÚSTAV, S.P. 03

Wyniki - *Results*:

Zastosowania w niskich temperaturach – *Low temperature application*

(Referencyjna temperatura wody 35 °C - *Reference water temperature 35 °C*)

Nazwa modelu – *Model names*			HPOM006Z0* + HPOM020W#*	HPOM009Z0* + HPOM020W#*	HPOM011Z0* + HPOM020W#*
Jednostka zewnętrzna – *Outdoor units*			HPOM006Z0*	HPOM009Z0*	HPOM011Z0*
Jednostka wewnętrzna – *Indoor units*			HPOM020W#* (Badana / Tested)	HPOM020W#* (Nie badana / Not tested)	HPOM020W#* (Badana / Tested)
Obciążenie obliczeniowe dla trybu ogrzewania *Full load heating*	$P_{designh}$ [kW]	A	5.39	6.44	8.79
		W	4.82	7.00	9.50 (Nie badana / Not tested)
		C	6.34	7.75	9.65 (Nie badana / Not tested)
Temperatura dwuwalencyjna *Bivalent temperature*	$T_{bivalent}$ [°C]	A	-7	-7	-7
		W	2	2	2
		C	-10	-10	-10
Wskaźnik sezonowej efektywności *Seasonal coefficient of performance*	SCOP [–]	A	4.55	4.61	4.87
		W	6.09 (Nie badana / Not tested)	6.29	6.46 (Nie badana / Not tested)
		C	3.77 (Nie badana / Not tested)	3.81	3.81 (Nie badana / Not tested)
Sezonowa efektywność energetyczna ogrzewania pomieszcze *Seasonal Space heating energy efficiency*	η_s [%]	A	178.9	181.6	191.7
		W	240.8 (Nie badana / Not tested)	248.6	255.3 (Nie badana / Not tested)
		C	147.9 (Nie badana / Not tested)	149.6	149.4 (Nie badana / Not tested)

(Badana - *Tested*) Tę próbkę analityczną/warunek zbadano w Laboratorium Badawczym. *This test sample was tested at the Testing Laboratory.*

(Nie badana - *Not tested*) Techniczne dane zostały zgłoszone przez Producenta zgodnie ze specyfikacją linii modeli i nie zostały zbadane przez Laboratorium Badawcze. *The technical data were declared by the Manufacturer according to the model range specifications and were not tested by the Testing Laboratory.*

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe potwierdza niniejszym certyfikatem z badań, że badanie produktu, którego dotyczy dało wyniki wskazane powyżej. Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe jest akredytowanym Laboratorium 1045.1.
Engineering Test Institute, Public Enterprise, confirms by this Test Certificate that the testing of the product in question was performed with the results as stated above. Engineering Test Institute, Public Enterprise, is an accredited Testing Laboratory 1045.1.

Brno, 2025-03-06

Ing. Mario Jankola

Kierownik ds. Urządzeń Grzewczych i Wyrobów Budowlanych
Heating Equipment and Construction Products Manager

- KONIEC CERTYFIKATU Z BADAŃ -
- END OF TEST CERTIFICATE -

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe, Brno, Republika Czeska
Engineering Test Institute. Public Enterprise. Brno. Czech Republic

CERTYFIKAT Z BADAŃ
TEST CERTIFICATE

Number **O-B-00149-25-rev. 1**

Klient *Customer*	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Produkt *Product*	Pompa Ciepła powietrze/woda – monoblok *Outdoor Air/Water Heat pump - monobloc*
Rodzaj oznaczenie / znak towarowy *Type designation / Trade mark*	**HPOM011Z0* + HPOM020W#***
Metoda testowa *Test methods*	ČSN EN 14511-2:2023, ČSN EN 14511-3:2024, ČSN EN 14825:2023
Podstawy zaświadczenia *Basis of certificate*	Raport z badań - *Test reports*: 39-18240/T z dnia - *of* 2025-02-20 39-17945/H z dnia - *of* 2025-01-09 Dokumentacja techniczna przedstawiona przez - *Technical documents of* HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.
Teplotní aplikace *Temperature application*	**WYSOKOTEMPERATUROWA - *MEDIUM*** Referencyjna temperatura wody 55 °C - *Reference water temperature 55 °C*
Referencyjny okres grzewczy *Reference heating season*	**„A“ = Umiarkowany - *„A“ = average* / „W“ = ciepły - *„W“ = warmer* / „C“ = chłodny - *„C“ = cold*** (Warunki obliczeniowe odniesienia dla ogrzewania – *Reference design conditions for heating* $T_{designh}$ = -10 °C / +2 °C / -22 °C)

Specyfikacja warunków - *Specification of conditions*:

Kontrola prędkości kompresora *Compressor speed control*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (wewnętrzny wymiennik ciepła) - *Rated liquid flow rate (indoor heat exchanger)*	**Zmienna** ***Variable***
Wylotowa temperatura wody (wewnętrzny wymiennik ciepła) - *Outlet water temperature (indoor heat exchanger)*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (zewnętrzny wymiennik ciepła) - *Rated liquid flow rate (outdoor heat exchanger)*	–
Funkcja *Function*	**Odwracalna** ***Reversible***		

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, S.P. 03

Wyniki - *Results*:

Zastosowania w średnich temperaturach – *Medium temperature application*

(Referencyjna temperatura wody 55 °C - *Reference water temperature 55 °C*)

Nazwa modelu – *Model names*			**HPOM006Z0* + HPOM020W#***	**HPOM009Z0* + HPOM020W#***	**HPOM011Z0* + HPOM020W#***
Jednostka zewnętrzna – *Outdoor units*			**HPOM006Z0***	**HPOM009Z0***	**HPOM011Z0***
Jednostka wewnętrzna – *Indoor units*			**HPOM020W#***	**HPOM020W#***	**HPOM020W#***
			(Badana / Tested)	(Nie badana / Not tested)	(Badana / Tested)
Obciążenie obliczeniowe dla trybu ogrzewania *Full load heating*	$P_{designh}$ [kW]	**A**	4.52	5.65	7.67
		W	4.47	5.80	8.00 (Nie badana / Not tested)
		C	5.68	7.13	9.50 (Nie badana / Not tested)
Temperatura dwuwalencyjna *Bivalent temperature*	$T_{bivalent}$ [°C]	**A**	-7	-7	-7
		W	2	2	2
		C	-10	-10	-10
Wskaźnik sezonowej efektywności *Seasonal coefficient of performance*	**SCOP** [–]	**A**	3.25 (Nie badana / Not tested)	3.29	3.39
		W	4.03 (Nie badana / Not tested)	4.00	4.23 (Nie badana / Not tested)
		C	2.77 (Nie badana / Not tested)	2.99	2.98 (Nie badana / Not tested)
Sezonowa efektywność energetyczna ogrzewania pomieszcze *Seasonal Space heating energy efficiency*	η_s [%]	**A**	127.1 (Nie badana / Not tested)	128.6	132.7
		W	158.1 (Nie badana / Not tested)	157.1	166.0 (Nie badana / Not tested)
		C	107.9 (Nie badana / Not tested)	116.7	116.2 (Nie badana / Not tested)

(Badana - *Tested*) Tę próbkę analityczną/warunek zbadano w Laboratorium Badawczym. *This test sample was tested at the Testing Laboratory.*

(Nie badana - *Not tested*) Techniczne dane zostały zgłoszone przez Producenta zgodnie ze specyfikacją linii modeli i nie zostały zbadane przez Laboratorium Badawcze. *The technical data were declared by the Manufacturer according to the model range specifications and were not tested by the Testing Laboratory.*

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe potwierdza niniejszym certyfikatem z badań, że badanie produktu, którego dotyczy dało wyniki wskazane powyżej. Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe jest akredytowanym Laboratorium 1045.1.
Engineering Test Institute, Public Enterprise, confirms by this Test Certificate that the testing of the product in question was performed with the results as stated above. Engineering Test Institute, Public Enterprise, is an accredited Testing Laboratory 1045.1.

Brno, 2025-03-06

Ing. Mario Jankola
Kierownik ds. Urządzeń Grzewczych i Wyrobów Budowlanych
Heating Equipment and Construction Products Manager

- KONIEC CERTYFIKATU Z BADAŃ -
- END OF TEST CERTIFICATE -

STROJIRENSKY ZKUSEBNI USTAV, S.P. 03

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe, Brno, Republika Czeska
Engineering Test Institute. Public Enterprise. Brno. Czech Republic

CERTYFIKAT Z BADAŃ
TEST CERTIFICATE

Number **O-B-00353-25**

Klient *Customer*	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Produkt *Product*	Pompa Ciepła powietrze/woda – monoblok *Outdoor Air/Water Heat pump - monobloc*
Rodzaj oznaczenia / znak towarowy *Type designation / Trade mark*	**HPOM011Z0* + HPOM020W#***
Metoda testowa *Test methods*	ČSN EN 14511-2:2023, ČSN EN 14511-3:2023, ČSN EN 14511-4:2023, ČSN EN 12102-1:2023
Podstawy zaświadczenia *Basis of certificate*	Raport z badań - *Test reports*: 39-18240/T z dnia - *of* 2025-02-20 39-17945/H z dnia - *of* 2025-01-09 Dokumentacja techniczna przedstawiona przez - *Technical documents of HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.*
Zastosowanie *Temperature application*	**NISKOTEMPERATUROWA - *LOW*,** **WYSOKOTEMPERATUROWA - *MEDIUM*** referencyjna temperatura wody 35 °C i 55 °C - *Reference water temperature 35 °C and 55 °C*

Wyniki - *Results*:

Warunki cieplne* *Temperature conditions**		**A7/W35**	**A7/W55**
Skorygowana moc grzewcza *Corrected heat capacity*	[kW]	11.370	10.090
Efektywny pobór mocy elektrycznej *Effective electric power input*	[kW]	2.680	3.911
Współczynnik efektywności *Coefficient of performance*	[–]	4.242	2.580
Ustawienia sterowania *Control settings*	[Hz]	85	90

(*) Uwagi do skróconych oznaczeń: np. A7/W35: A (powietrze), 7 (temperatura wejściowa - temperatura termometru suchego) w °C, W (woda), 35 (temperatura wyjściowa) w °C.

Comment to abbreviated marking: e.g. A7/W35: A (air), 7 (input air – dry bulb temperature in °C) / W (water), 35 (output heating water temperature in °C).

STROJIRENSKÝ ZKUŠEBNÍ ÚSTAV, S.P. 03

Poziom mocy akustycznej dla danych warunków temperaturowych A7/W55˚ (at 36 Hz):
Sound power level at temperature condition A7/W55˚ (at 36 Hz):

Pompa Ciepła Powietrze/Woda – monobloc *Air/Water Heat Pump – monobloc*	**HPOM011Z0*** – Jednostka zewnętrzna – *– outdoor unit –*	**HPOM020W#*** – Jednostka wewnętrzna – *– indoor unit –*
Poziom mocy akustycznej *Sound power level*	L_{WA} 55.1 ± 1.5 dB(A)	L_{WA} 27.6 ± 1.5 dB(A)
Klasa dokładności *Accuracy class*	Techniczna (2) *Engineering (2)*	Techniczna (2) *Engineering (2)*

(*) Uwagi do skróconych oznaczeń: np. A7/W35: A (powietrze), 7 (temperatura wejściowa - temperatura termometru suchego) w °C, W (woda), 35 (temperatura wyjściowa) w °C.

Comment to abbreviated marking: e.g. A7/W35: A (air), 7 (input air – dry bulb temperature in °C) / W (water), 35 (output heating water temperature in °C).

Specyfikacja warunków - *Specification of conditions*:

Kontrola prędkości kompresora *Compressor speed control*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (wewnętrzny wymiennik ciepła) - *Rated liquid flow rate (indoor heat exchanger)*	**Zmienna** ***Variable***
Wylotowa temperatura wody (wewnętrzny wymiennik ciepła) - *Outlet water temperature (indoor heat exchanger)*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (zewnętrzny wymiennik ciepła) - *Rated liquid flow rate (outdoor heat exchanger)*	–
Funkcja *Function*	**Odwracalna** ***Reversible***		

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe potwierdza niniejszym certyficatem z badań, że badanie produktu, którego dotyczy dało wyniki wskazane powyżej. Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe jest akredytowanym Laboratorium 1045.1.
Engineering Test Institute, Public Enterprise, confirms by this Test Certificate that the testing of the product in question was performed with the results as stated above. Engineering Test Institute, Public Enterprise, is an accredited Testing Laboratory 1045.1.

Brno, 2025-03-03

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. 03

Ing. Mario Jankola
Kierownik ds. Urządzeń Grzewczych i Wyrobów Budowlanych
Heating Equipment and Construction Products Manager
- KONIEC CERTYFIKATU Z BADAŃ -
- END OF TEST CERTIFICATE -

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe, Brno, Republika Czeska
Engineering Test Institute. Public Enterprise. Brno. Czech Republic

CERTYFIKAT Z BADAŃ
TEST CERTIFICATE

Number **O-B-00146-25-rev. 1**

Klient *Customer*	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Produkt *Product*	Pompa Ciepła powietrze/woda – monoblok *Outdoor Air/Water Heat pump - monobloc*
Rodzaj oznaczenie / znak towarowy *Type designation / Trade mark*	**HPOM011Z0* + HPOM020W#***
Metoda testowa *Test methods*	ČSN EN 14511-2:2023, ČSN EN 14511-3:2024, ČSN EN 14825:2023, ČSN EN 12102-1:2023
Podstawy zaświadczenia *Basis of certificate*	Raport z badań - *Test reports*: 39-18240/T z dnia - *of* 2025-02-20 39-17945/H z dnia - *of* 2025-01-09 Dokumentacja techniczna przedstawiona przez - *Technical documents of* HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.
Referencyjny okres grzewczy *Reference heating season*	**„A" = Średni - *„A" = average*** (Warunki obliczeniowe odniesienia dla ogrzewania $T_{designh}$ = -10 °C - *Reference design temperature $T_{designh}$ = -10 °C*)

Wyniki - Results:

NISKA TEMPERATURA
LOW TEMPERATURE

Referencyjna temperatura wody 35 °C - *Reference water temperature 35 °C*

ŚREDNIA TEMPERATURA
MEDIUM TEMPERATURE

Referencyjna temperatura wody 55 °C - *Reference water temperature 55 °C*

8.79	**$P_{designh}$ [kW]** … Obciążenie obliczeniowe dla trybu ogrzewania - *Full load heating*	**7.67**
4.87	**SCOP [-]** … Wskaźnik sezonowej efektywności - *Seasonal coefficient of performance*	**3.39**

Temperatura zewnętrzna *Outdoor temperature* T_j [°C]	Deklarowana wydajność grzewcza *Heating declared capacity* P_{dh} [kW]	Wskaźnik efektywności dla deklarowanej wydajności *Coefficient of performance at the declared capacity* COP_d [–]	Temperatura zewnętrzna *Outdoor temperature* T_j [°C]	Deklarowana wydajność grzewcza *Heating declared capacity* P_{dh} [kW]	Wskaźnik efektywności dla deklarowanej wydajności *Coefficient of performance at the declared capacity* COP_d [–]
T_j = -7	7.778	2.935	T_j = -7	6.783	1.861
T_j = +2	4.967	4.927	T_j = +2	3.795	3.444
T_j = +7	4.935	6.234	T_j = +7	4.629	4.491
T_j = +12	5.771	7.958	T_j = +12	5.516	6.018
T_j = TOL = -10	6.955	2.672	T_j = TOL = -10	6.048	1.616
T_j = $T_{bivalent}$ = -7	7.778	2.935	T_j = $T_{bivalent}$ = -7	6.783	1.861

NISKA TEMPERATURA ***LOW TEMPERATURE*** Referencyjna temperatura wody 35 °C - *Reference water temperature 35 °C*	**ŚREDNIA TEMPERATURA** ***MEDIUM TEMPERATURE*** Referencyjna temperatura wody 55 °C - *Reference water temperature 55 °C*

Pobór mocy w trybach innych niż „tryb aktywny" - *Power consumption in modes other than „active mode"*

11.6	Tryb wyłączenia *Off mode*	P_{OFF}	[W]	11.6
11.7	Tryb wyłączonego termostatu *Thermostat off mode*	P_{TO}	[W]	11.7
11.6	Tryb czuwania *Standby mode*	P_{SB}	[W]	11.6
0.5	Tryb włączonej grzałki karteru *Crankcase heater mode*	P_{CK}	[W]	0.5

Roczne zużycie energii elektrycznej na potrzeby ogrzewania wg: - *Annual electricity consumption for heating according to*:

3733	ČSN EN 14825:2023	Q_{HE}	[kWh]	**4670**

Sezonowa efektywność energetyczna ogrzewania pomieszczeń - *Seasonal Space heating energy efficiency*

191.7	ČSN EN 14825:2023	η_s	[%]	**132.7**

Przepływ cieczy w zewnętrznym wymienniku ciepła - *Liquid flow rate in outdoor heating exchanger*

–	Ciecz obiegu źródła *Source liquid*	Min/Max	[m^3/h]	–

Przepływ cieczy w wewnętrznym wymienniku ciepła - *Liquid flow rate in indoor heating exchanger*

0.7034	Woda grzewcza *Heating water*	Min/Max	[m^3/h]	1.9763

Poziom mocy akustycznej dla warunków - Sound power level at condition A7W55* (at 36 Hz):

HPOM011Z0* – Jednostka zewnętrzna – *– outdoor unit –*	L_{WA}	55.1 ± 1.5	dB(A)	Klasa dokładności 2 (Techniczna) *Accuracy class 2 (Engineering)*
HPOM020W#* – Jednostka wewnętrzna – *– indoor unit –*	L_{WA}	27.6 ± 1.5	dB(A)	

(*) Uwagi do skróconych oznaczeń: np. A7/W55: A (powietrze), 7 (temperatura wejściowa - temperatura termometru suchego w °C), W (woda), 55 (temperatura wyjściowa w °C).
Comment to abbreviated marking: e.g. A7/W55: A (air), 7 (input air – dry bulb temperature in °C) / W (water), 55 (output heating water temperature in °C).

Specyfikacja warunków - *Specification of conditions*:

Kontrola prędkości kompresora *Compressor speed control*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (wewnętrzny wymiennik ciepła) - *Rated liquid flow rate (indoor heat exchanger)*	**Zmienna** ***Variable***
Wylotowa temperatura wody (wewnętrzny wymiennik ciepła) - *Outlet water temperature (indoor heat exchanger)*	**Zmienna** ***Variable***	Nominalne natężenie przepływu cieczy (zewnętrzny wymiennik ciepła) - *Rated liquid flow rate (outdoor heat exchanger)*	–
Funkcja *Function*	**Odwracalna** **Reversible**		

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe potwierdza niniejszym certyficatem z badań, że badanie produktu, którego dotyczy dało wyniki wskazane powyżej. Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe jest akredytowanym Laboratorium 1045.1.
Engineering Test Institute, Public Enterprise, confirms by this Test Certificate that the testing of the product in question was performed with the results as stated above. Engineering Test Institute, Public Enterprise, is an accredited Testing Laboratory 1045.1.

Brno, 2025-03-06

Ing. Mario Jankola
Kierownik ds. Urządzeń Grzewczych i Wyrobów Budowlanych
Heating Equipment and Construction Products Manager

- KONIEC CERTYFIKATU Z BADAŃ -
- END OF TEST CERTIFICATE -

Strojírenský zkušební ústav, s.p.
Hudcova 424/56b, Medlánky, 621 00 Brno, Czech Republic
Testing Laboratory 1045.1 accredited by the CAI pursuant to ČSN EN ISO/IEC 17025:2018

L 1045.1

TEST REPORT
39-18240/T

Product:	Outdoor Air/Water Heat pump - monobloc
Type designation:	**HPOM011Z0* + HPOM020W#***
Customer:	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Manufacturer:	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Report issue date:	2025-02-20
Distribution list:	1 copy to the Customer 1 copy to the Engineering Test Institute

I. Description of product tested

The Heat pump **HPOM011Z0C + HPOM020W6C** supplied by the company **HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.** is structurally adapted to operate in air/water system. Device is designed as monobloc placed outdoor and indoor hydrobox hanging on inner wall. Outdoor and indoor units are connected by water pipes and electrical wiring. Refrigerant R32 is used with charge 1.8 kg. Power supply is a one-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 **HPOM011Z0C:**

- Serial number HPOM011Z285A1101
- Cubic shape with dimensions 1165 × 375 × 880 mm (W × D × H)
- Frame and casing made of varnished steel sheets
- L-shaped evaporator, 2.5 rows (3 rows on the back side with one row being cut short on the side), dimensions 1100 × 65(40) × 820 mm (W × D × H), spacing 2 mm
- Plate condenser SWEP B26Hx34/1P-SC-M 9.65+16+1"+1 1/4"
- Compressor Mitsubishi Electric SVB220FLGMC-L
- Refrigerant R32 (1.8 kg)
- Electric expansion valve Sanhua
- 4-way reversing valve Sanhua SHF-7H-34U-P Y70727
- Refrigerant accumulator Dongguan Qingxin'an Refrigeration Fittings Co., Ltd.
- Axial fan Nidec ø 55 cm
- Pressure sensors
- Temperature sensors
- Refrigerant pipes
- Air vent
- Safety valve

Main components of the indoor unit **HPOM020W6C:**

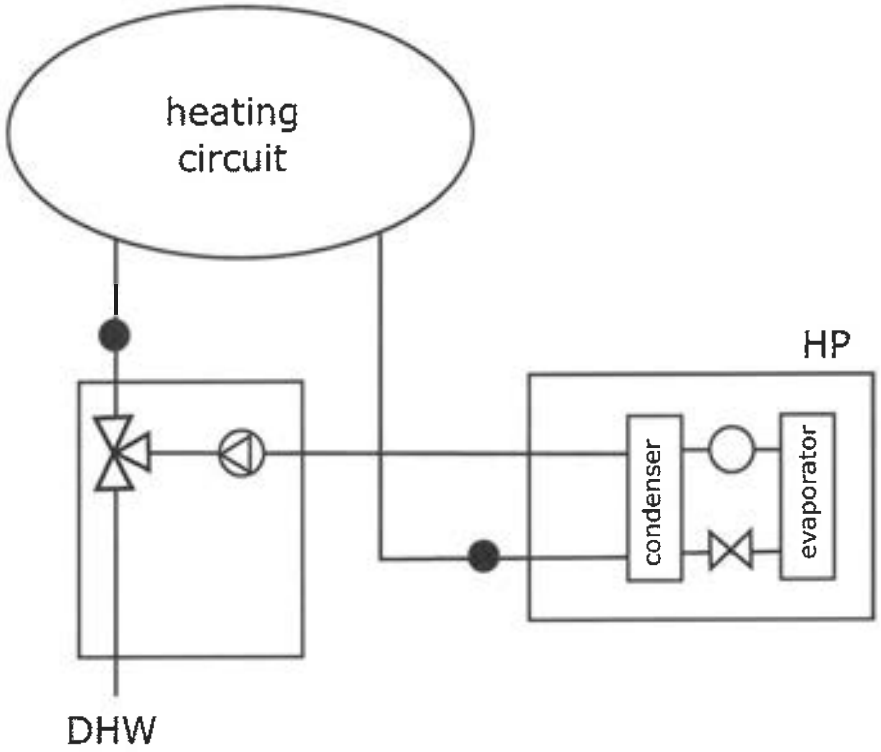
- Serial number HPOM020W376A2050
- Cubic shape with dimensions 500 × 730 × 265 mm (W × D × H)
- Frame and casing made of varnished steel
- Electric backup heater
- Circulation pump Wilo
- 3-way valve
- Display
- Regulation
- Air vent
- Battery
- Temperature sensors
- Software
- Flowswitch
- Pressure scale

HPOM011Z0* and **HPOM020W#*** is a general name. The last character in the product model code, "*", denotes different product versions, which do not affect the device's performance. Depending on the model, the indoor unit may be available as a hydrobox configuration equipped with a three-way valve,

necessary piping, a condenser circulation pump (Wilo or Shimge), and an optional anti-freeze module. Alternatively, it may come in a compact configuration without hydraulic components, containing only the necessary electrical system along with the heat pump controller.

The "#" symbol indicates the heating capacity of the built-in electric heater (e.g., 6 = 6 kW, 0 = no heater).

Scheme:



Photodocumentation:

Heat pump **HPOM011Z0C** – outdoor unit
– Front view –

Heat pump **HPOM011Z0C** – outdoor unit
– Back view –

Not recognized

Heat pump **HPOM011Z0C** – outdoor unit
– Compressor label –

Heat pump **HPOM011Z0C** – outdoor unit
– Label –

Heat pump **HPOM011Z0C** – outdoor unit
– Without cover –

Heat pump **HPOM020W6C** – indoor unit
– Label –

Heat pump **HPOM020W6C** – indoor unit
– With cover –

Heat pump **HPOM020W6C** – indoor unit
– Without cover –

II. Sample tested

SZU reg. no.	Product name	Date of submission
1212.24.40447.001-002	**HPOM011Z0C + HPOM020W6C**	2024-09-06
1212.25.41051.001		2025-01-07
1212.25.41052.001		2025-01-07

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

III. Measuring and test equipment:

No.	Description:	Inventory number:
1.	Electrical energy meter	E3.1
2.	Digital watt meter	1.2.3 ENERGIE ANALYZATOR_3
3.	Flow meter Krohne Optiflux	8.1.5 TECH_K3_V_DN15_SEK
4.	Barometer	2.4 MAR18_1_PB
5.	Differential pressure gauge	14.2.2 MAR18_3_dP_2
6.	Temperature-humidity meter HF532	14.1.1 K3_VLHKOST_1
7.	Temperature-humidity meter HF532	14.1.3 K3_VLHKOST_2
8.	Thermometers	14.4 MAR18_T

IV. Methods, results of tests and verifications

No.	Test objective	Requirement	Method of test	Documentation	Test evaluation/ verification *
1.	Rating conditions	–	ČSN EN 14511-2:2023 ČSN EN 14511-3:2024	Page No. 8	x
2.	Seasonal performance tests and SCOP calculation – Low temperature application	–	ČSN EN 14511-3:2024 ČSN EN 14825:2023	Page No. 9 – 15	x
3.	Seasonal performance tests and SCOP calculation – Medium temperature application	–	ČSN EN 14511-3:2024 ČSN EN 14825:2023	Page No. 16 – 22	x

***) Evaluation / statement of conformity:**
+..... Requirement fulfilled
-..... Requirement not fulfilled
0 .....Not applicable
x .....Not evaluated

Measured quantity	Unit	Uncertainty of measurement	Evaluation
Liquid			
- temperature difference (dT)	[K]	± 0.15 K	fulfilled
- temperature inlet/outlet	[°C]	± 0.15 K	fulfilled
- volume flow	[m3/s]	± 1 %	fulfilled
- static pressure difference	[kPa]	± 1 kPa (Δp ≤ 20 kPa) or ± 5 % (Δp > 20 kPa)	fulfilled
Air			
- dry bulb temperature	[°C]	± 0.2 K	fulfilled
- wet bulb temperature	[°C]	± 0.4 K	fulfilled
- volume flow	[m3/s]	± 5 %	not applied
- static pressure difference	[Pa]	± 5 Pa (Δp ≤ 100 Pa) or ± 5 % (Δp > 100 Pa)	not applied
Refrigerant			
- pressure at compressor outlet	[kPa]	± 1 %	not applied
- temperature	[°C]	± 0.5 K	not applied
Concentration (in volume)			
- heat transfer medium	[%]	± 2	not related
Electrical quantities			
- electric power	[W]	± 1 %	fulfilled
- voltage	[V]	± 0.5 %	fulfilled
- current	[A]	± 0.5 %	fulfilled
- electric energy	[kWh]	± 1 %	not applied
Compressor rotational speed	[min-1]	± 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:
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.

If a statement of conformity is provided, the decision rule pursuant to ILAC-G8:09/2019, Art. 4.2.1 - binary statement for the simple acceptance rule shall apply.

Comment to abbreviated marking: e.g. A7/W35
A (air) 7 (input air, dry-bulb temperature in °C) / W (water), 35 (output heating water temperature in °C)

Test objective:	Rating conditions
Exact name of the test procedure:	**1.37* - Tests of leakage, pressure resistance, thermal and technical parameters, combustion efficiency, safety functions**
Test method:	ČSN EN 14511-2:2023, ČSN EN 14511-3:2024
Sample tested:	Heat pump **HPOM011Z0* + HPOM020W#***
Measuring equipment used:	see Chapter III

Specification of the assessment condition		**A7/W35**	**A7/W55**
Date of testing		**2024-09-10**	**2024-09-10**
Transient test procedure	YES / NO	NO	NO
Average defrost time of 1 cycle	[min]	–	–
Average time of 1 cycle	[min]	–	–
Calculation time	[min]	70.0	70.0
Output heating water – temperature calculation	[°C]	34.97	55.02
Input heating water – temperature calculation	[°C]	29.99	46.94
Output heating water temperature	[°C]	34.97	55.02
Input heating water temperature	[°C]	29.99	46.94
Air temperature – dry bulb temperature	[°C]	7.01	7.00
Air temperature – wet bulb temperature	[°C]	6.03	6.01
Relative humidity	[%]	87.09	86.99
Barometric pressure	[kPa]	97.820	97.890
Ambient temperature	[°C]	7.10	7.07
Secondary circuit pressure difference	[kPa]	-8.188	77.050
Efficiency of the secondary liquid pump	[–]	0.170	0.315
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	1.9763	1.0929
Density of heating water	[$kg \cdot m^{-3}$]	994.0	986.0
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.179
Voltage	[V]	401.20	400.47
Total current	[A]	11.50	17.37
Overall power input	[kW]	2.654	3.986
Capacity correction of sec. liquid pump	[W]	-21.993	50.923
Power input correction of sec. liquid pump	[W]	-26.49	74.31
Heating capacity – heating water	[kW]	11.348	10.141
Corrected heating capacity – heating water	**[kW]**	**11.370**	**10.090**
Uncertainty of corrected heating capacity	[kW]	± 0.196	± 0.111
Effective electric power input	**[kW]**	**2.680**	**3.911**
COP	**[–]**	**4.242**	**2.580**
Uncertainty of COP	[–]	± 0.074	± 0.029
Control settings	**[Hz]**	**85**	**90**
Circulation pump settings – heating water	[–]	10	10

Test objective:	Seasonal performance tests and SCOP calculation – Low temperature application
Exact name of the test procedure:	**1.37* - Tests of leakage, pressure resistance, thermal and technical parameters, combustion efficiency, safety functions**
Test method:	ČSN EN 14511-3:2024, ČSN EN 14825:2023
Sample tested:	Heat pump **HPOM011Z0* + HPOM020W#***
Measuring equipment used:	see Chapter III

Design					Air / water – monobloc		
Conditions specification according to ČSN EN 14825:2023	Temperature application				**Low** (reference water temperature 35 °C)		
	Reference heating season				**Average**		
	Outlet water temperature - indoor heat exchanger				Variable		
	Compressor speed control				Variable		
	Air flow rate – primary circuit				–		
	Water flow rate – secondary circuit				Variable		
Seasonal space heating energy efficiency	Heating	Average	η_s		**<u>191.7</u>**	%	
		Warmer	η_s		–	%	
		Colder	η_s		–	%	
Seasonal efficiency according to ČSN EN 14825:2023	Heating	Average	**SCOP**		**<u>4.87</u>**	–	
		Warmer	SCOP		–	–	
		Colder	SCOP		–	–	
Function	Cooling				Yes		
	Heating	Yes	Reference heating season	Average	Yes		
				Warmer	–		
				Colder	–		
Full heating load	Cooling		$P_{designc}$		–	kW	
	Heating	Average	$P_{designh}$		**<u>8.79</u>**	kW	
		Warmer	$P_{designh}$		–	kW	
		Colder	$P_{designh}$		–	kW	
Bivalent temperatures	Heating	Average	$T_{bivalent}$		-7	°C	
		Warmer	$T_{bivalent}$		–	°C	
		Colder	$T_{bivalent}$		–	°C	
Operation limit temperatures	Heating	Average	TOL		-10	°C	
		Warmer	TOL		–	°C	
		Colder	TOL		–	°C	
Seasonal power consumption according to ČSN EN 14825:2023	Cooling		Q_{CE}		–	kWh	
	Heating	Average	Q_{HE}		3733	kWh	
		Warmer	Q_{HE}		–	kWh	
		Colder	Q_{HE}		–	kWh	
Modes other than „active mode"	Off mode			P_{OFF}	11.6	W	
	Thermostat off mode			P_{TO}	11.7	W	
	Standby mode			P_{SB}	11.6	W	
	Crankcase heater mode			P_{CK}	0.5	W	

Calculation of SCOP according to ČSN EN 14825:2023:

Number of hours used for calculation of reference SCOP (Annex B – Table B. 2, B. 3)

- For reversible heat pumps and reference heating season „A" = average

H_{HE}	2066	[h]
H_{TO}	178	[h]
H_{SB}	0	[h]
H_{CK}	178	[h]
H_{OFF}	0	[h]

Measured data:

P_{TO}	0.0117	[kW]
P_{SB}	0.0116	[kW]
P_{CK}	0.0005	[kW]
P_{OFF}	0.0116	[kW]
$P_{designh}$	8.79	[kW]
$SCOP_{ON}$	4.87	[–]

Coefficient and correction:

F(1)	3	[%]
F(2)	0	[%]
CC	2.5	[–]

Calculation of SCOP:

7.3 Calculation of the reference annual heating demand (Q_H)

$Q_H = P_{designh} \cdot H_{HE}$ [kWh]

$Q_H = 8.79 \cdot 2066 = 18165$ [kWh]

7.4 Calculation of the annual electricity consumption (Q_{HE})

$Q_{HE} = Q_H / SCOP_{on} + H_{TO} \cdot P_{TO} + H_{SB} \cdot P_{SB} + H_{CK} \cdot P_{CK} + H_{OFF} \cdot P_{OFF}$ [kWh]

$Q_{HE} = 18165 / 4.87 + 178 \cdot 0.0117 + 0 \cdot 0.0116 + 178 \cdot 0.0005 + 0 \cdot 0.0116 = 3733$ [kWh]

7.2 General formula for calculation of reference SCOP

$SCOP = Q_H / Q_{HE}$ [–]

$SCOP = 18165 / 3733 = 4.87$ [–]

7.1 Calculation of the seasonal space heating efficiency η_s

$\Sigma F(i) = F(1) + F(2)$ [–]

$\Sigma F = 0.03 + 0 = 0.03$ [–]

$\eta_s = 1 / CC \cdot SCOP - \Sigma F(i)$ [–]

$\eta_s / A = (1 / 2.5) * 4.87 - 0.03 =$ **1.917** [–]

Temperature level		Low (reference water temperature 35 °C)		
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)		
Assessment condition		**A, Tbiv (F)**	**B**	**C**
Specification of the assessment condition		**A-7/W34**	**A2/W30**	**A7/W28.92**
Date of testing		**2024-09-09**	**2024-09-12**	**2024-09-10**
Transient test procedure	YES / NO	NO	NO	NO
Average defrost time of 1 cycle	[min]	–	–	–
Average time of 1 cycle	[min]	–	–	–
Calculation time	[min]	70.0	70.0	70.0
Output heating water – temperature calculation	[°C]	34.01	30.06	28.94
Input heating water – temperature calculation	[°C]	29.00	25.06	23.95
Output heating water temperature	[°C]	34.01	30.06	28.94
Input heating water temperature	[°C]	29.00	25.06	23.95
Air temperature – dry bulb temperature	[°C]	-7.00	2.00	7.00
Air temperature – wet bulb temperature	[°C]	-8.01	1.01	6.01
Relative humidity	[%]	74.95	83.99	86.98
Barometric pressure	[kPa]	97.506	98.158	98.067
Ambient temperature	[°C]	-7.07	2.06	7.07
Secondary circuit pressure difference	[kPa]	-5.097	27.404	0.844
Efficiency of the secondary liquid pump	[–]	0.137	0.195	0.115
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	1.3469	0.8677	0.8580
Density of heating water	[$kg \cdot m^{-3}$]	994.3	995.5	995.8
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.176	4.176
Voltage	[V]	401.67	232.42	231.26
Total current	[A]	11.39	4.68	3.68
Overall power input	[kW]	2.636	1.042	0.793
Capacity correction of sec. liquid pump	[W]	-12.034	27.291	1.549
Power input correction of sec. liquid pump	[W]	-13.94	33.90	1.75
Heating capacity – heating water	[kW]	7.766	4.994	4.936
Corrected heating capacity – heating water	**[kW]**	**7.778**	**4.967**	**4.935**
Uncertainty of corrected heating capacity	[kW]	± 0.134	± 0.086	± 0.085
Effective electric power input	**[kW]**	**2.650**	**1.008**	**0.792**
COP	**[–]**	**2.935**	**4.927**	**6.234**
Uncertainty of COP	[–]	± 0.051	± 0.088	± 0.108
Control settings	**[Hz]**	**90**	**43**	**36**
Circulation pump settings – heating water	[–]	**6**	**5**	**5**

Temperature level		Low (reference water temperature 35 °C)	
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)	
Assessment condition		**D**	**TOL (E)**
Specification of the assessment condition		**A12/W27.83**	**A-10/W35**
Date of testing		**2024-09-13**	**2024-09-11**
Transient test procedure	YES / NO	NO	NO
Average defrost time of 1 cycle	[min]	–	–
Average time of 1 cycle	[min]	–	–
Calculation time	[min]	70.0	70.0
Output heating water – temperature calculation	[°C]	27.74	34.97
Input heating water – temperature calculation	[°C]	22.74	29.97
Output heating water temperature	[°C]	27.74	34.97
Input heating water temperature	[°C]	22.74	29.97
Air temperature – dry bulb temperature	[°C]	12.00	-10.02
Air temperature – wet bulb temperature	[°C]	11.00	-10.95
Relative humidity	[%]	88.96	72.08
Barometric pressure	[kPa]	97.606	97.625
Ambient temperature	[°C]	12.14	-10.09
Secondary circuit pressure difference	[kPa]	-0.990	21.363
Efficiency of the secondary liquid pump	[–]	0.116	0.201
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	1.0015	1.2118
Density of heating water	[$kg \cdot m^{-3}$]	996.2	994.0
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.177	4.175
Voltage	[V]	232.44	399.80
Total current	[A]	3.40	11.48
Overall power input	[kW]	0.723	2.639
Capacity correction of sec. liquid pump	[W]	-2.103	28.506
Power input correction of sec. liquid pump	[W]	-2.38	35.70
Heating capacity – heating water	[kW]	5.769	6.983
Corrected heating capacity – heating water	**[kW]**	**5.771**	**6.955**
Uncertainty of corrected heating capacity	[kW]	± 0.100	± 0.121
Effective electric power input	**[kW]**	**0.725**	**2.603**
COP	**[–]**	**7.958**	**2.672**
Uncertainty of COP	[–]	± 0.138	± 0.047
Control settings	**[Hz]**	**36**	**90**
Circulation pump settings – heating water	[–]	**5**	**12**

Data for SCOP calculation

- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average

	Outdoor heat exchanger Outdoor air inlet	Indoor heat exchanger Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	34.00	88.46	7.78	7.778	2.935	0.900	1.00	2.935	–
B	2	30.00	53.85	4.73	4.967	4.927	0.900	1.00	4.927	–
C	7	28.92	34.62	3.04	4.935	6.234	0.985	0.62	6.177	0.0117
D	12	27.83	15.38	1.35	5.771	7.958	0.984	0.23	7.560	0.0117
TOL (E)	-10	35.00	100.00	8.79	6.955	2.672	0.900	1.00	2.672	–
Tbiv (F)	-7	34.00	88.46	7.78	7.778	2.935	0.900	1.00	2.935	–

Adaption of water temperature – according to ČSN EN 14825:2023, Annex E

- Low temperature application (reference water temperature 35 °C)
- Reference season „A"– average
- Condition D
- Variable water flow rate – secondary circuit

General formulas and derivation:

$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (t_{outlet,\ capacity\ test} - t_{inlet,\ capacity\ test}) \cdot CR$ [°C]

$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (\Delta t) \cdot CR$ [°C]

$t_{outlet,\ average} = t_{outlet,\ capacity\ test} - \Delta t + \Delta t \cdot CR$ [°C]

$t_{outlet,\ capacity\ test} = t_{outlet,\ average} + \Delta t - \Delta t \cdot CR$ [°C]

For variable flow:

$\Delta t = 5$

$CR \cdot \Delta t$ = Part load / Declared capacity · 5

$t_{outlet,\ capacity\ test,\ variable\ flow} = t_{outlet,\ average} + 5$ - Part load / Declared capacity · 5

Measured data:

$t_{outlet,\ average}$	24.00	[°C]
Declared capacity	5.771	[kW]
Declared capacity standard rating condition A7/W35	–	[kW]
Part load	1.35	[kW]

Calculation of water temperature

$t_{outlet,\ capacity\ test,\ variable\ flow} = 24 + 5 - 1.35 / 5.771 \cdot 5 =$ **27.83** [°C]

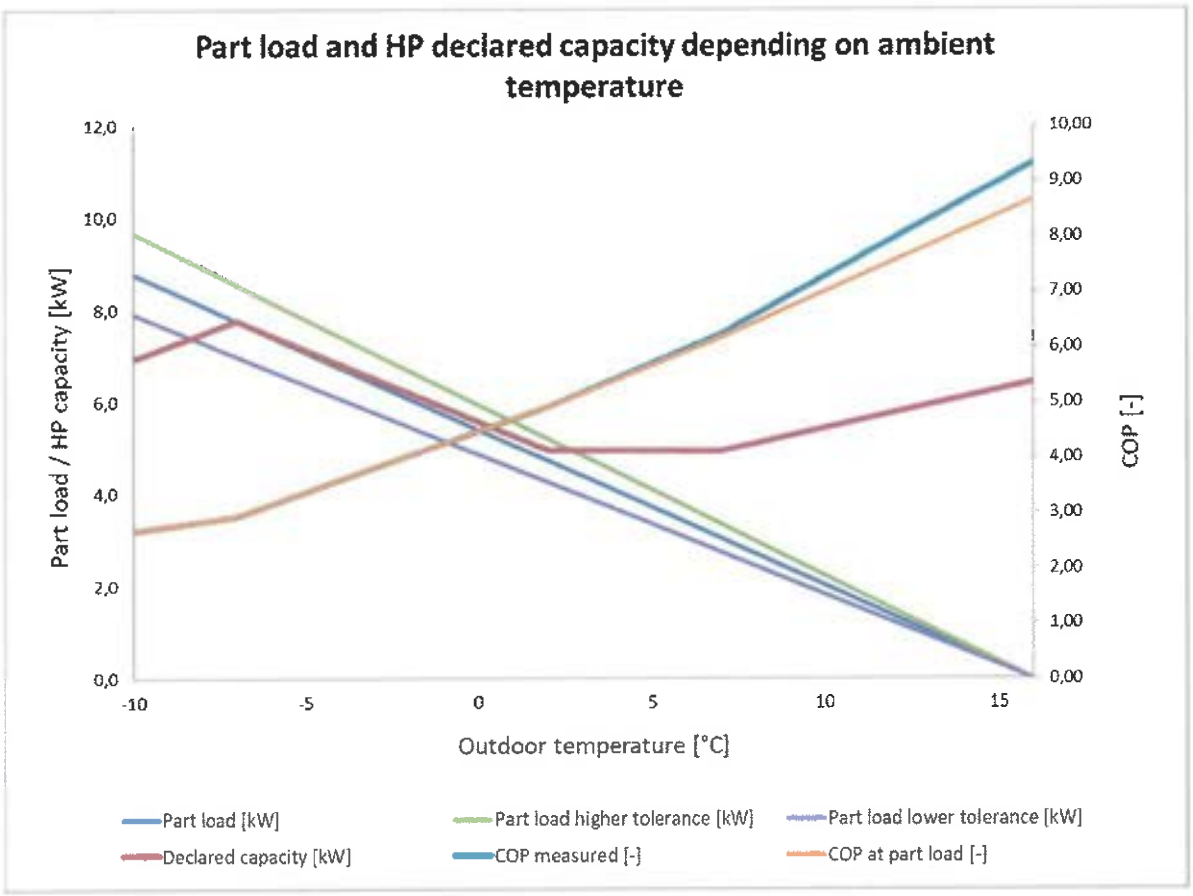
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$

- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average

	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	Tj	hj		Ph(Tj)			elbu(Tj)	hj x elbu(Tj)	COPbin (Tj)	hj x P h(Tj)		hj x (P h(Tj) - elbu(Tj))	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
TOL (E)	21	-10	1	100.00	8.79	6.96	6.96	1.84	1.84	2.67	9	4	7	3
	22	-9	25	96.15	8.45	7.23	7.23	1.23	30.63	2.76	211	96	181	65
	23	-8	23	92.31	8.12	7.50	7.50	0.61	14.09	2.85	187	75	173	61
A, Tbiv (F)	24	-7	24	88.46	7.78	7.78	7.78	0.00	0.00	2.94	187	64	187	64
	25	-6	27	84.62	7.44	7.47	7.44	0.00	0.00	3.16	201	64	201	64
	26	-5	68	80.77	7.10	7.15	7.10	0.00	0.00	3.38	483	143	483	143
	27	-4	91	76.92	6.76	6.84	6.76	0.00	0.00	3.60	615	171	615	171
	28	-3	89	73.08	6.43	6.53	6.43	0.00	0.00	3.82	572	150	572	150
	29	-2	165	69.23	6.09	6.22	6.09	0.00	0.00	4.04	1004	249	1004	249
	30	-1	173	65.38	5.75	5.90	5.75	0.00	0.00	4.26	995	233	995	233
	31	0	240	61.54	5.41	5.59	5.41	0.00	0.00	4.48	1299	290	1299	290
	32	1	280	57.69	5.07	5.28	5.07	0.00	0.00	4.71	1420	302	1420	302
B	33	2	320	53.85	4.73	4.97	4.73	0.00	0.00	4.93	1515	307	1515	307
	34	3	357	50.00	4.40	4.96	4.40	0.00	0.00	5.18	1569	303	1569	303
	35	4	356	46.15	4.06	4.95	4.06	0.00	0.00	5.43	1445	266	1445	266
	36	5	303	42.31	3.72	4.95	3.72	0.00	0.00	5.68	1127	199	1127	199
	37	6	330	38.46	3.38	4.94	3.38	0.00	0.00	5.93	1116	188	1116	188
C	38	7	326	34.62	3.04	4.94	3.04	0.00	0.00	6.18	992	161	992	161
	39	8	348	30.77	2.71	5.10	2.71	0.00	0.00	6.45	941	146	941	146
	40	9	335	26.92	2.37	5.27	2.37	0.00	0.00	6.73	793	118	793	118
	41	10	315	23.08	2.03	5.44	2.03	0.00	0.00	7.01	639	91	639	91
	42	11	215	19.23	1.69	5.60	1.69	0.00	0.00	7.28	364	50	364	50
D	43	12	169	15.38	1.35	5.77	1.35	0.00	0.00	7.56	229	30	229	30
	44	13	151	11.54	1.01	5.94	1.01	0.00	0.00	7.84	153	20	153	20
	45	14	105	7.69	0.68	6.11	0.68	0.00	0.00	8.11	71	9	71	9
	46	15	74	3.85	0.34	6.27	0.34	0.00	0.00	8.39	25	3	25	3
		Σ	4910							Σ	18162	3730	18115	3684

SCOPon	4.87	SCOPnet	4.92
		SCOP	**4.87**

Part load performance diagram
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average



Test objective:	Seasonal performance tests and SCOP calculation – Medium temperature application
Exact name of the test procedure:	**1.37* - Tests of leakage, pressure resistance, thermal and technical parameters, combustion efficiency, safety functions**
Test method:	ČSN EN 14511-3:2024, ČSN EN 14825:2023
Sample tested:	Heat pump **HPOM011Z0* + HPOM020W#***
Measuring equipment used:	see Chapter III

Design					Air / water – monobloc		
Conditions specification according to ČSN EN 14825:2023	Temperature application				**Medium** (reference water temperature 55 °C)		
	Reference heating season				**Average**		
	Outlet water temperature - indoor heat exchanger				Variable		
	Compressor speed control				Variable		
	Air flow rate – primary circuit				–		
	Water flow rate – secondary circuit				Variable		
Seasonal space heating energy efficiency	Heating	Average	η_s		<u>132.7</u>	%	
		Warmer	η_s		–	%	
		Colder	η_s		–	%	
Seasonal efficiency according to ČSN EN 14825:2023	Heating	Average	**SCOP**		<u>3.39</u>	–	
		Warmer	SCOP		–	–	
		Colder	SCOP		–	–	
Function	Cooling				Yes		
	Heating	Yes	Reference heating season	Average	Yes		
				Warmer	–		
				Colder	–		
Full heating load	Cooling		$P_{designc}$		–	kW	
	Heating	Average	$P_{designh}$		<u>7.67</u>	kW	
		Warmer	$P_{designh}$		–	kW	
		Colder	$P_{designh}$		–	kW	
Bivalent temperatures	Heating	Average	$T_{bivalent}$		-7	°C	
		Warmer	$T_{bivalent}$		–	°C	
		Colder	$T_{bivalent}$		–	°C	
Operation limit temperatures	Heating	Average	TOL		-10	°C	
		Warmer	TOL		–	°C	
		Colder	TOL		–	°C	
Seasonal power consumption according to ČSN EN 14825:2023	Cooling		Q_{CE}		–	kWh	
	Heating	Average	Q_{HE}		4670	kWh	
		Warmer	Q_{HE}		–	kWh	
		Colder	Q_{HE}		–	kWh	
Modes other than „active mode“	Off mode			P_{OFF}	11.6	W	
	Thermostat off mode			P_{TO}	11.7	W	
	Standby mode			P_{SB}	11.6	W	
	Crankcase heater mode			P_{CK}	0.5	W	

Calculation of SCOP according to ČSN EN 14825:2023:

Number of hours used for calculation of reference SCOP (Annex B – Table B. 2, B. 3)

- For reversible heat pumps and reference heating season „A" = average

H_{HE}	2066	[h]
H_{TO}	178	[h]
H_{SB}	0	[h]
H_{CK}	178	[h]
H_{OFF}	0	[h]

Measured data:

P_{TO}	0.0117	[kW]
P_{SB}	0.0116	[kW]
P_{CK}	0.0005	[kW]
P_{OFF}	0.0116	[kW]
$P_{designh}$	7.67	[kW]
$SCOP_{ON}$	3.39	[–]

Coefficient and correction:

F(1)	3	[%]
F(2)	0	[%]
CC	2.5	[–]

Calculation of SCOP:

7.3 Calculation of the reference annual heating demand (Q_H)

$Q_H = P_{designh} \cdot H_{HE}$ [kWh]

$Q_H = 7.67 \cdot 2066 = 15842$ [kWh]

7.4 Calculation of the annual electricity consumption (Q_{HE})

$Q_{HE} = Q_H / SCOP_{on} + H_{TO} \cdot P_{TO} + H_{SB} \cdot P_{SB} + H_{CK} \cdot P_{CK} + H_{OFF} \cdot P_{OFF}$ [kWh]

$Q_{HE} = 15842 / 3.39 + 178 \cdot 0.0117 + 0 \cdot 0.0116 + 178 \cdot 0.0005 + 0 \cdot 0.0116 = 4670$ [kWh]

7.2 General formula for calculation of reference SCOP

$SCOP = Q_H / Q_{HE}$ [–]

$SCOP = 15842 / 4670 = 3.39$ [–]

7.1 Calculation of the seasonal space heating efficiency η_s

$\Sigma F(i) = F(1) + F(2)$ [–]

$\Sigma F = 0.03 + 0 = 0.03$ [–]

$\eta_s = 1 / CC \cdot SCOP - \Sigma F(i)$ [–]

$\eta_s / A = (1 / 2.5) * 3.39 - 0.03 =$ **1.327** [–]

Temperature level		Medium (reference water temperature 55 °C)		
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)		
Assessment condition		**A, Tbiv (F)**	**B**	**C**
Specification of the assessment condition		**A-7/W52**	**A2/W42**	**A7/W39.41**
Date of testing		**2024-09-09**	**2024-09-12**	**2024-09-10**
Transient test procedure	YES / NO	NO	NO	NO
Average defrost time of 1 cycle	[min]	–	–	–
Average time of 1 cycle	[min]	–	–	–
Calculation time	[min]	70.0	70.0	70.0
Output heating water – temperature calculation	[°C]	52.09	41.90	39.36
Input heating water – temperature calculation	[°C]	43.99	37.20	33.64
Output heating water temperature	[°C]	52.09	41.90	39.36
Input heating water temperature	[°C]	43.99	37.20	33.64
Air temperature – dry bulb temperature	[°C]	-6.99	2.01	7.01
Air temperature – wet bulb temperature	[°C]	-7.99	1.01	6.01
Relative humidity	[%]	75.16	84.00	86.96
Barometric pressure	[kPa]	97.596	98.189	97.923
Ambient temperature	[°C]	-7.07	2.05	7.06
Secondary circuit pressure difference	[kPa]	11.623	29.462	2.949
Efficiency of the secondary liquid pump	[–]	0.143	0.185	0.120
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.7305	0.7066	0.7034
Density of heating water	[$kg \cdot m^{-3}$]	987.5	991.7	992.6
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.178	4.175	4.175
Voltage	[V]	398.16	232.01	232.02
Total current	[A]	16.01	5.04	4.68
Overall power input	[kW]	3.661	1.133	1.036
Capacity correction of sec. liquid pump	[W]	14.182	25.425	4.240
Power input correction of sec. liquid pump	[W]	16.54	31.21	4.82
Heating capacity – heating water	[kW]	6.798	3.820	4.634
Corrected heating capacity – heating water	**[kW]**	**6.783**	**3.795**	**4.629**
Uncertainty of corrected heating capacity	[kW]	± 0.074	± 0.070	± 0.070
Effective electric power input	**[kW]**	**3.644**	**1.102**	**1.031**
COP	**[–]**	**1.861**	**3.444**	**4.491**
Uncertainty of COP	[–]	± 0.020	± 0.065	± 0.068
Control settings	**[Hz]**	**90**	**36**	**36**
Circulation pump settings – heating water	[–]	6	5	5

Temperature level		Medium (reference water temperature 55 °C)	
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)	
Assessment condition		**D**	**TOL (E)**
Specification of the assessment condition		**A12/W36.29**	**A-10/W55**
Date of testing		**2024-09-13**	**2024-09-11**
Transient test procedure	YES / NO	NO	NO
Average defrost time of 1 cycle	[min]	–	–
Average time of 1 cycle	[min]	–	–
Calculation time	[min]	70.0	70.0
Output heating water – temperature calculation	[°C]	36.23	54.85
Input heating water – temperature calculation	[°C]	29.47	47.41
Output heating water temperature	[°C]	36.23	54.85
Input heating water temperature	[°C]	29.47	47.41
Air temperature – dry bulb temperature	[°C]	12.00	-10.03
Air temperature – wet bulb temperature	[°C]	11.00	-10.90
Relative humidity	[%]	88.99	73.75
Barometric pressure	[kPa]	97.805	97.781
Ambient temperature	[°C]	12.11	-10.11
Secondary circuit pressure difference	[kPa]	29.456	29.315
Efficiency of the secondary liquid pump	[–]	0.186	0.185
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.7124	0.7099
Density of heating water	[$kg \cdot m^{-3}$]	993.6	986.3
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.179
Voltage	[V]	402.57	400.51
Total current	[A]	4.31	16.43
Overall power input	[kW]	0.948	3.773
Capacity correction of sec. liquid pump	[W]	25.535	25.421
Power input correction of sec. liquid pump	[W]	31.36	31.20
Heating capacity – heating water	[kW]	5.542	6.073
Corrected heating capacity – heating water	**[kW]**	**5.516**	**6.048**
Uncertainty of corrected heating capacity	[kW]	± 0.072	± 0.072
Effective electric power input	**[kW]**	**0.917**	**3.741**
COP	**[–]**	**6.018**	**1.616**
Uncertainty of COP	[–]	± 0.082	± 0.019
Control settings	**[Hz]**	**36**	**90**
Circulation pump settings – heating water	[–]	5	12

Data for SCOP calculation

- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A" – average

	Outdoor heat exchanger Outdoor air inlet	Indoor heat exchanger Outlet water temperatu re	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	52.00	88.46	6.78	6.783	1.861	0.900	1.00	1.861	–
B	2	42.00	53.85	4.13	3.795	3.444	0.900	1.00	3.444	–
C	7	39.41	34.62	2.65	4.629	4.491	0.989	0.57	4.453	0.0117
D	12	36.29	15.38	1.18	5.516	6.018	0.987	0.21	5.748	0.0117
TOL (E)	-10	55.00	100.00	7.67	6.048	1.616	0.900	1.00	1.616	–
Tbiv (F)	-7	52.00	88.46	6.78	6.783	1.861	0.900	1.00	1.861	–

Adaption of water temperature – according to ČSN EN 14825:2023, Annex E

- Medium temperature application (reference water temperature 55 °C)
- Reference season „A"– average
- Condition D
- Variable water flow rate – secondary circuit

General formulas and derivation:

$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (t_{outlet,\ capacity\ test} - t_{inlet,\ capacity\ test}) \cdot CR$ [°C]

$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (\Delta t) \cdot CR$ [°C]

$t_{outlet,\ average} = t_{outlet,\ capacity\ test} - \Delta t + \Delta t \cdot CR$ [°C]

$t_{outlet,\ capacity\ test} = t_{outlet,\ average} + \Delta t - \Delta t \cdot CR$ [°C]

For variable flow:

$\Delta t = 8$

$CR \cdot \Delta t$ = Part load / Declared capacity · 8

$t_{outlet,\ capacity\ test,\ variable\ flow} = t_{outlet,\ average} + 8$ - Part load / Declared capacity · 8

Measured data:

$t_{outlet,\ average}$	30.00	[°C]
Declared capacity	5.516	[kW]
Declared capacity $_{standard\ rating\ condition\ A7/W55}$	–	[kW]
Part load	1.18	[kW]

Calculation of water temperature

$t_{outlet,\ capacity\ test,\ variable\ flow} = 30 + 8 - 1.18 / 5.516 \cdot 8 =$ **36.29** [°C]

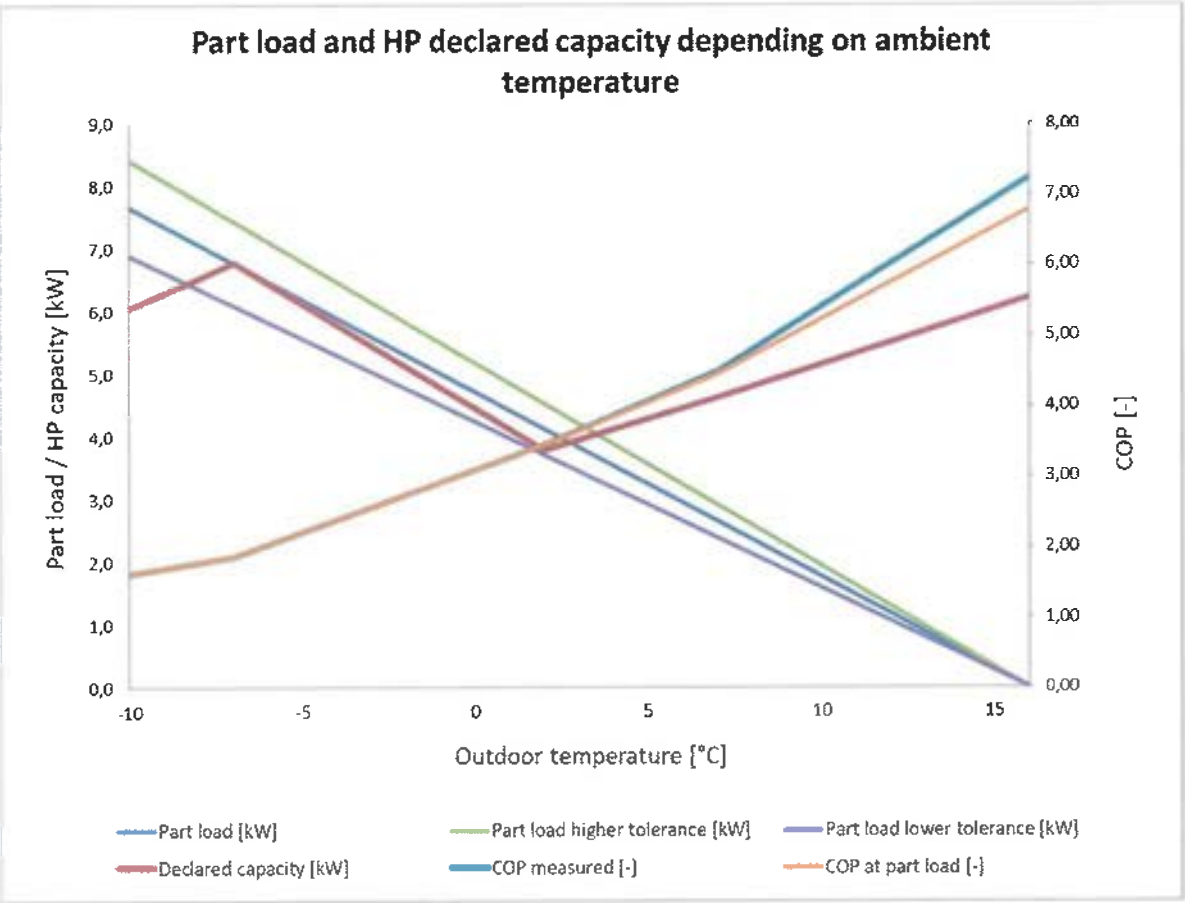
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$

- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A" – average

	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	Tj	hj		Ph(Tj)			elbu(Tj)	hj x elbu(Tj)	COPbin (Tj)	hj x Ph(Tj)		hj x (Ph(Tj) - elbu(Tj))	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
TOL (E)	21	-10	1	100.00	7.67	6.05	6.05	1.62	1.62	1.62	8	5	6	4
	22	-9	25	96.15	7.37	6.29	6.29	1.08	27.00	1.70	184	120	157	93
	23	-8	23	92.31	7.08	6.54	6.54	0.54	12.42	1.78	163	97	150	85
A, Tbiv (F)	24	-7	24	88.46	6.78	6.78	6.78	0.00	0.00	1.86	163	87	163	87
	25	-6	27	84.62	6.49	6.45	6.45	0.00	0.00	2.04	175	86	175	86
	26	-5	68	80.77	6.19	6.12	6.12	0.00	0.00	2.21	421	190	421	190
	27	-4	91	76.92	5.90	5.79	5.79	0.00	0.00	2.39	537	225	537	225
	28	-3	89	73.08	5.60	5.46	5.46	0.00	0.00	2.56	499	194	499	194
	29	-2	165	69.23	5.31	5.12	5.12	0.00	0.00	2.74	876	320	876	320
	30	-1	173	65.38	5.01	4.79	4.79	0.00	0.00	2.92	867	297	867	297
	31	0	240	61.54	4.72	4.46	4.46	0.00	0.00	3.09	1132	366	1132	366
	32	1	280	57.69	4.42	4.13	4.13	0.00	0.00	3.27	1239	379	1239	379
B	33	2	320	53.85	4.13	3.80	3.80	0.00	0.00	3.44	1321	384	1321	384
	34	3	357	50.00	3.83	3.96	3.83	0.00	0.00	3.65	1369	375	1369	375
	35	4	356	46.15	3.54	4.13	3.54	0.00	0.00	3.85	1260	327	1260	327
	36	5	303	42.31	3.24	4.30	3.24	0.00	0.00	4.05	983	243	983	243
	37	6	330	38.46	2.95	4.46	2.95	0.00	0.00	4.25	973	229	973	229
C	38	7	326	34.62	2.65	4.63	2.65	0.00	0.00	4.45	865	194	865	194
	39	8	348	30.77	2.36	4.81	2.36	0.00	0.00	4.71	821	174	821	174
	40	9	335	26.92	2.06	4.98	2.06	0.00	0.00	4.97	692	139	692	139
	41	10	315	23.08	1.77	5.16	1.77	0.00	0.00	5.23	557	107	557	107
	42	11	215	19.23	1.47	5.34	1.47	0.00	0.00	5.49	317	58	317	58
D	43	12	169	15.38	1.18	5.52	1.18	0.00	0.00	5.75	199	35	199	35
	44	13	151	11.54	0.88	5.69	0.88	0.00	0.00	6.01	134	22	134	22
	45	14	105	7.69	0.59	5.87	0.59	0.00	0.00	6.27	62	10	62	10
	46	15	74	3.85	0.29	6.05	0.29	0.00	0.00	6.53	22	3	22	3
		Σ	4910							Σ	15839	4667	15798	4626

SCOPon	3.39	SCOPnet	3.41
		SCOP	**3.39**

Part load performance diagram
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A" – average

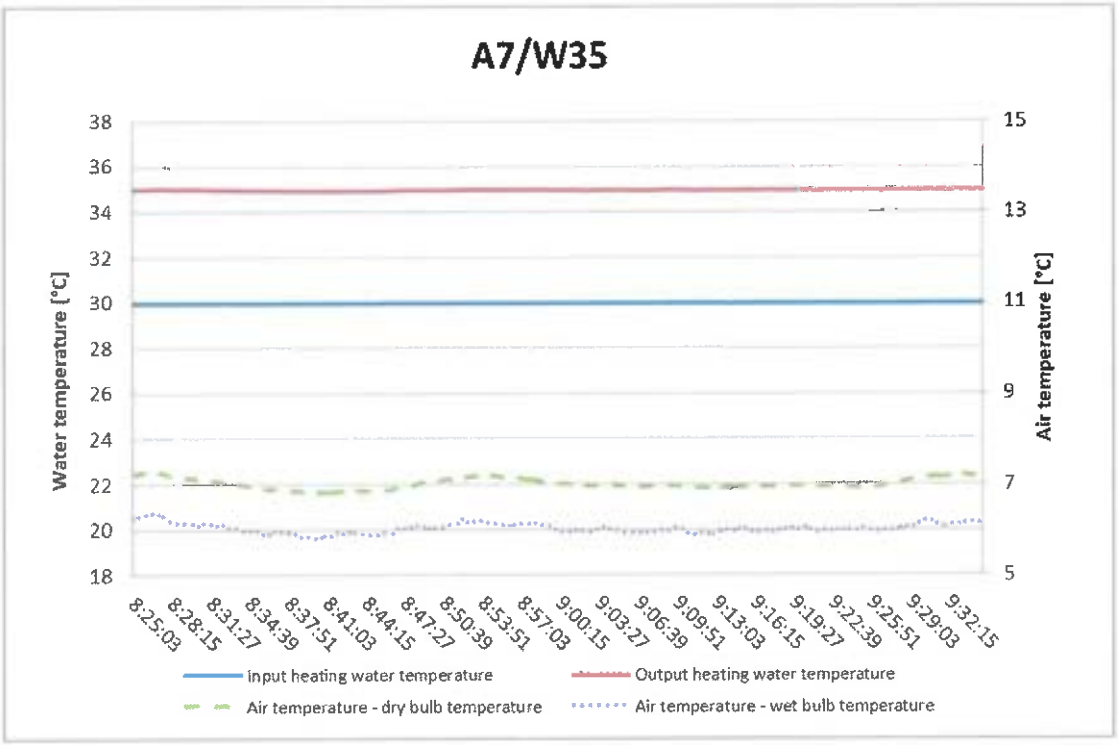


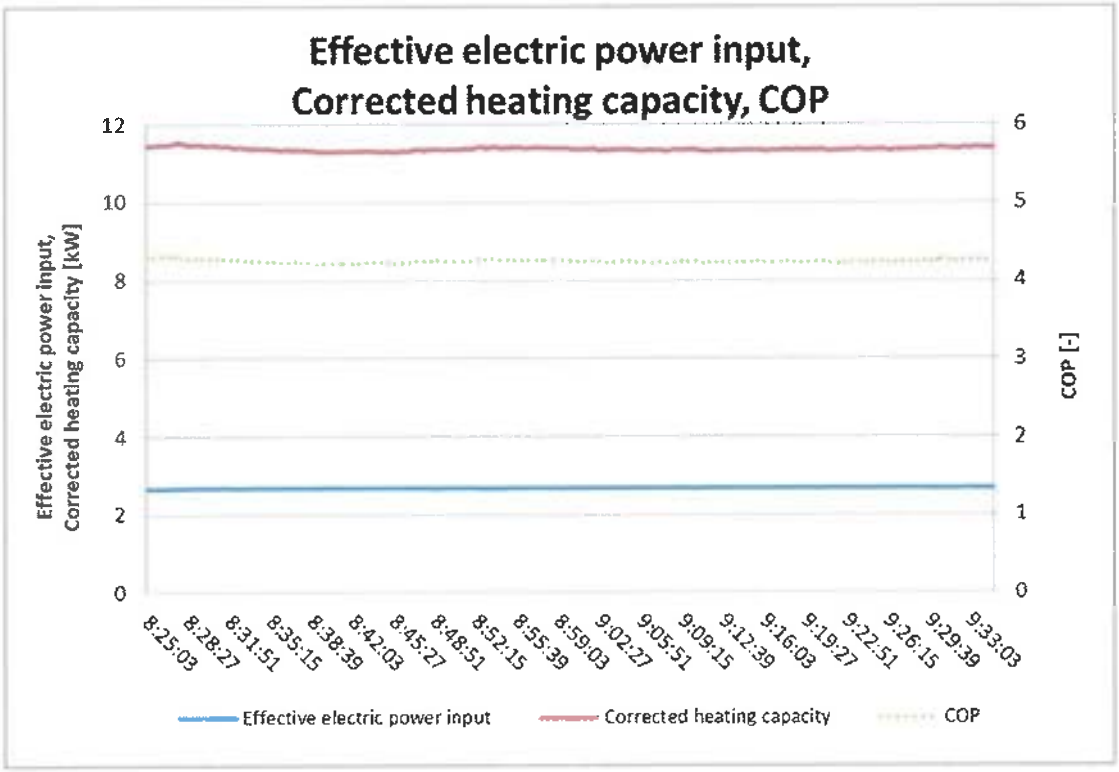
Tested by:	Ing. Tomáš Sedláček	Date:	2025-02-20	Signed:	
Reviewed and approved by:	Ing. Michal Faltýnek	Date:	2025-02-20	Signed:	

V. Graphs

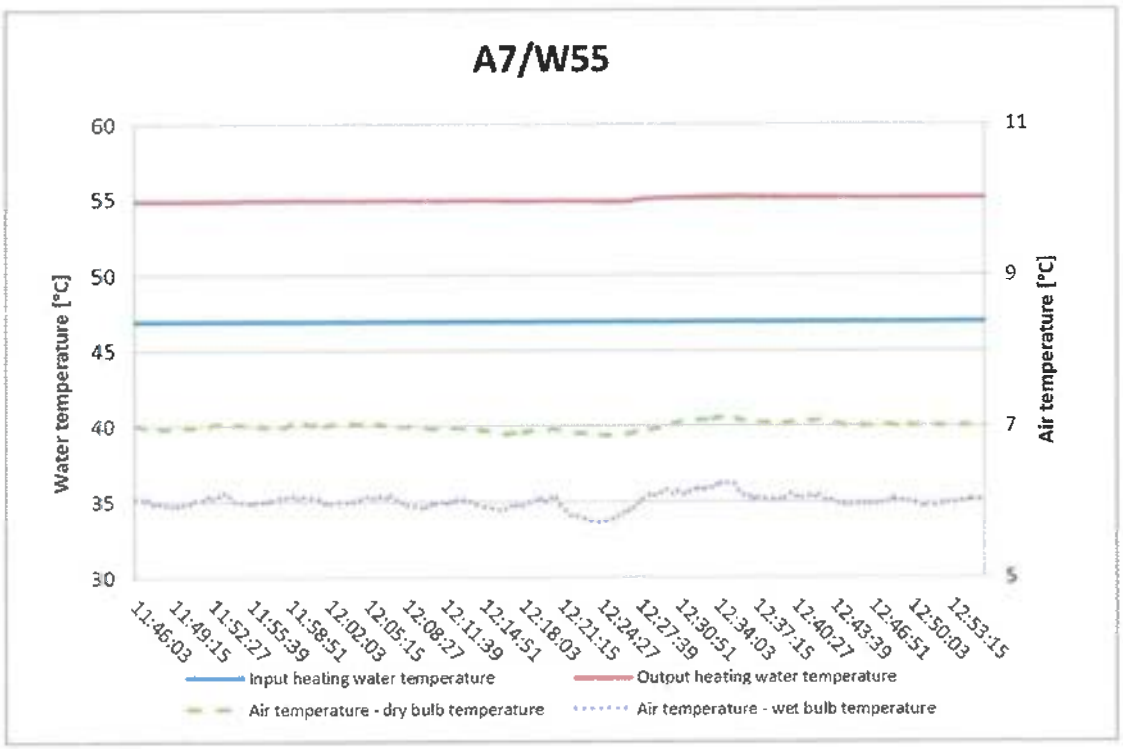
1. Rating conditions

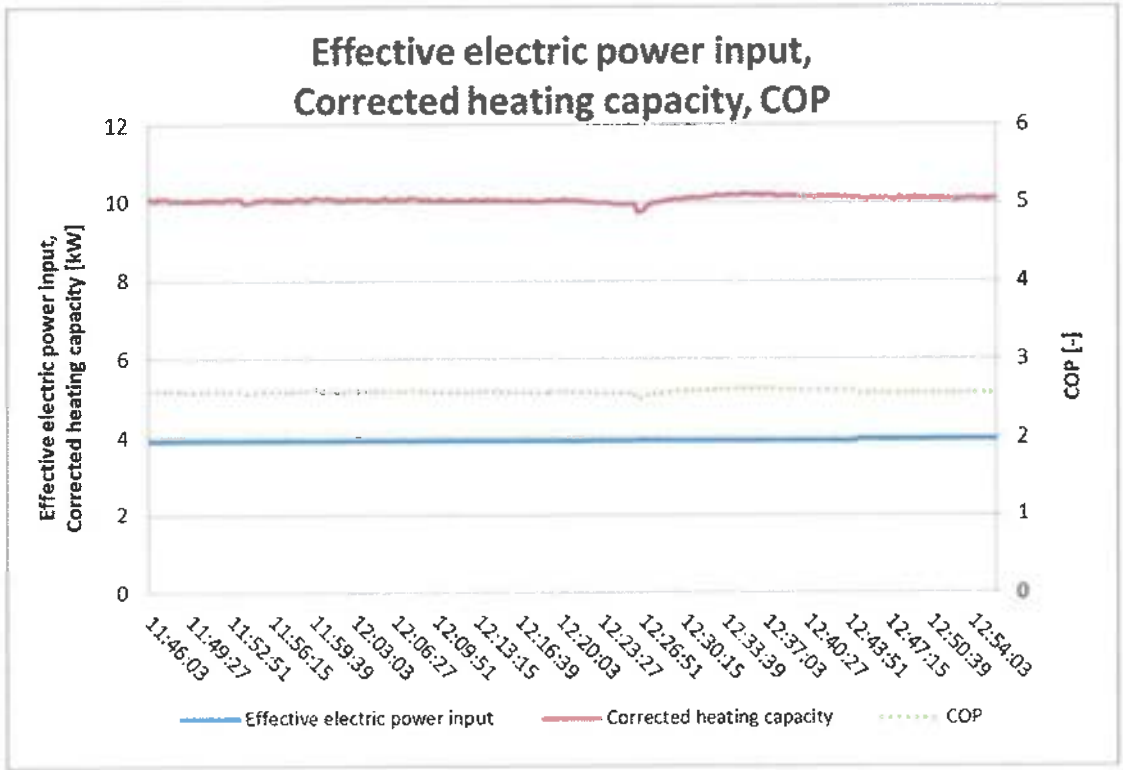
A7/W35 (85 Hz)





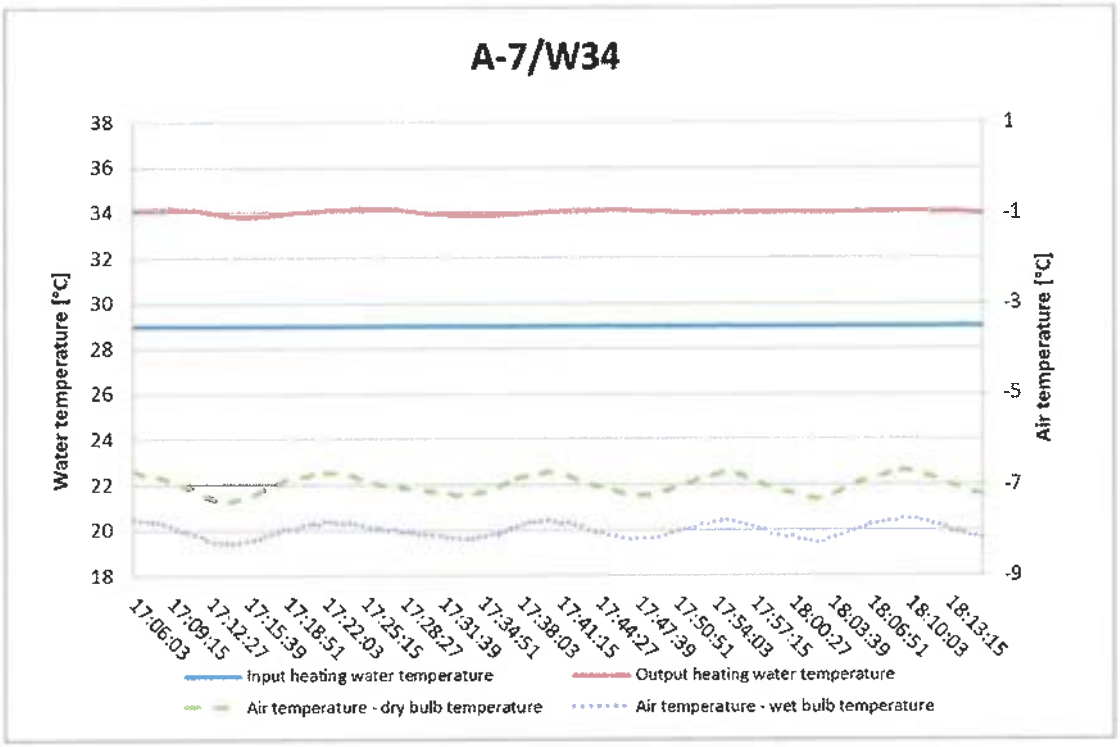
A7/W55 (90 Hz)

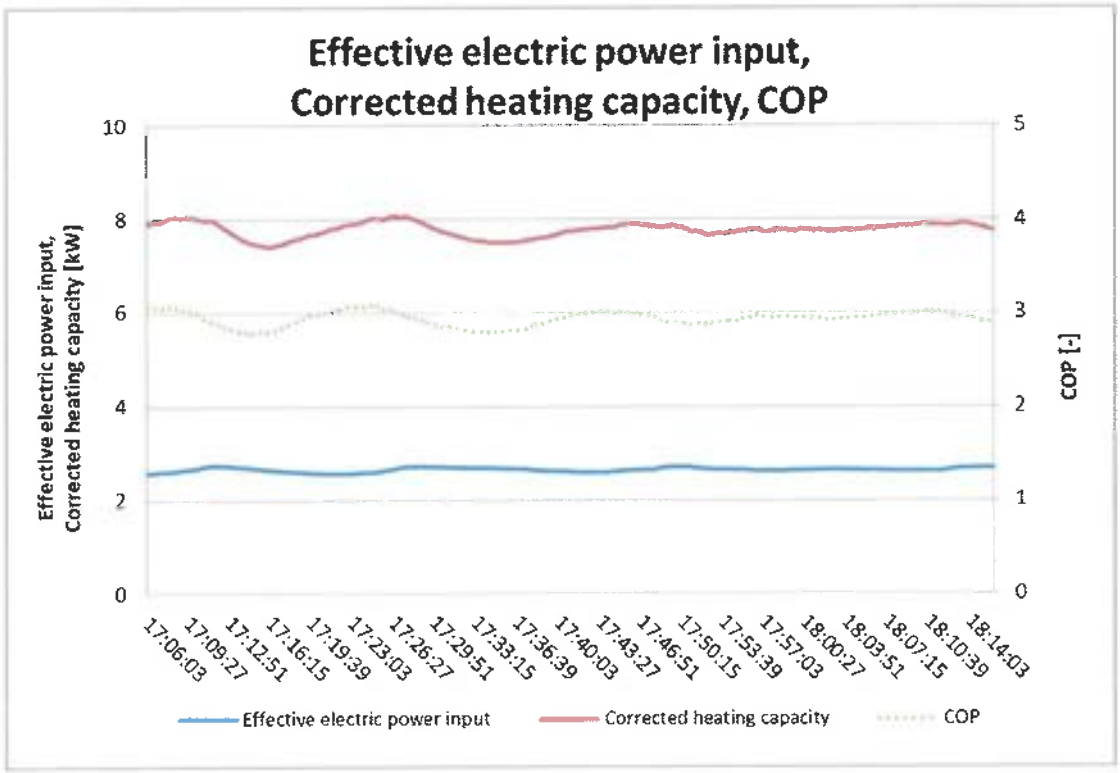

A7/W55
Water temperature [°C]
Air temperature [°C]
60
55
50
45
40
35
30
11
9
7
5
11:46:03
11:49:15
11:52:27
11:55:39
11:58:51
12:02:03
12:05:15
12:08:27
12:11:39
12:14:51
12:18:03
12:21:15
12:24:27
12:27:39
12:30:51
12:34:03
12:37:15
12:40:27
12:43:39
12:46:51
12:50:03
12:53:15
Input heating water temperature
Output heating water temperature
Air temperature - dry bulb temperature
Air temperature - wet bulb temperature


Effective electric power input,
Corrected heating capacity, COP
Effective electric power input, Corrected heating capacity [kW]
COP [-]
12
10
8
6
4
2
0
6
5
4
3
2
1
0
11:46:03
11:49:27
11:52:51
11:56:15
11:59:39
12:03:03
12:06:27
12:09:51
12:13:15
12:16:39
12:20:03
12:23:27
12:26:51
12:30:15
12:33:39
12:37:03
12:40:27
12:43:51
12:47:15
12:50:39
12:54:03
Effective electric power input
Corrected heating capacity
COP

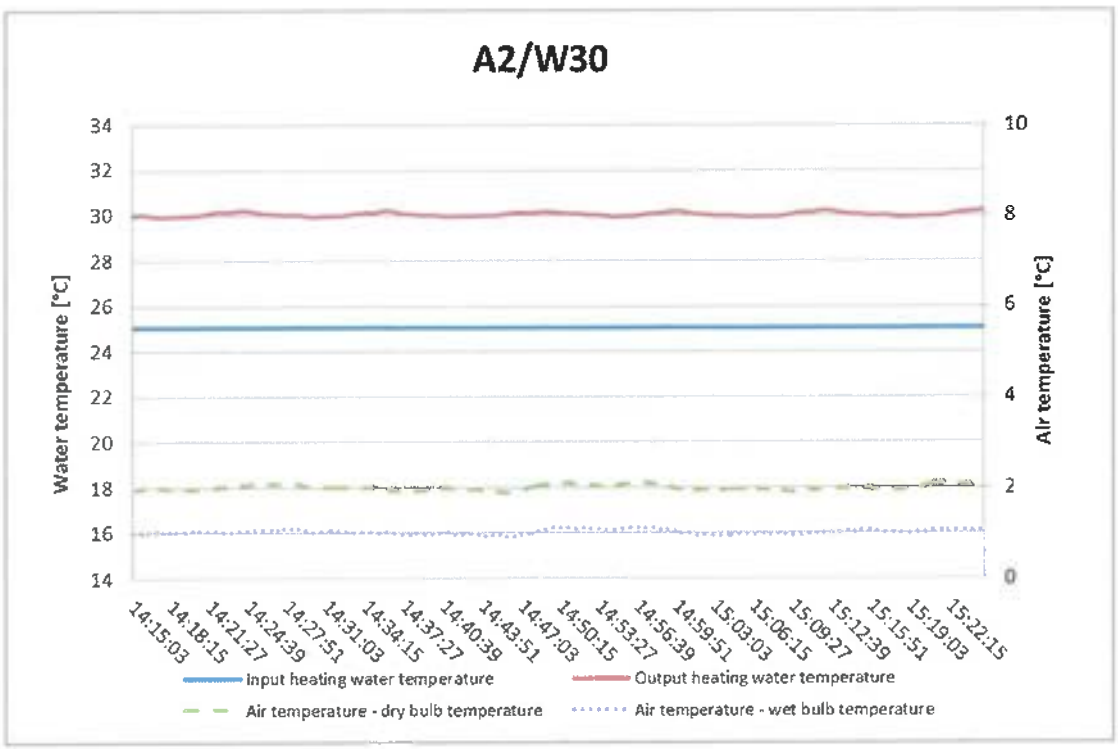
2. Seasonal performance tests and SCOP calculation – Low temperature application

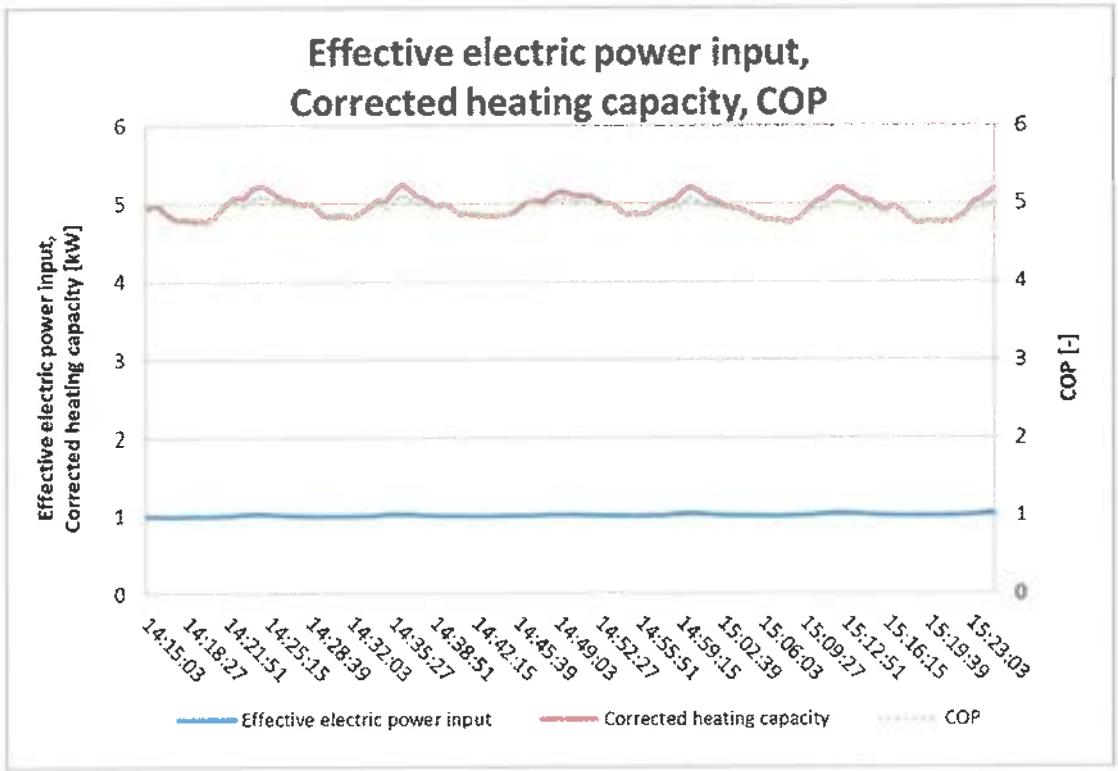
A-7/W34 (90 Hz)



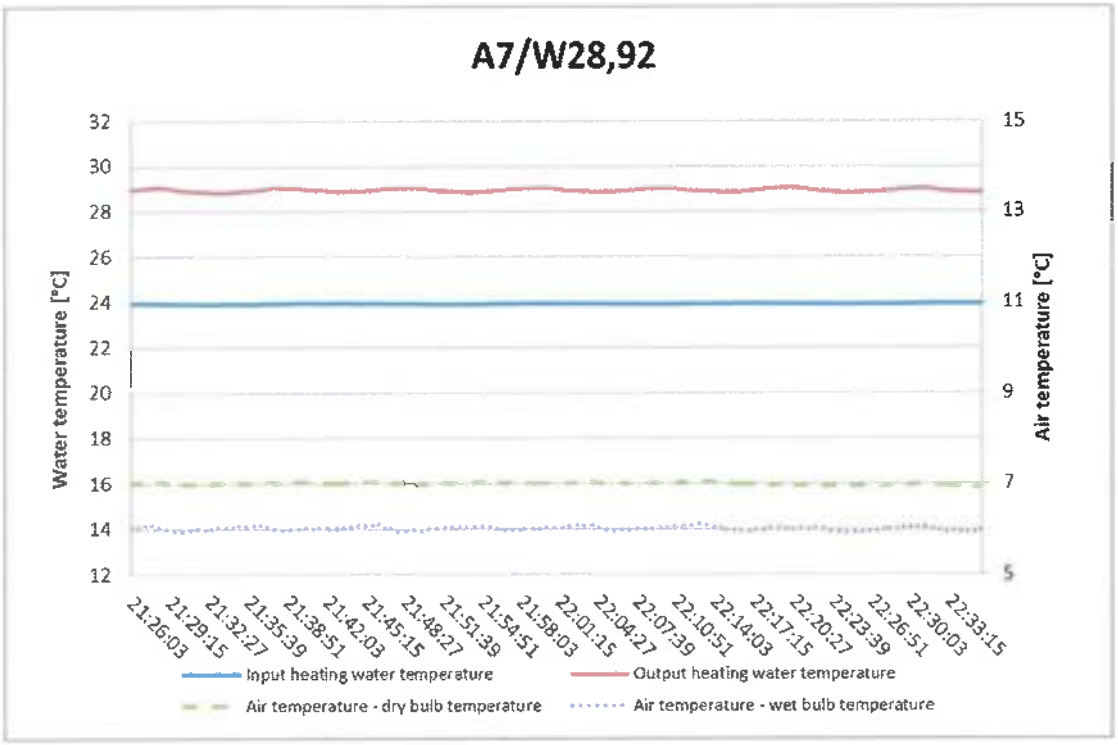


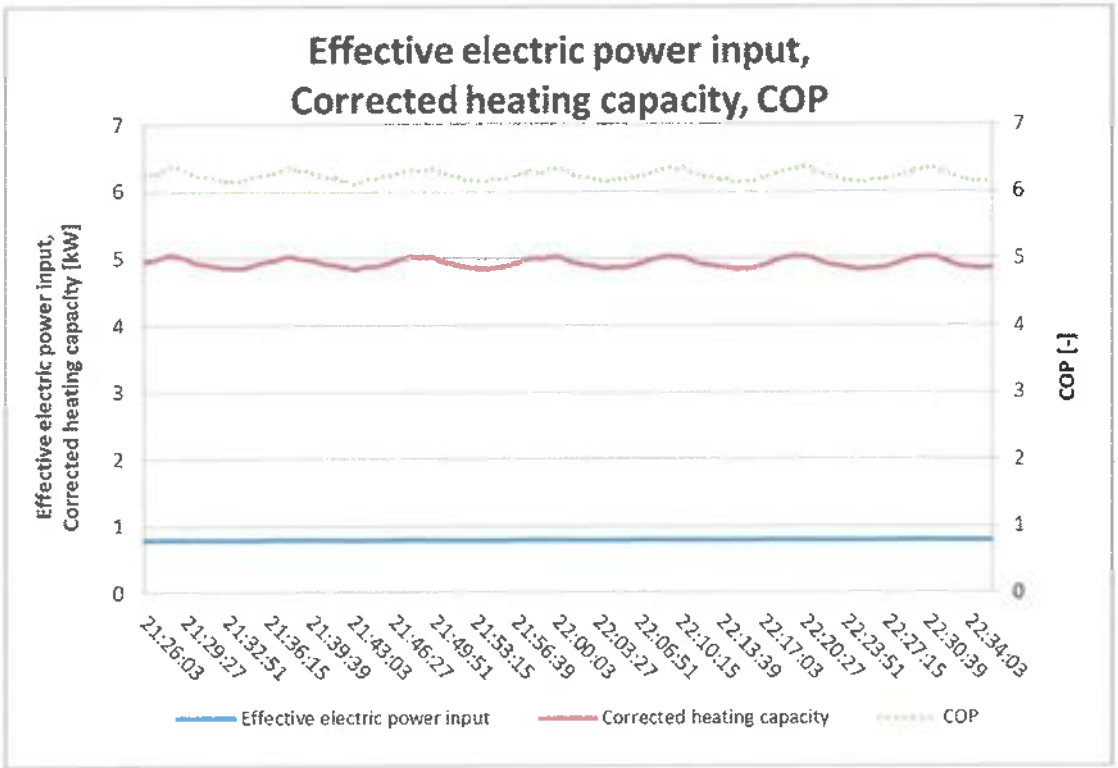
A2/W30 (43 Hz)


A2/W30
Water temperature [°C]
Air temperature [°C]
34
32
30
28
26
24
22
20
18
16
14
10
8
6
4
2
0
14:15:03
14:18:15
14:21:27
14:24:39
14:27:51
14:31:03
14:34:15
14:37:27
14:40:39
14:43:51
14:47:03
14:50:15
14:53:27
14:56:39
14:59:51
15:03:03
15:06:15
15:09:27
15:12:39
15:15:51
15:19:03
15:22:15
Input heating water temperature
Output heating water temperature
Air temperature - dry bulb temperature
Air temperature - wet bulb temperature

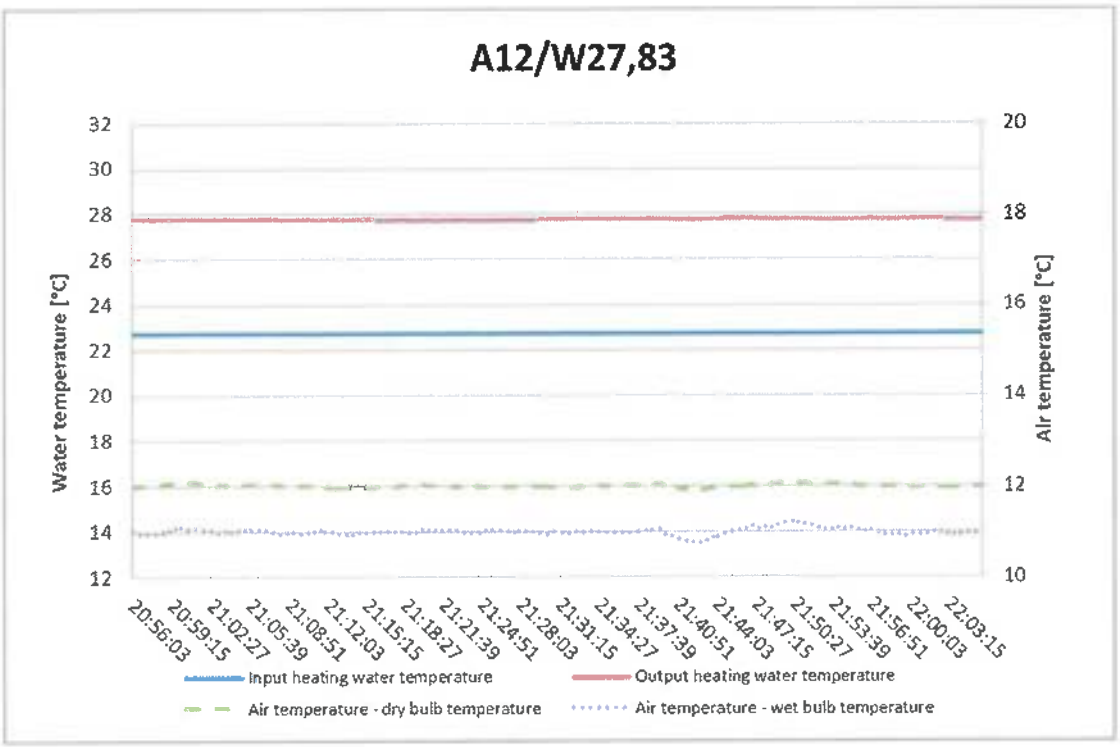

Effective electric power input,
Corrected heating capacity, COP
Effective electric power input, Corrected heating capacity [kW]
COP [-]
6
5
4
3
2
1
0
14:15:03
14:18:27
14:21:51
14:25:15
14:28:39
14:32:03
14:35:27
14:38:51
14:42:15
14:45:39
14:49:03
14:52:27
14:55:51
14:59:15
15:02:39
15:06:03
15:09:27
15:12:51
15:16:15
15:19:39
15:23:03
Effective electric power input
Corrected heating capacity
COP

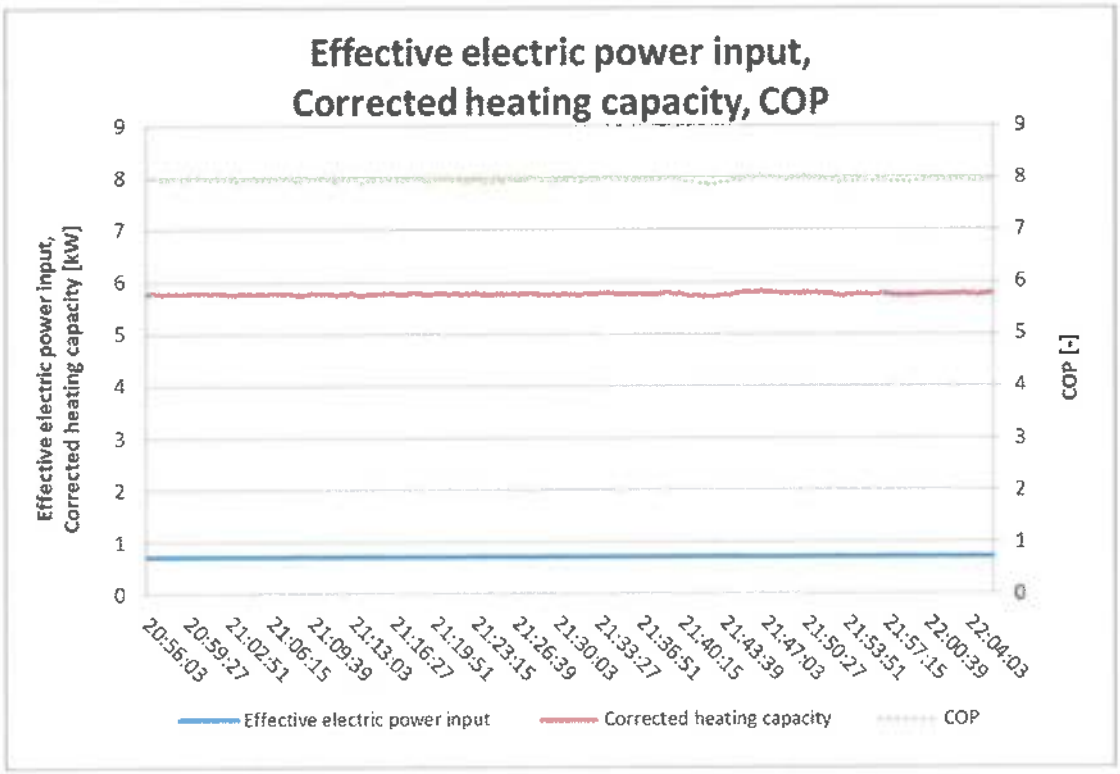
A7/W28.92 (36 Hz)



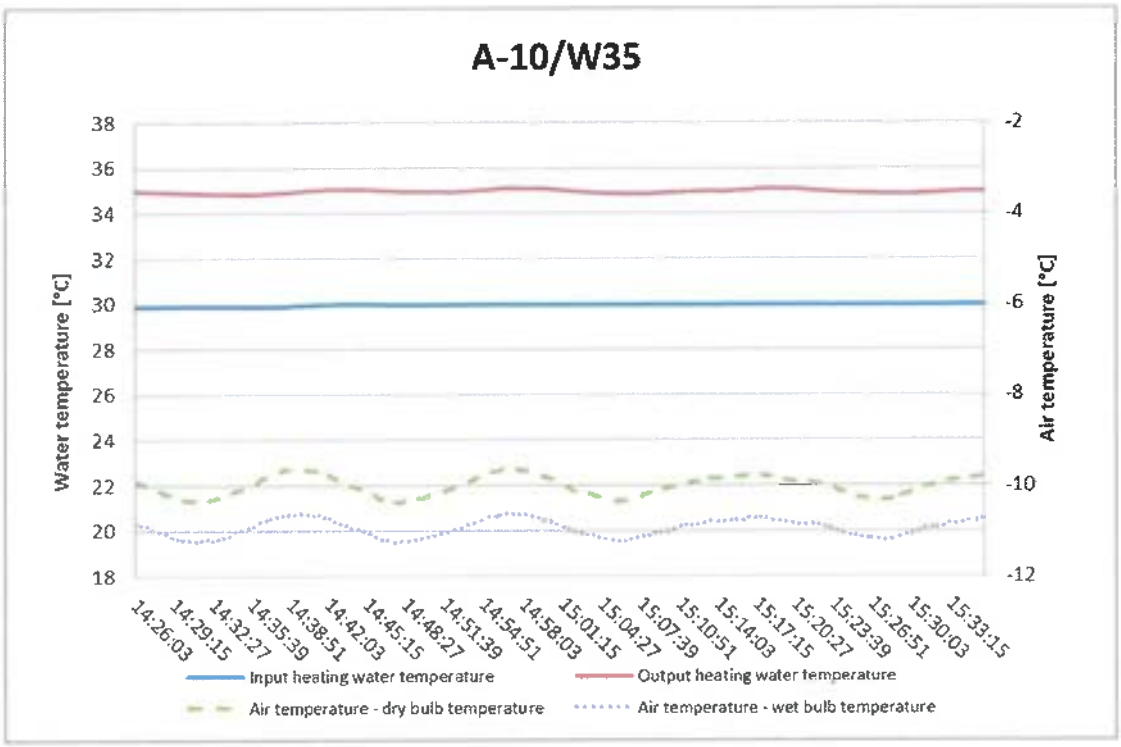


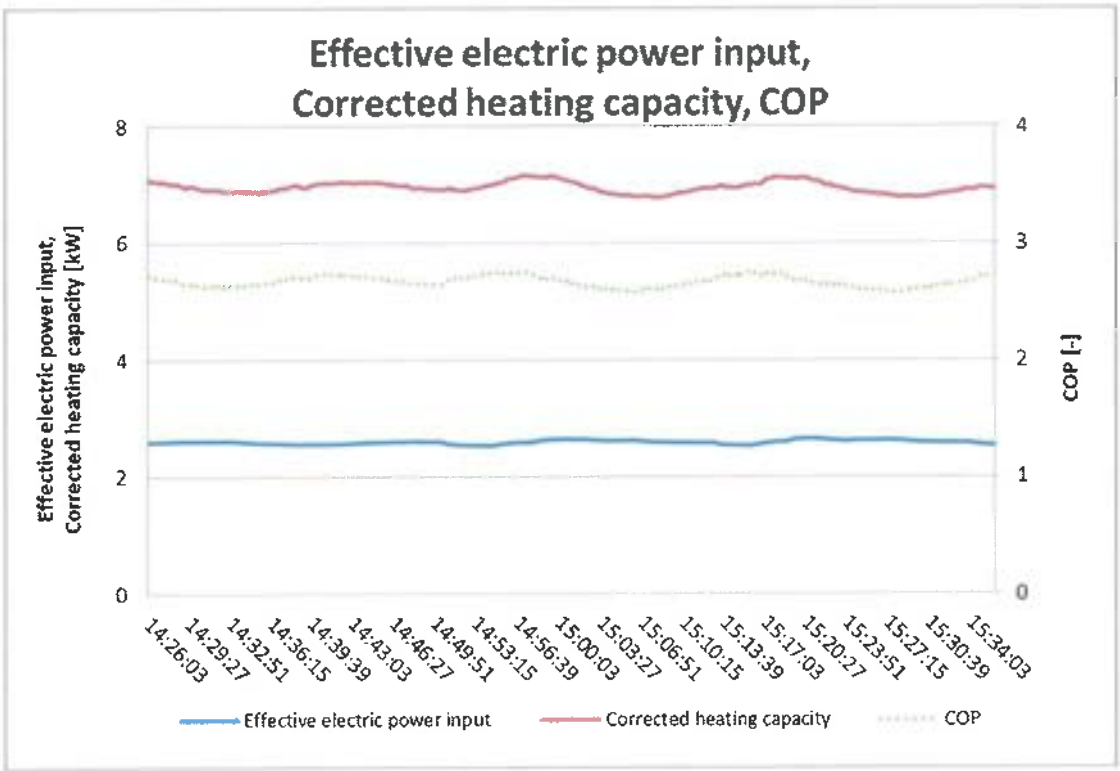
A12/W27.83 (36 Hz)





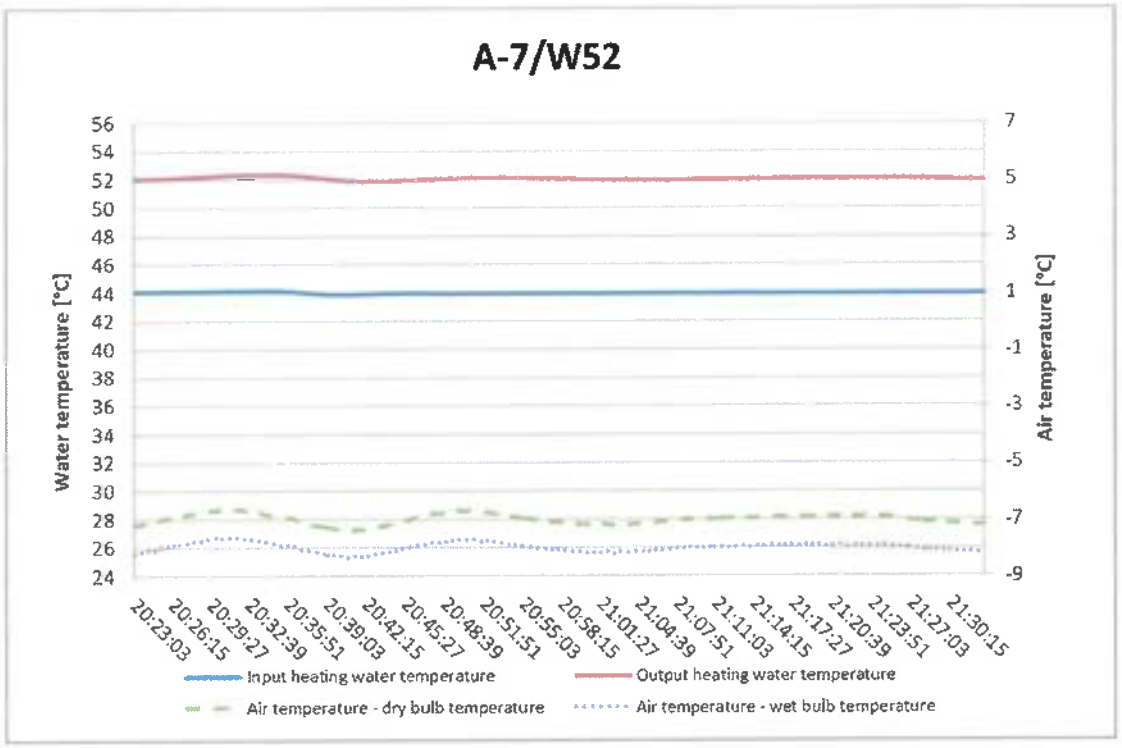
A-10/W35 (90 Hz)

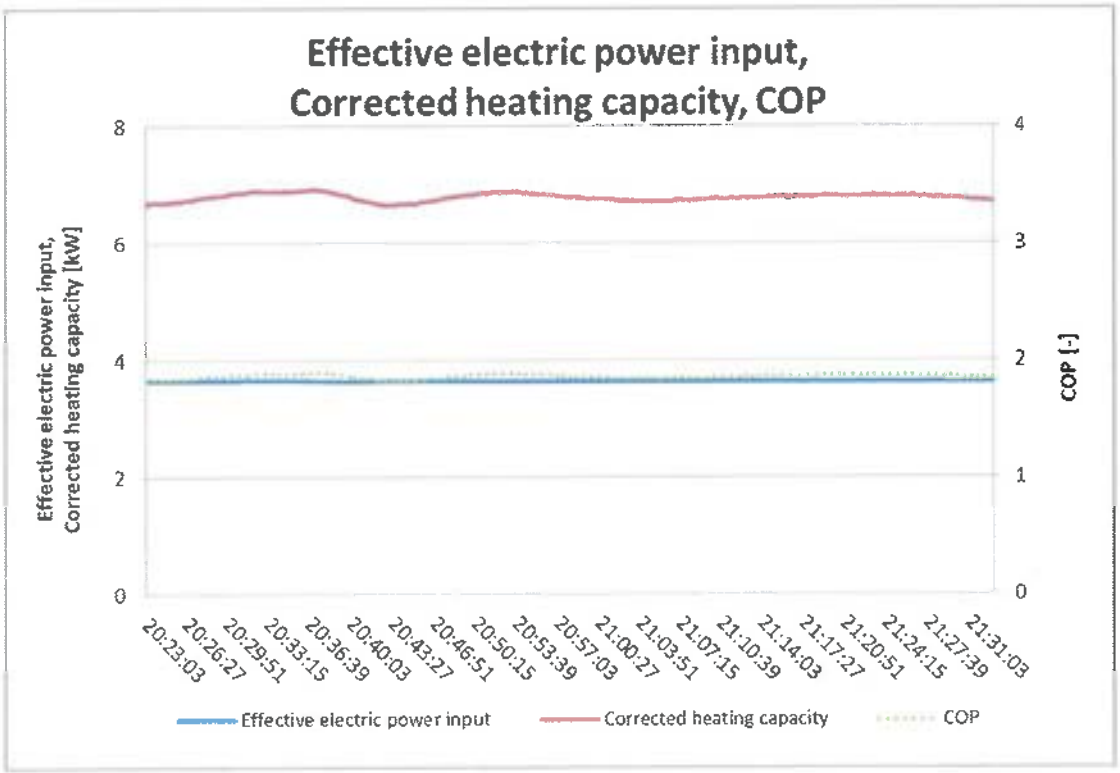

A-10/W35
Water temperature [°C]
Air temperature [°C]
38
36
34
32
30
28
26
24
22
20
18
-2
-4
-6
-8
-10
-12
14:26:03
14:29:15
14:32:27
14:35:39
14:38:51
14:42:03
14:45:15
14:48:27
14:51:39
14:54:51
14:58:03
15:01:15
15:04:27
15:07:39
15:10:51
15:14:03
15:17:15
15:20:27
15:23:39
15:26:51
15:30:03
15:33:15
Input heating water temperature
Output heating water temperature
Air temperature - dry bulb temperature
Air temperature - wet bulb temperature


Effective electric power input,
Corrected heating capacity, COP
Effective electric power input, Corrected heating capacity [kW]
COP [-]
8
6
4
2
0
4
3
2
1
0
14:26:03
14:29:27
14:32:51
14:36:15
14:39:39
14:43:03
14:46:27
14:49:51
14:53:15
14:56:39
15:00:03
15:03:27
15:06:51
15:10:15
15:13:39
15:17:03
15:20:27
15:23:51
15:27:15
15:30:39
15:34:03
Effective electric power input
Corrected heating capacity
COP

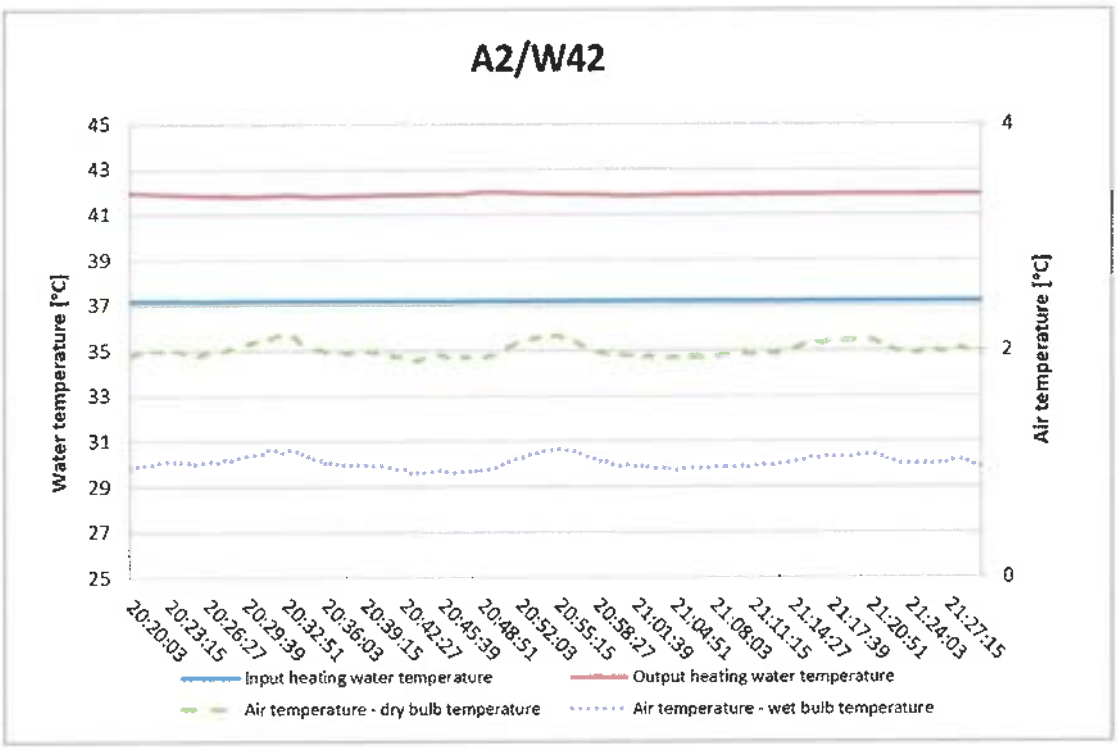
3. Seasonal performance tests and SCOP calculation – Medium temperature application

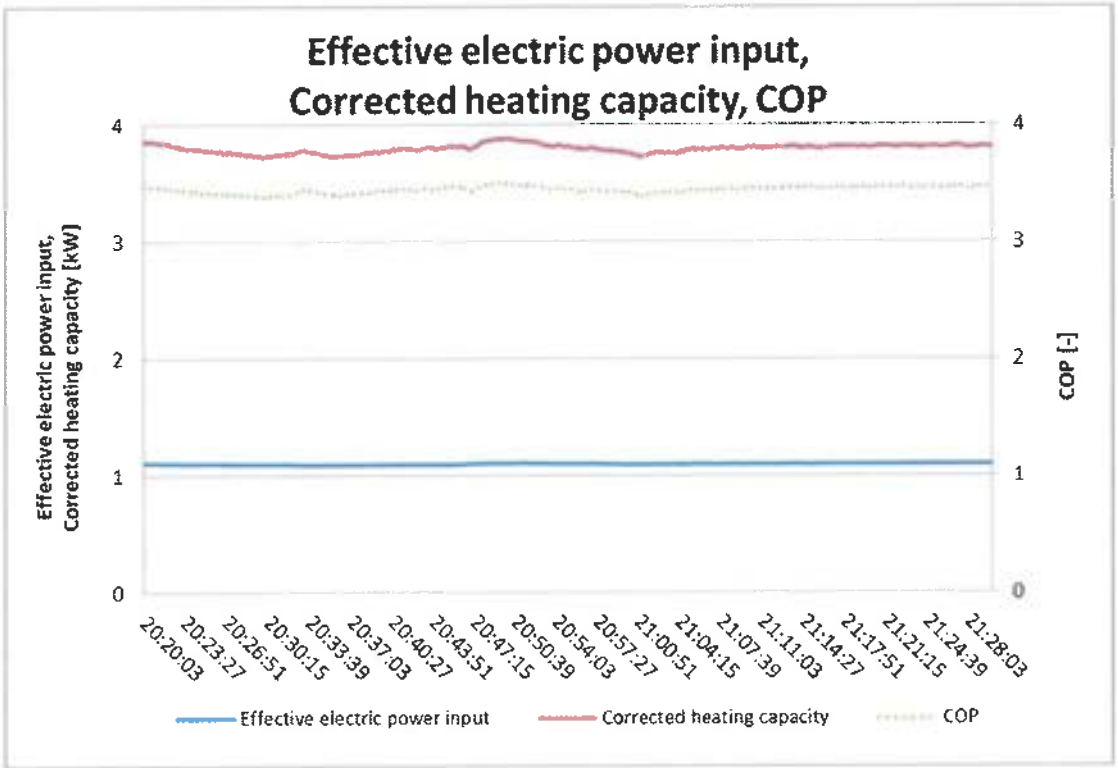
A-7/W52 (90 Hz)



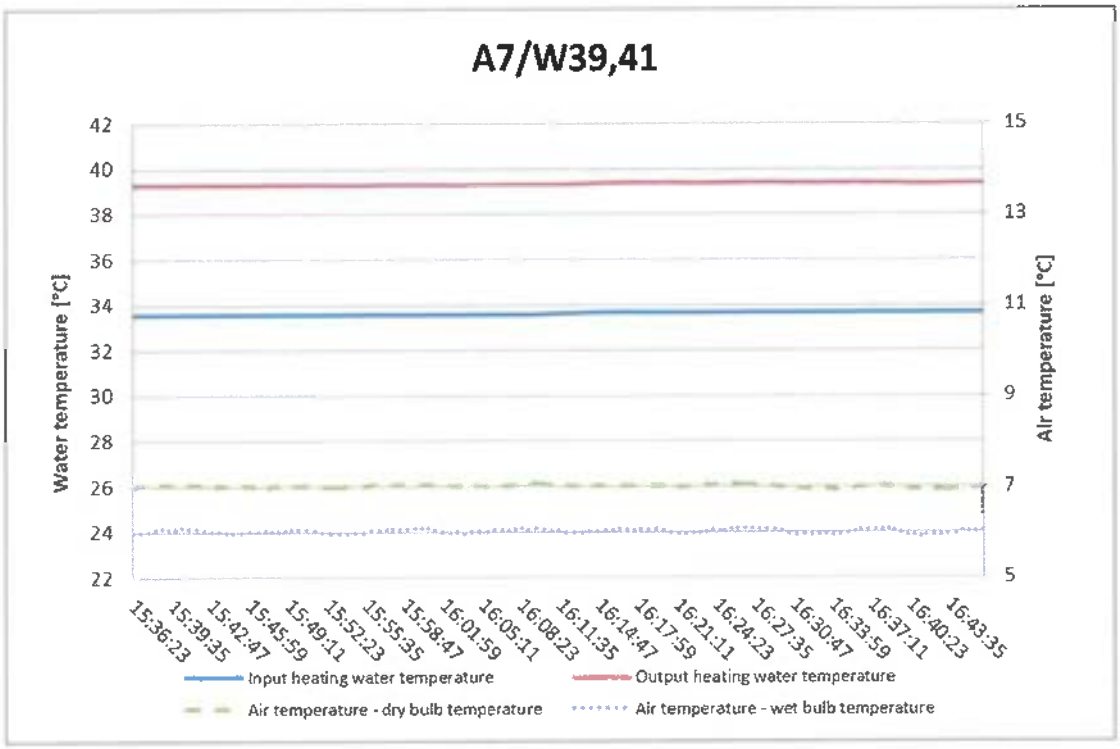


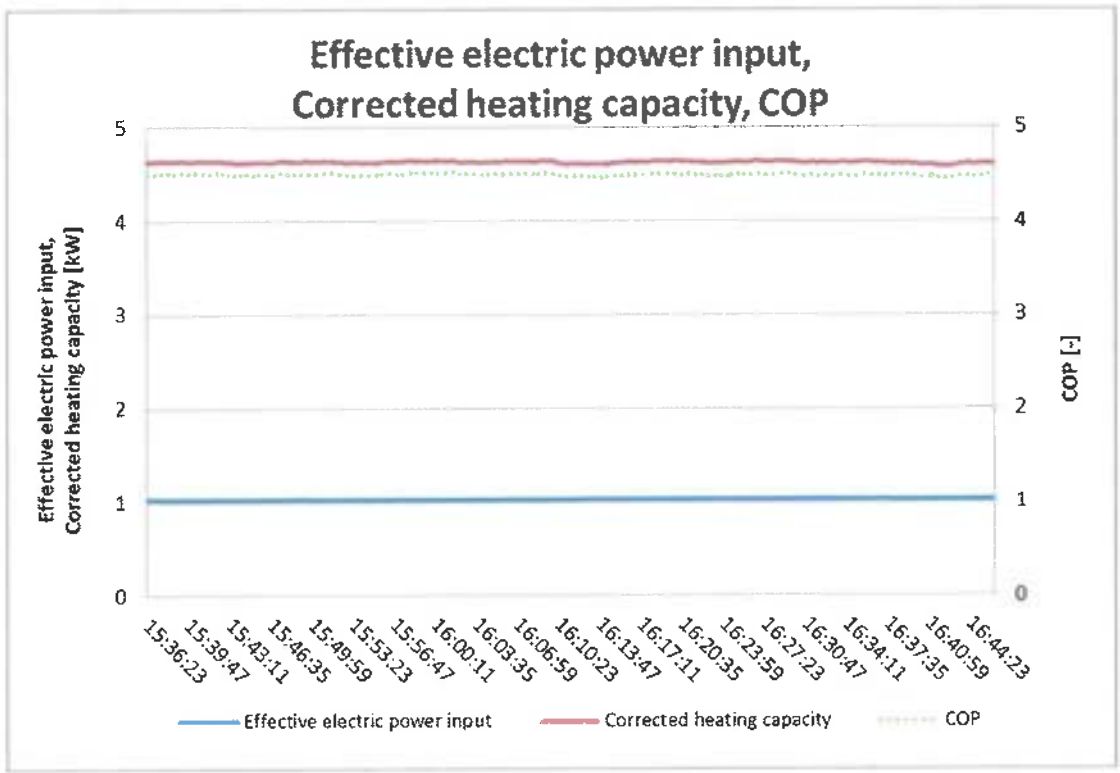
A2/W42 (36 Hz)


A2/W42
Water temperature [°C]
Air temperature [°C]
45
43
41
39
37
35
33
31
29
27
25
4
2
0
20:20:03
20:23:15
20:26:27
20:29:39
20:32:51
20:36:03
20:39:15
20:42:27
20:45:39
20:48:51
20:52:03
20:55:15
20:58:27
21:01:39
21:04:51
21:08:03
21:11:15
21:14:27
21:17:39
21:20:51
21:24:03
21:27:15
Input heating water temperature
Output heating water temperature
Air temperature - dry bulb temperature
Air temperature - wet bulb temperature

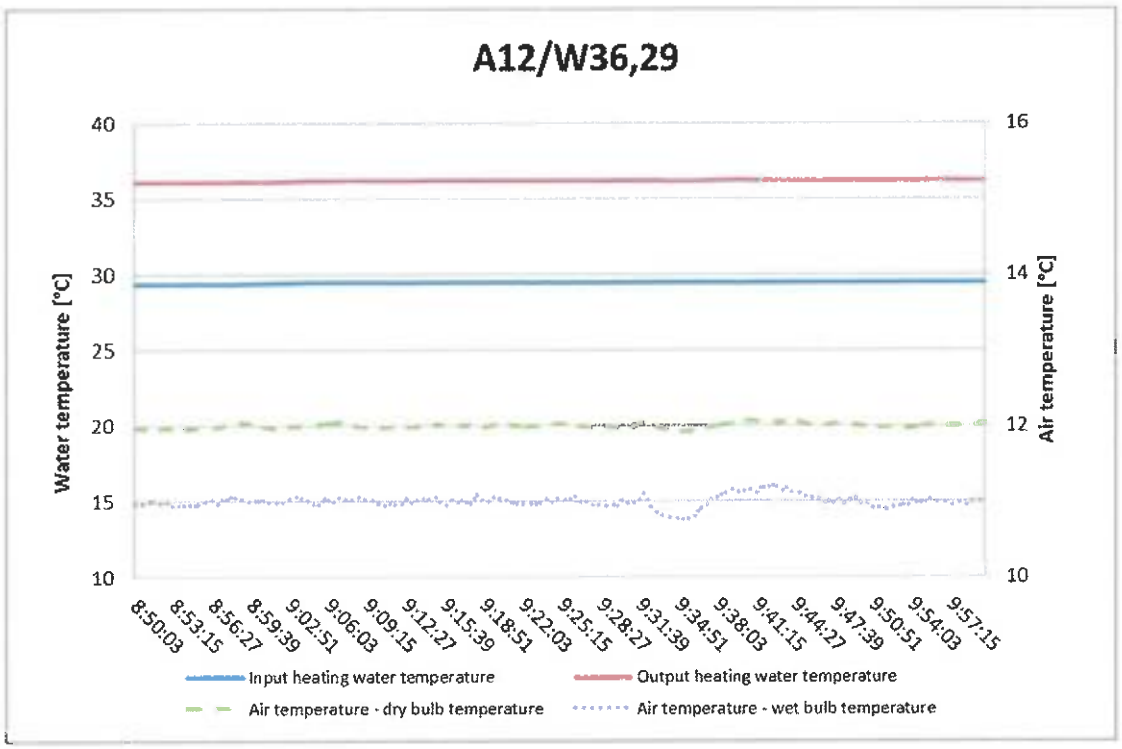

Effective electric power input,
Corrected heating capacity, COP
Effective electric power input, Corrected heating capacity [kW]
COP [-]
4
3
2
1
0
20:20:03
20:23:27
20:26:51
20:30:15
20:33:39
20:37:03
20:40:27
20:43:51
20:47:15
20:50:39
20:54:03
20:57:27
21:00:51
21:04:15
21:07:39
21:11:03
21:14:27
21:17:51
21:21:15
21:24:39
21:28:03
Effective electric power input
Corrected heating capacity
COP

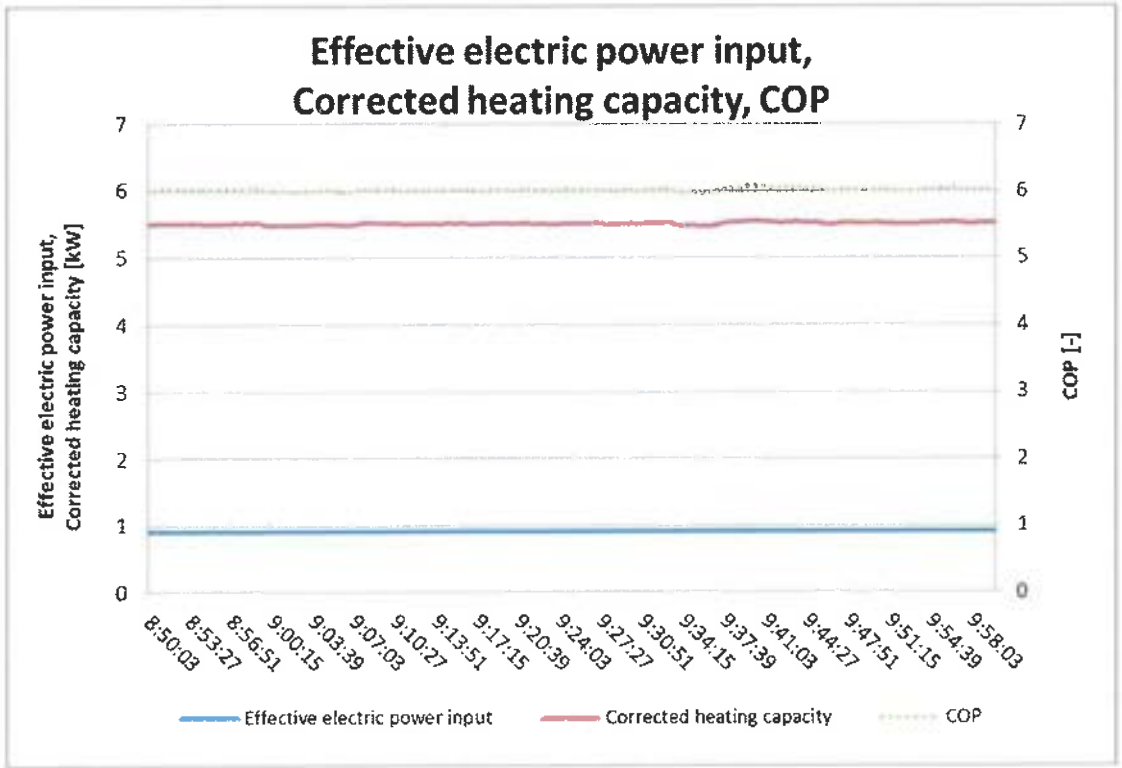
A7/W39.41 (36 Hz)



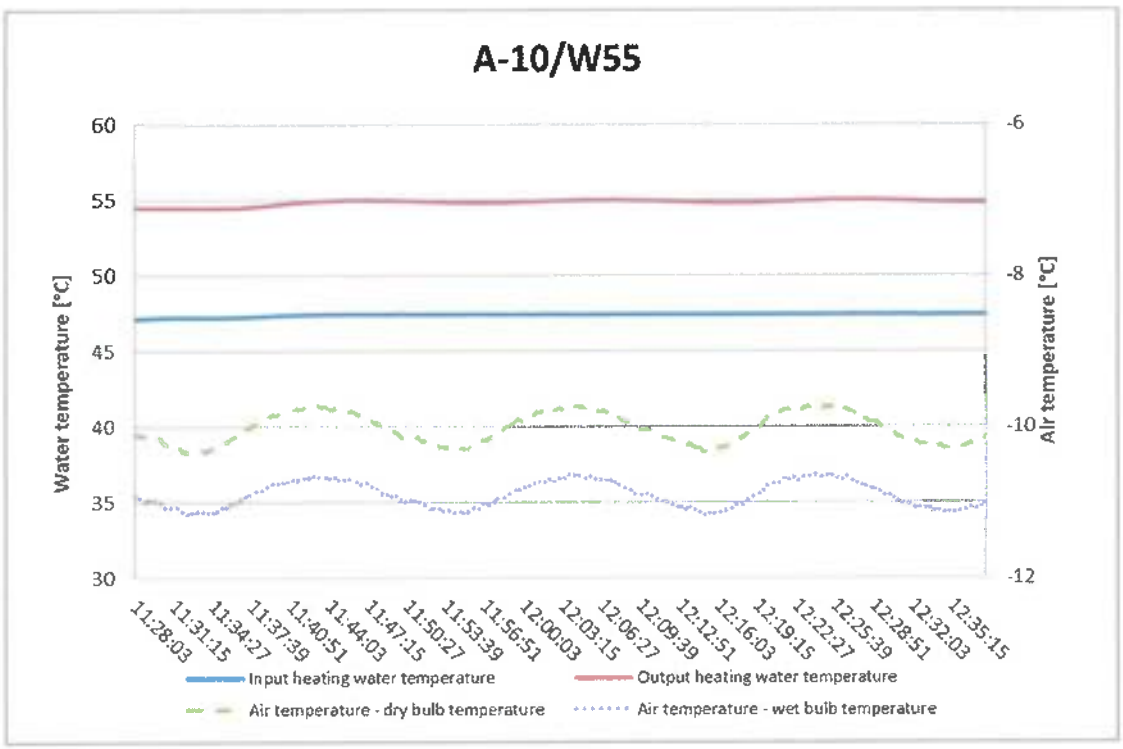


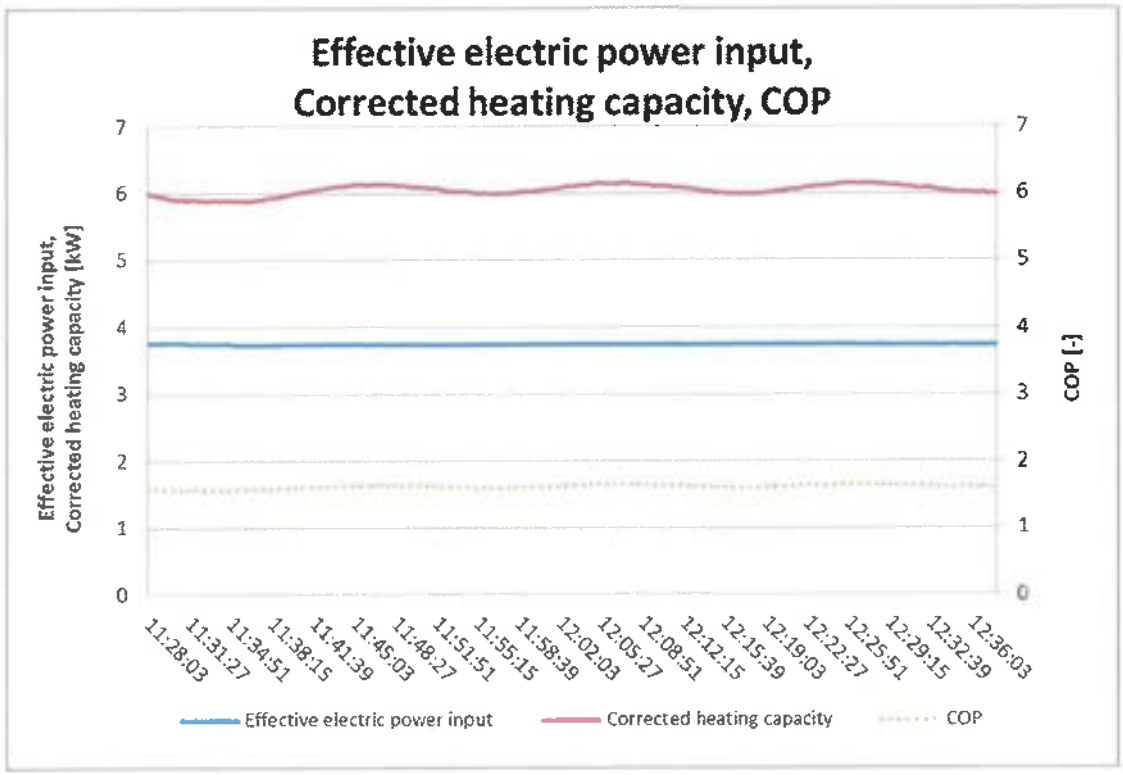
A12/W36.29 (36 Hz)





A-10/W55 (90 Hz)


A-10/W55
Water temperature [°C]
Air temperature [°C]
60
55
50
45
40
35
30
-6
-8
-10
-12
11:28:03
11:31:15
11:34:27
11:37:39
11:40:51
11:44:03
11:47:15
11:50:27
11:53:39
11:56:51
12:00:03
12:03:15
12:06:27
12:09:39
12:12:51
12:16:03
12:19:15
12:22:27
12:25:39
12:28:51
12:32:03
12:35:15
Input heating water temperature
Output heating water temperature
Air temperature - dry bulb temperature
Air temperature - wet bulb temperature


Effective electric power input,
Corrected heating capacity, COP
Effective electric power input, Corrected heating capacity [kW]
COP [-]
7
6
5
4
3
2
1
0
11:28:03
11:31:27
11:34:51
11:38:15
11:41:39
11:45:03
11:48:27
11:51:51
11:55:15
11:58:39
12:02:03
12:05:27
12:08:51
12:12:15
12:15:39
12:19:03
12:22:27
12:25:51
12:29:15
12:32:39
12:36:03
Effective electric power input
Corrected heating capacity
COP

VI. A list of referenced documents

- Order B-84290 of 2024-08-27 (Order reg. no. B-84290, received on 2024-08-21)
- Contract B-84290
- 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 14511-3:2024 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling a process chillers with electrically driven compressors - Part 3: Test methods
- ČSN EN 14825:2023 - Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance

Test Report compiled by: Ing. Tomáš Sedláček

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. 06

Test Report approved by: Ing. Mario Jankola
Heating Equipment and Construction Products Manager

– End of Test Report –

Strojírenský zkušební ústav, s.p.
Hudcova 424/56b, Medlánky, 621 00 Brno, Česká republika
Testing Laboratory 1045.1 accredited by the CAI pursuant to ČSN EN ISO/IEC 17025:2018

L 1045.1

TEST REPORT
39-17945/H

Product:	**Outdoor Air/Water Heat pump - monobloc**
Type designation:	**HPOM011Z0* + HPOM020W#***
Customer:	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Manufacturer:	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Report issue date:	2025-01-09
Distribution list:	1x copy to the SZÚ, s.p. 1x copy to the Customer

I. Description of product tested

The Heat pump **HPOM011Z0C + HPOM020W6C** supplied by the company **HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.** is structurally adapted to operate in air/water system. Device is designed as monobloc placed outdoor and indoor hydrobox hanging on inner wall. Outdoor and indoor units are connected by water pipes and electrical wiring. Refrigerant R32 is used with charge 1.8 kg. Power supply is a one-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 **HPOM011Z0C:**

- Serial number HPOM011Z285A1101
- Cubic shape with dimensions 1165 × 375 × 880 mm (W × D × H)
- Frame and casing made of varnished steel sheets
- L-shaped evaporator, 2.5 rows (3 rows on the back side with one row being cut short on the side), dimensions 1100 × 65(40) × 820 mm (W × D × H), spacing 2 mm
- Plate condenser SWEP B26Hx34/1P-SC-M 9.65+16+1"+1 1/4"
- Compressor Mitsubishi Electric SVB220FLGMC-L
- Refrigerant R32 (1.8 kg)
- Electric expansion valve Sanhua
- 4-way reversing valve Sanhua SHF-7H-34U-P Y70727
- Refrigerant accumulator Dongguan Qingxin'an Refrigeration Fittings Co., Ltd.
- Axial fan Nidec ø 55 cm
- Pressure sensors
- Temperature sensors
- Refrigerant pipes
- Air vent
- Safety valve

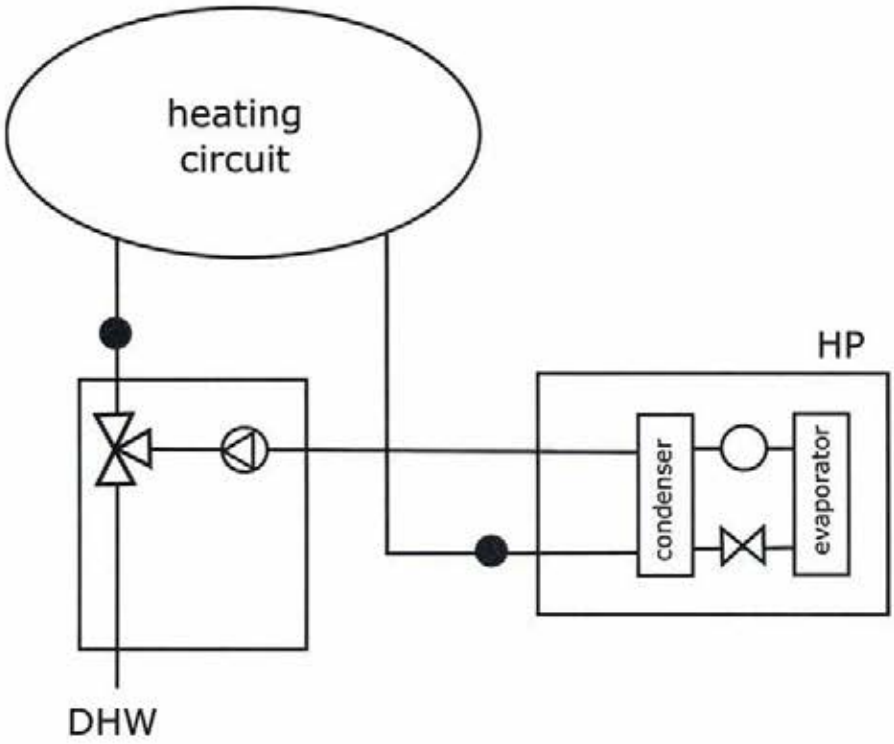
Main components of the indoor unit **HPOM020W6C:**

- Serial number HPOM020W376A2050
- Cubic shape with dimensions 500 × 730 × 265 mm (W × D × H)
- Frame and casing made of varnished steel
- Electric backup heater
- Circulation pump Wilo
- 3-way valve
- Display
- Regulation
- Air vent
- Battery
- Temperature sensors
- Software
- Flowswitch
- Pressure scale

HPOM011Z0* and **HPOM020W#*** is a general name. The last character in the product model code, "*", denotes different product versions, which do not affect the device's performance. Depending on the model, the indoor unit may be available as a hydrobox configuration equipped with a three-way valve, necessary piping, a condenser circulation pump (Wilo or Shimge), and an optional anti-freeze module. Alternatively, it may come in a compact configuration without hydraulic components, containing only the necessary electrical system along with the heat pump controller.

The "#" symbol indicates the heating capacity of the built-in electric heater (e.g., 6 = 6 kW, 0 = no heater).

Scheme:



Photodocumentation:

Heat pump **HPOM011Z0C** – outdoor unit
– Front view –

Heat pump **HPOM011Z0C** – outdoor unit
– Back view –

Not recognized

Heat pump **HPOM011Z0C** – outdoor unit
– Compressor label –

Heat pump **HPOM011Z0C** – outdoor unit
– Label –

Heat pump **HPOM011Z0C** – outdoor unit
– Without cover –

Heat pump **HPOM020W6C** – indoor unit
– Label –

Heat pump **HPOM020W6C** – indoor unit
– With cover –

Heat pump **HPOM020W6C** – indoor unit
– Without cover –

II. Sample tested

SZU reg. no.	Product name	Date of submission
1212.24.40447.001-002	**HPOM011Z0C + HPOM020W6C**	2024-09-06

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

III. Measuring and test equipment:

No.	Description	Inventory number
1.	Electrical energy meter	E2.1 E3.1
2.	Digital watt meter	1.2.2 ENERGIE ANALYZATOR_2 1.2.3 ENERGIE ANALYZATOR_3
3.	Flow meter Krohne Optiflux	8.1.2 TECH_K2_V_DN15 8.1.3 TECH_K2_V_DN25 8.1.4 TECH_K3_V_DN15_PRIM 8.1.5 TECH_K3_V_DN15_SEK 8.1.6 TECH_K3_V_DN50_SEK 8.1.7 TECH_K3_V_DN80_PRIM
4.	Barometer	2.4 MAR18_1_PB
5.	Differential pressure gauge	3.2 MAR18_2_dP 14.2.1 MAR18_3_dP_1 14.2.2 MAR18_3_dP_2
6.	Thermometers	3.4 MAR18_T 14.4 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

IV. Methods, results of tests and verifications

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. 9-19	+
2.	Acoustic measurements – Sound power level	Art. 8	**ČSN EN 12102-1:2023**	Page No. 8-19	+

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

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

Note:
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.

If a statement of conformity is provided, the decision rule pursuant to ILAC-G8:09/2019, Art. 4.2.1 – binary statement for the simple acceptance rule shall apply.

Test objective:	Heating and cooling equipment
Exact name of the test procedure:	**2.136*** - Measurement of noise characteristics
Test method:	**ČSN EN 12102-1:2023; ČSN ISO 9614-2:1997**
Sample tested:	Air/Water Heat pump **HPOM011Z0C + HPOM020W6C**
Measuring equipment used:	see Chapter III
Place of test:	Engineering Test Institute, Hudcova 424/56b, 621 00 Brno, CZ

Measurement uncertainty:

Measured quantity	Unit	Uncertainty of measurement	Evaluation
Liquid			
- temperature difference (dT)	[K]	± 0.15 K	fulfilled
- temperature inlet/outlet	[°C]	± 0.15 K	fulfilled
- volume flow	[m^3/s]	± 1 %	fulfilled
- static pressure difference	[kPa]	± 1 kPa (Δp ≤ 20 kPa) or ± 5 % (Δp > 20 kPa)	fulfilled
Air			
- dry bulb temperature	[°C]	± 0.2 K	fulfilled
- wet bulb temperature	[°C]	± 0.4 K	fulfilled
- volume flow	[m^3/s]	± 5 %	not applied
- static pressure difference	[Pa]	± 5 Pa (Δp ≤ 100 Pa) or ± 5 % (Δp > 100 Pa)	not applied
Refrigerant			
- pressure at compressor outlet	[kPa]	± 1 %	not applied
- temperature	[°C]	± 0.5 K	not applied
Concentration (in volume)			
- heat transfer medium	[%]	± 2	not applied
Electrical quantities			
- electric power	[W]	± 1 %	fulfilled
- voltage	[V]	± 0.5 %	fulfilled
- current	[A]	± 0.5 %	fulfilled
- electric energy	[kWh]	± 1 %	not applied
Compressor rotational speed	[min^{-1}]	± 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)

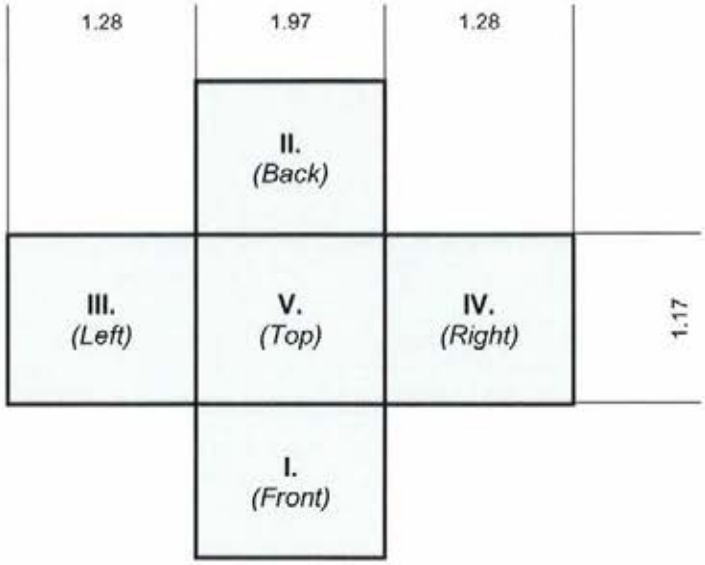
a) Measurement surface

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

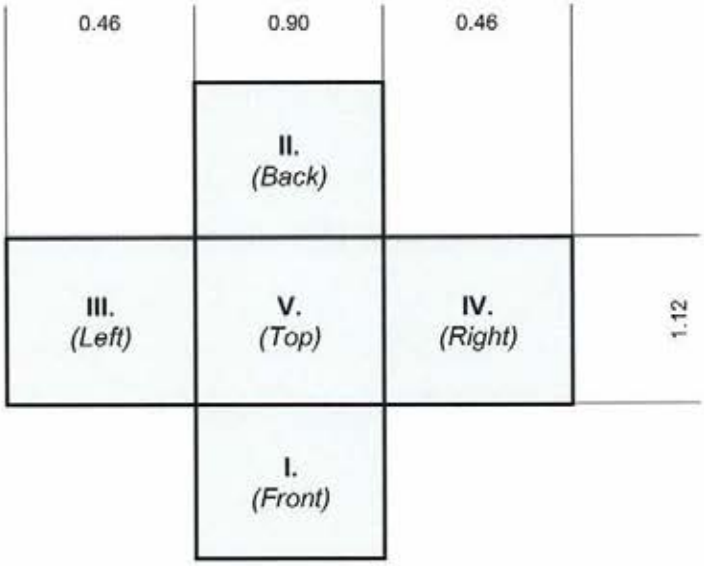
Test Sample: Air/Water Heat pump **HPOM011Z0C + HPOM020W6C**			**For outdoor unit**	**For indoor unit**
Distance from the test sample	*d*	[m]	0.40	0.20
Height of measurement surface	*h*	[m]	1.28	0.46
Width of measurement surface	*w*	[m]	1.97	0.90
Depth of measurement surface	*l*	[m]	1.17	1.12
Total measurement surface area	*S*	[m²]	10.34	2.50
Minimal measuring time per surface	t_M	[s]	90.00	90.00

Sketch of measurement surface (not to scale):

Air/Water Heat pump **HPOM011Z0C**
– Outdoor unit –



Air/Water Heat pump **HPOM020W6C**
– Indoor 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.

Climate-acoustic chamber *(corresponds to free field over a reflecting plane)*			**For outdoor unit**	**For indoor unit**
Width of testing room	l_1	[m]	6.95	3.75
Length of testing room	l_2	[m]	4.50	4.50
Height of testing room	l_3	[m]	3.60	4.25

c) Measured and calculated data – General overview:

Test sample			Air/Water Heat pump **HPOM011Z0C** Outdoor unit	Air/Water Heat pump **HPOM020W6C** Indoor unit
The measured values are in accordance with ČSN EN 12102-1:2023			YES	
The measured values are in accordance with 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			F1 (36 Hz)	
Fan speed settings			AUTO	
Date of testing (YYYY-MM-DD)			2024-09-13	2024-09-13
Reference air temperature	t_{amb}	[°C]	7.0	18.0
Relative humidity of air	RH	[%]	86.9	62.7
Ambient pressure	p_{amb}	[hPa]	992.3	979.5
Overall sound power level (linear)	L_W	[dB]	68.2 ± 1.5	39.2 ± 1.5
Overall A-weighted sound power level	L_{WA}	**[dB(A)]**	**55.1 ± 1.5**	**27.6 ± 1.5**
Accuracy class			**Engineering** (grade 2)	

*) *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 **HPOM020W6C** Indoor unit at A7/W55;	**Engineering** **(Grade 2)**

f_m	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	L_W	L_{WA}	U	Evaluation
[Hz]	L_d	F_{pl}	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{W(1)}-L_{W(2)} \leq 5$		[dB]	[dB(A)]	[dB]	
125	**23.2**	**5.5**	**YES**	**0.0**	**YES**	**YES**	**YES**	**38.9**	**23.0**	**± 3.0**	**c**
250	23.0	4.6	YES	0.0	YES	YES	YES	22.0	14.4	± 2.0	c
500	23.6	5.5	YES	0.1	YES	YES	YES	19.6	15.5	± 1.5	c
1000	23.5	16.4	YES	3.0	YES	NO	NO	14.1	13.5	± 1.5	nc
2000	21.9	3.1	YES	0.1	YES	YES	YES	15.4	16.6	± 1.5	c
4000	21.2	15.2	YES	2.9	YES	YES	YES	17.5	18.1	± 1.5	c
8000**)	20.5	1.9	YES	0.7	YES	YES	YES	22.6	22.5	± 2.5	c
Total								**39.2**	**27.6**	**± 1.5**	

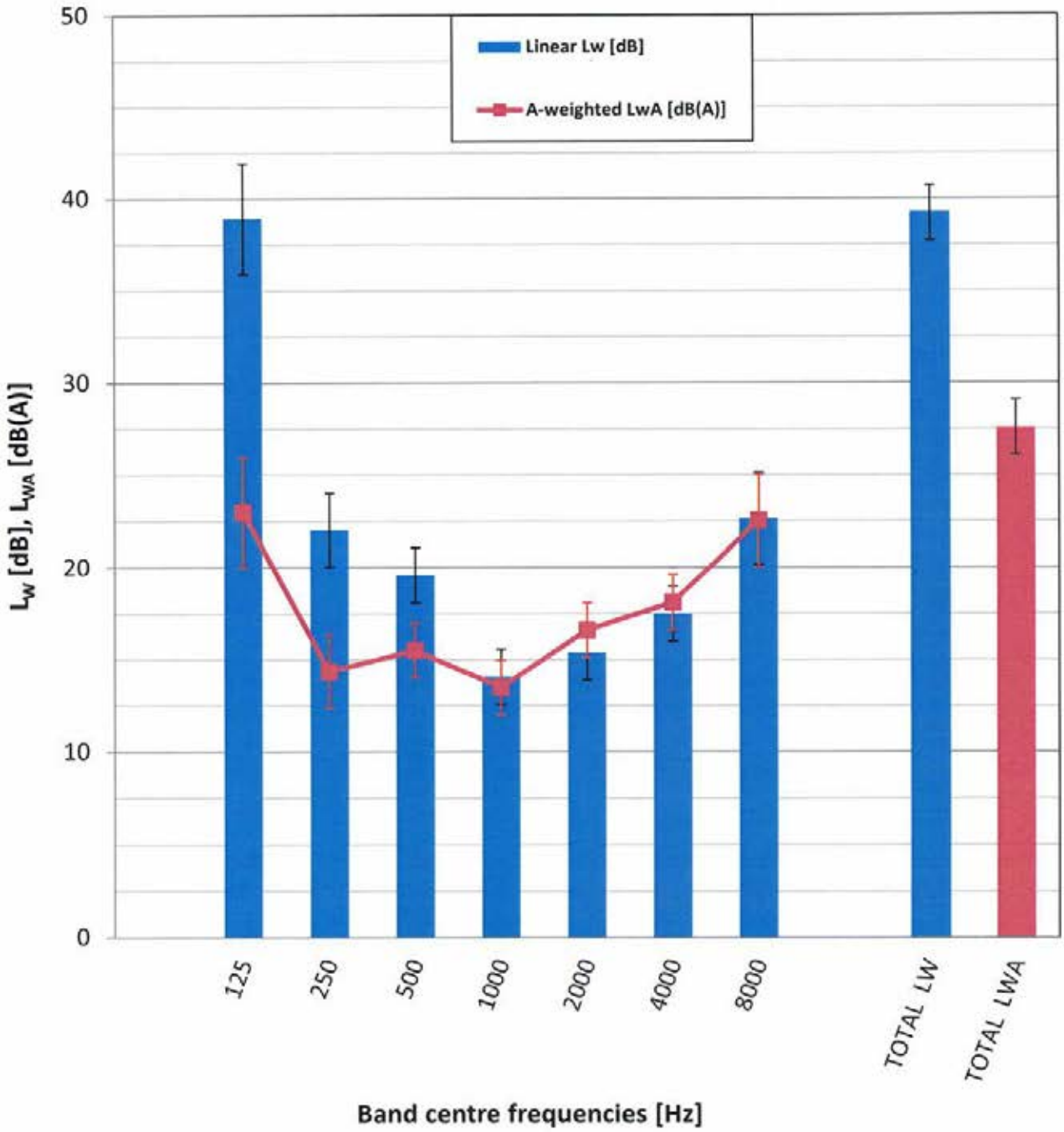
**) *Due to the sound intensity method limitations, the frequency of 6300 Hz was measured only.*

Legend:

passed	*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.*
not passed	*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.*
c	*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}.*
nc	*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 **HPOM020W6C** Indoor unit at A7/W55;	**Engineering** **(Grade 2)**



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

Air/Water Heat pump **HPOM020W6C** Indoor unit at A7/W55;	**Engineering** **(Grade 2)**

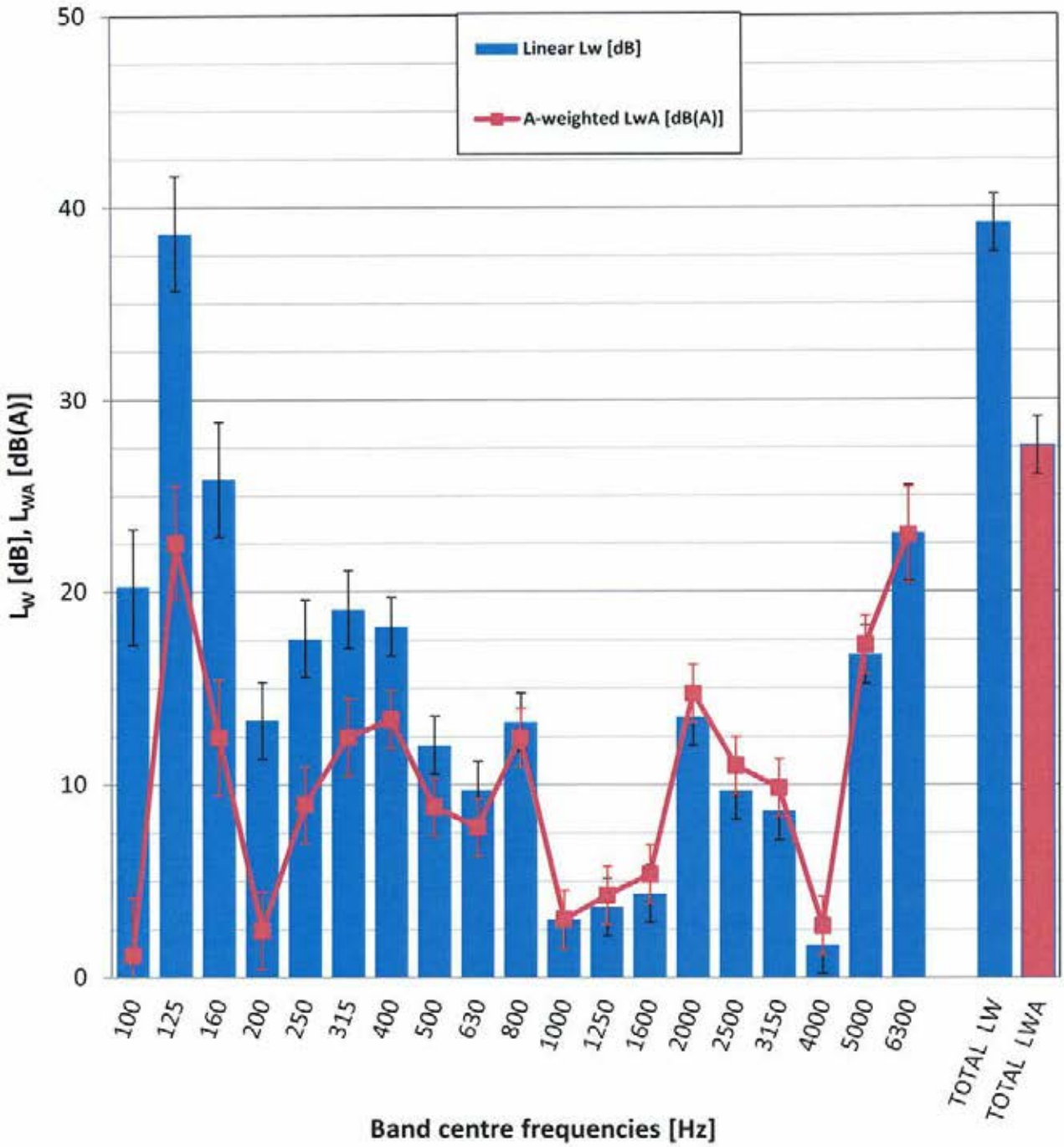
f_m	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	L_W	L_{WA}	U	Evaluation
[Hz]	L_d	F_{pl}	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{W(1)}-L_{W(2)} \leq 5$		[dB]	[dB(A)]	[dB]	
100	23.0	18.1	YES	2.8	YES	NO	NO	20.3	1.2	± 3.0	nc
125	**23.2**	**5.5**	**YES**	**0.0**	**YES**	**YES**	**YES**	**38.7**	**22.6**	**± 3.0**	**c**
160	23.2	8.3	YES	0.0	YES	YES	YES	25.9	12.5	± 3.0	c
200	23.1	11.4	YES	2.5	YES	NO	NO	13.3	2.4	± 2.0	nc
250	23.0	4.6	YES	0.0	YES	YES	YES	17.6	9.0	± 2.0	c
315	23.5	3.9	YES	0.0	YES	YES	YES	19.1	12.5	± 2.0	c
400	23.9	2.6	YES	0.9	YES	YES	YES	18.2	13.4	± 1.5	c
500	23.6	5.5	YES	0.1	YES	YES	YES	12.0	8.8	± 1.5	c
630	23.2	8.4	YES	1.1	YES	NO	NO	9.7	7.8	± 1.5	nc
800	22.7	15.4	YES	2.5	YES	YES	YES	13.3	12.5	± 1.5	c
1000	23.5	16.4	YES	3.0	YES	NO	NO	3.0	3.0	± 1.5	nc
1250	23.0	16.1	YES	3.0	YES	NO	NO	3.7	4.3	± 1.5	nc
1600	23.5	18.6	YES	2.9	YES	NO	NO	4.4	5.4	± 1.5	nc
2000	21.9	3.1	YES	0.1	YES	YES	YES	13.5	14.7	± 1.5	c
2500	22.1	8.5	YES	0.0	YES	YES	YES	9.7	11.0	± 1.5	c
3150	21.1	10.3	YES	0.3	YES	YES	YES	8.7	9.9	± 1.5	c
4000	21.2	15.2	YES	2.9	YES	YES	YES	1.7	2.7	± 1.5	c
5000	20.5	1.4	YES	0.0	YES	YES	YES	16.8	17.3	± 1.5	c
6300	**20.5**	**1.9**	**YES**	**0.7**	**YES**	**YES**	**YES**	**23.1**	**23.0**	**± 2.5**	**c**
Total								**39.2**	**27.6**	**± 1.5**	

Legend:

passed	*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.*
not passed	*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.*
c	*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}.*
nc	*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 **HPOM020W6C** Indoor unit at A7/W55;	**Engineering** **(Grade 2)**



2A) **Measurement results** – octave bands

Air/Water Heat pump **HPOM011Z0C** Outdoor unit at A7/W55;	**Engineering (Grade 2)**

f_m	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	L_W	L_{WA}	U	Evaluation
[Hz]	L_d	F_{pl}	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{W(1)}$-$L_{W(2)} \leq 5$		[dB]	[dB(A)]	[dB]	
125	16.1	6.0	YES	0.0	YES	YES	YES	57.0	42.2	± 3.0	c
250	16.6	2.2	YES	0.0	YES	YES	YES	57.6	48.7	± 2.0	passed
500	16.8	2.2	YES	0.0	YES	YES	YES	52.6	49.4	± 1.5	passed
1000	**16.8**	**2.8**	**YES**	**0.0**	**YES**	**YES**	**YES**	**50.7**	**50.8**	**± 1.5**	**passed**
2000	17.2	2.5	YES	0.0	YES	YES	YES	42.7	43.8	± 1.5	c
4000	17.3	4.3	YES	0.0	YES	YES	YES	33.4	34.5	± 1.5	c
8000**)	17.8	7.6	YES	0.0	YES	NO	NO	27.1	27.0	± 2.5	nc
Total								**61.5**	**55.1**	**± 1.5**	

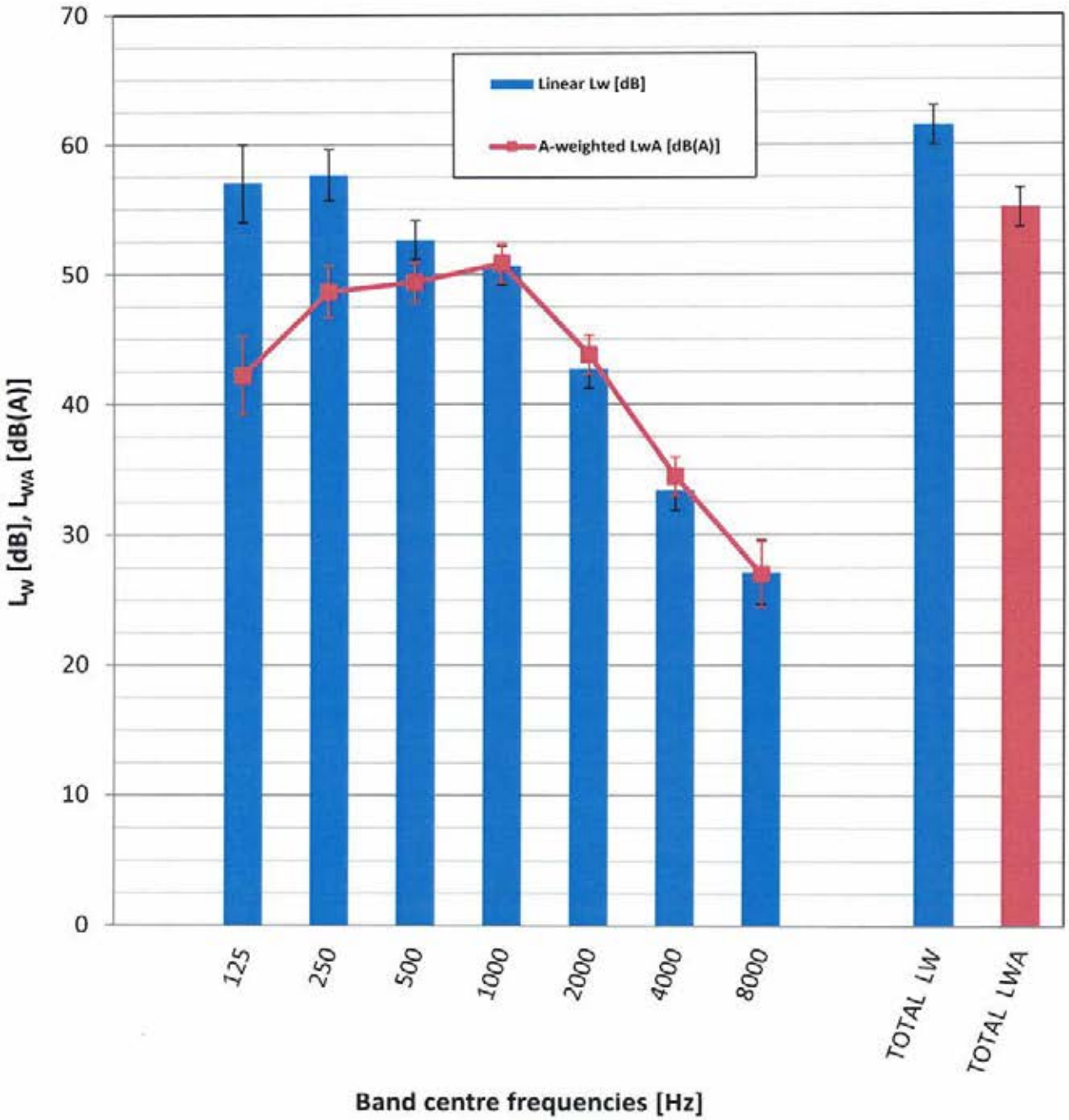
**) *Due to the sound intensity method limitations, the frequency of 6300 Hz was measured only.*

Legend:

passed	*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.*
not passed	*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.*
c	*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}.*
nc	*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 **HPOM011Z0C** Outdoor unit at A7/W55;	**Engineering (Grade 2)**



2B) **Measurement results** – one-third octave bands

Air/Water Heat pump **HPOM011Z0C** Outdoor unit at A7/W55;	**Engineering (Grade 2)**

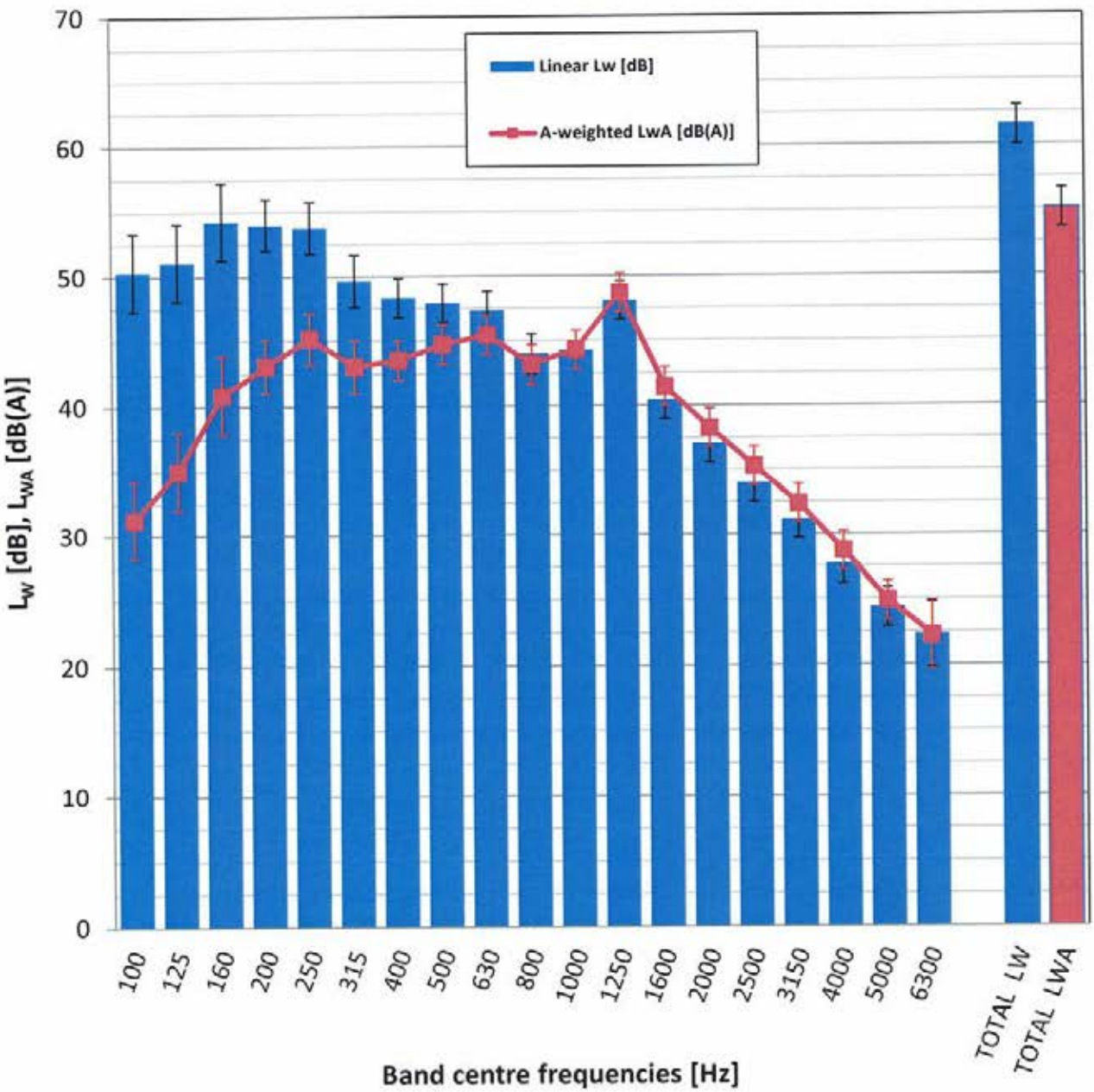
f_m	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	L_W	L_{WA}	U	Evaluation
[Hz]	L_d	F_{pl}	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{W(1)}-L_{W(2)} \leq 5$		[dB]	[dB(A)]	[dB]	
100	15.9	4.8	YES	0.0	YES	YES	YES	50.3	31.2	± 3.0	c
125	16.1	6.0	YES	0.0	YES	YES	YES	51.1	35.0	± 3.0	c
160	16.4	5.1	YES	0.0	YES	YES	YES	54.3	40.9	± 3.0	passed
200	16.4	2.9	YES	0.0	YES	YES	YES	54.0	43.1	± 2.0	passed
250	16.6	2.2	YES	0.0	YES	YES	YES	53.8	45.2	± 2.0	passed
315	16.8	2.3	YES	0.0	YES	YES	YES	49.7	43.1	± 2.0	passed
400	16.8	2.2	YES	0.0	YES	YES	YES	48.3	43.5	± 1.5	passed
500	16.8	2.2	YES	0.0	YES	YES	YES	47.9	44.7	± 1.5	passed
630	16.7	2.3	YES	0.0	YES	YES	YES	47.3	45.4	± 1.5	passed
800	16.9	3.4	YES	0.0	YES	YES	YES	44.0	43.2	± 1.5	passed
1000	16.8	2.8	YES	0.0	YES	YES	YES	44.3	44.3	± 1.5	passed
1250	**17.0**	**2.6**	**YES**	**0.0**	**YES**	**YES**	**YES**	**48.1**	**48.7**	**± 1.5**	**passed**
1600	16.6	2.8	YES	0.0	YES	YES	YES	40.5	41.5	± 1.5	passed
2000	17.2	2.5	YES	0.0	YES	YES	YES	37.1	38.3	± 1.5	c
2500	17.2	2.5	YES	0.0	YES	YES	YES	34.0	35.3	± 1.5	c
3150	17.1	2.9	YES	0.0	YES	YES	YES	31.2	32.4	± 1.5	c
4000	17.3	4.3	YES	0.0	YES	YES	YES	27.7	28.7	± 1.5	c
5000	17.3	4.7	YES	0.0	YES	NO	NO	24.4	24.9	± 1.5	nc
6300	17.8	7.6	YES	0.0	YES	NO	NO	22.3	22.2	± 2.5	nc
Total								**61.5**	**55.1**	**± 1.5**	

Legend:

passed	*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.*
not passed	*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.*
c	*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}.*
nc	*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 **HPOM011Z0C** Outdoor unit at A7/W55;	**Engineering** **(Grade 2)**



Tested by: Ing. Ondrej Bilkovič Date: 2025-01-09 Signed:

Reviewed and approved by: Ing. Antonín Kolbábek, Ph.D. Date: 2025-01-09 Signed:

V. A list of referenced documents

- Order of 2024-08-27 (Order reg. no. B-82897, received on 2024-08-21)
- Contract B-82897/39

- 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 scannig

- 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 14511-3:2024 - 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 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. 39-17945
- Record measurement file 39-17945-H.zip

Test Report compiled by: **Ing. Ondrej Bilkovič**
Test engineer

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. 06

Test Report approved by: **Ing. Antonín Kolbábek, Ph.D.**
Hydraulic and Pressure Equipment Manager

– End of Test Report –

L 1045.1

TEST REPORT
39-15772/1/H

Product:	Outdoor Air/Water Heat Pumps – monobloc
Type designation	**HPOM006Z0* + HPOM020W#***
Customer:	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Manufacturer:	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Employee responsible:	Ing. Antonín Kolbábek, Ph.D.
Report issue date:	2021-09-30
Distribution list:	1 copy to the Engineering Test Institute (SZU) 1 copy to the Customer

The tests were performed based on these documents:
- Order B-73632 of 2021-06-01 (Order reg. no. B-73632 delivered on 2021-07-02)
- Contract B-73632/39

I. Description of product tested

The Heat pump **HPOM006Z0* + HPOM020W#***, supplied by the company **HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.**, is structurally adapted to operate in air/water system. Device is designed as a monobloc unit, divided to the outdoor unit **HPOM006Z0A** – most often placed outside on a pedestal – and an indoor hydraulic unit **HPOM020W6A** – for example placed in a technical room.

Outdoor and indoor units are connected by water pipes and electrical wires. Refrigerant R32 is used with charge 0.90 kg. Power supply is a one-phase. Heat pump is able to work in heating and cooling mode.

Main components of the outdoor unit **HPOM006Z0A**:

- Serial number HPOM006Z12PA1010
- Cuboid shape with dimensions 700 × 370 × 1010 mm (W × D × H)
- Frame and casing made of varnished steel sheets
- Compressor Mitsubishi 2V3140FCAMC
- Refrigerant R32 (charge: 0.90 kg)
- L-shaped evaporator Fin&Tube, 2-row with dimensions: 920 × 40 × 980 mm (W × D × H), spacing 1.8 mm
- PHE condenser SWEP B26Hx20/1P-SC-M with dimensions: 150 × 75 × 400 mm (W × D × H), including insulation
- Electronic expansion valve Sanhua PQH10060
- 4-way reversing valve Sanhua SHF-7H-340-P, with coil
- Refrigerant accumulator Hong Shan GCCYQ
- Axial fan NIDEC ø 480 mm with motor SIC-65FV-F162-1
- 2× Pressure sensors
- Temperature sensors on water, refrigerant pipes, outside
- Air vent

Main components of the indoor hydro-box unit **HPOM020W6A**:

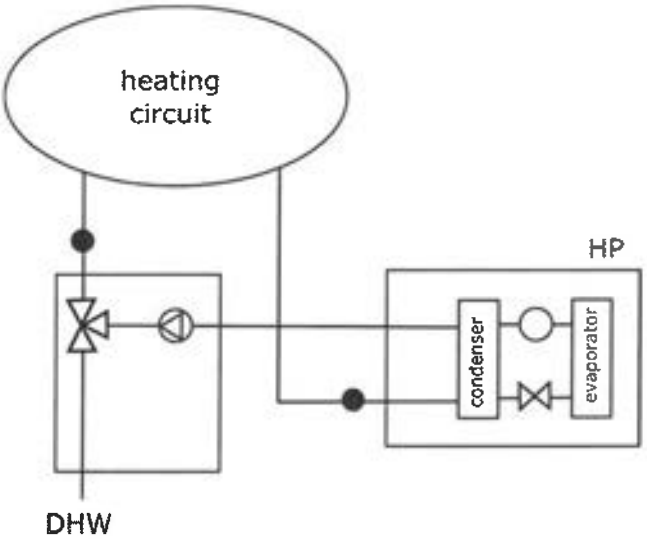
- Serial number AK0305, HPOM020W12PA3011
- Cuboid shape with dimensions 500 × 275 × 720 mm (W × D × H)
- Frame and casing made of varnished steel
- Circulation pump Wilo Para 25/9-87/iPWM1
- 3-way valve LK Armatur EMV 110-M 89i0
- Battery MW power MW 22-12 12 V 22 Ah
- Display
- Regulation Geco G922-PZHX
- Electric backup heater
- Air vent
- Temperature sensors

HPOM006Z0* + HPOM020W#* is a general name,

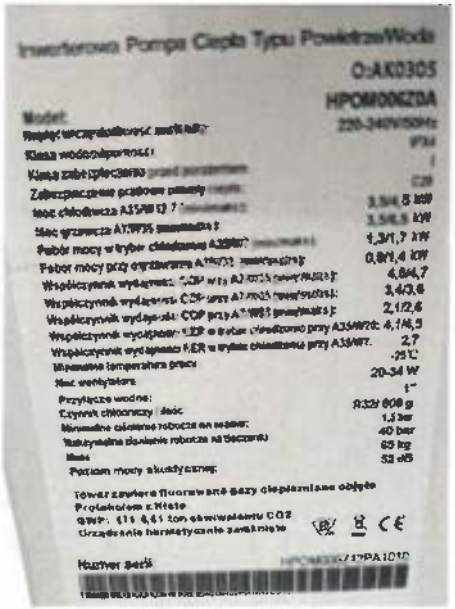
* represents different product versions that do not differ in fundamental elements and construction or anything that could change the performance of the unit.

represents electric heater (e.g. 6 = 6 kW).

Scheme:



Photos:

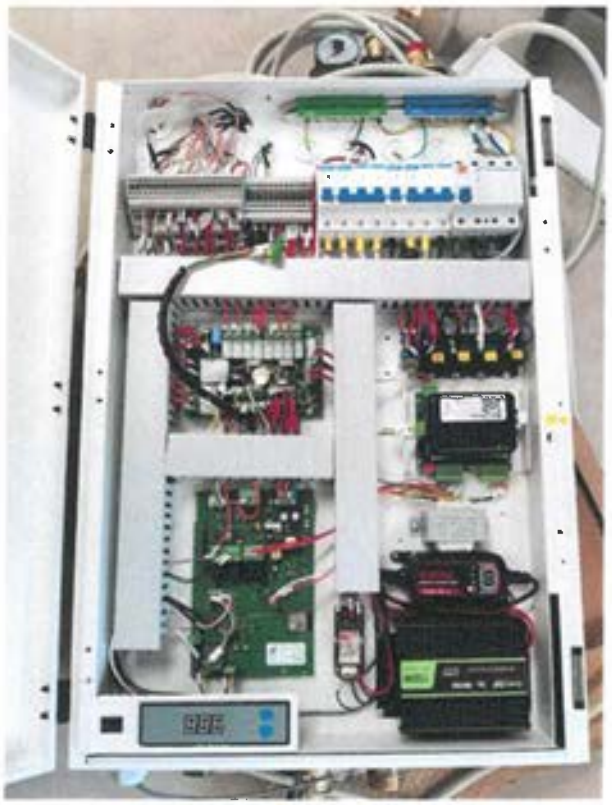


Air/Water Heat pump **HPOM006Z0A + HPOM020W6A**
– Outdoor unit label */on left/*, Indoor unit label */on right/* –

Outdoor unit **HPOM006Z0A**
– Front view with cover */on left/*, Back view with cover */on right/* –

Outdoor unit **HPOM006Z0A**
– Back view without cover –

Outdoor unit **HPOM006Z0A**
– Compressor label –



Indoor hydro-box unit **HPOM020W6A**
– Front view without cover: Electrical part */on left/*, Hydraulic part */on right/* –

II. Sample tested

Reg. No. SZÚ	Product	Date of submission
0213.21.35166.001-002	Air/Water Heat pump **HPOM006Z0A + HPOM020W6A**	2021-08-30

The visual inspection, tests and verification were carried out by Ing. Antonín Kolbábek, Ph.D. – Test engineer at the test station of SZU.

III. Measuring and testing equipment

The tests were carried out with the use of validly calibrated measuring and test equipment.

No.	Name:	Inventory number:	Calibration valid until:	Accuracy see Calibration Sheet number:
1.	Electrical energy meter	E3.1	05/2031	0004/21
2.	Digital watt meter	1.2.3 ENERGIE ANALYZATOR_3	05/2023	K21050741
3.	Flow meter Krohne Optiflux	8.1.2 TECH_K2_V_DN15	04/2025	6015-KL-P0352-21
4.	Barometer	2.4 MAR18_1_PB	06/2023	4952/2021
5.	Differential pressure gauge	3.2 MAR18_2_dP	06/2023	KL-P-0061-21
6.	Temperature-humidity meter HF532	14.1.1 K3_VLHKOST_1	04/2026	6036-KL-V0118-21
7.	Temperature-humidity meter HF532	14.1.3 K3_VLHKOST_2	04/2026	6036-KL-V0119-21
8.	Thermometers	3.4 MAR18_T	05/2024	KL-T-0058-21
9.	Thermometers	14.4 MAR18_T	05/2024	KL-T-0086-21
10.	Tape measure	ME 475	10/2022	8799/2017
11.	Thermo-hydro meter 608-H1	117043	02/2023	1088F-18
12.	Multi-analyser SINUS SoundBook MK2	000-000-000-875/1	12/2022	6035-OK-Z0084-20
13.	Calibrator G.R.A.S. 42AG	000-000-000-875/3	01/2023	8012-KL-10035-21
14.	Microphone pair G.R.A.S. 40 AK, wind deflector	000-000-000-875/2	11/2022	6035-OL-M0078-20 6035-OL-M0079-20

IV. Test results

Accredited test number: **M 006***

Test title:	Measurement of noise characteristics
Testing method:	ČSN EN 12102-1:2018; ČSN ISO 9614-2:1997; EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a
Sample tested:	Air/Water Heat pump **HPOM006Z0* + HPOM020W#***
Measuring equipment used:	see table above
Place of testing:	Engineering Test Institute, Hudcova 424/56b, 621 00 Brno, CZ
Test engineer responsible:	Ing. Antonín Kolbábek, Ph.D.

Uncertainties of measurement for indicated values:

Measured quantity	Unit	Uncertainty of measurement	Evaluation
Liquid			
- temperature difference (dT)	[K]	± 0.15 K	fulfilled
- temperature inlet/outlet	[°C]	± 0.15 K	fulfilled
- volume flow	[m^3/s]	± 1 %	fulfilled
- static pressure difference	[kPa]	± 1 kPa (Δp ≤ 20 kPa) or ± 5 % (Δp > 20 kPa)	fulfilled
Air			
- dry bulb temperature	[°C]	± 0.2 K	fulfilled
- wet bulb temperature	[°C]	± 0.4 K	fulfilled
- volume flow	[m^3/s]	± 5 %	not applied
- static pressure difference	[Pa]	± 5 Pa (Δp ≤ 100 Pa) or ± 5 % (Δp > 100 Pa)	not applied
Refrigerant			
- pressure at compressor outlet	[kPa]	± 1 %	not applied
- temperature	[°C]	± 0.5 K	not applied
Concentration (in volume)			
- heat transfer medium	[%]	± 2	not related
Electrical quantities			
- electric power	[W]	± 1 %	fulfilled
- voltage	[V]	± 0.5 %	fulfilled
- current	[A]	± 0.5 %	fulfilled
- electric energy	[kWh]	± 1 %	not applied
Compressor rotational speed	[min^{-1}]	± 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

The following expanded measurement uncertainties have been calculated as the coefficient of measurement uncertainty and the expanded coefficient k = 2, which corresponds to a coverage probability of 95% for normal distribution.

If a statement of conformity is given, the decisions rule pursuant to ILAC-G8: 09/2019 Art. 4.2.1 – binary statement for the simple acceptance rule shall be used.

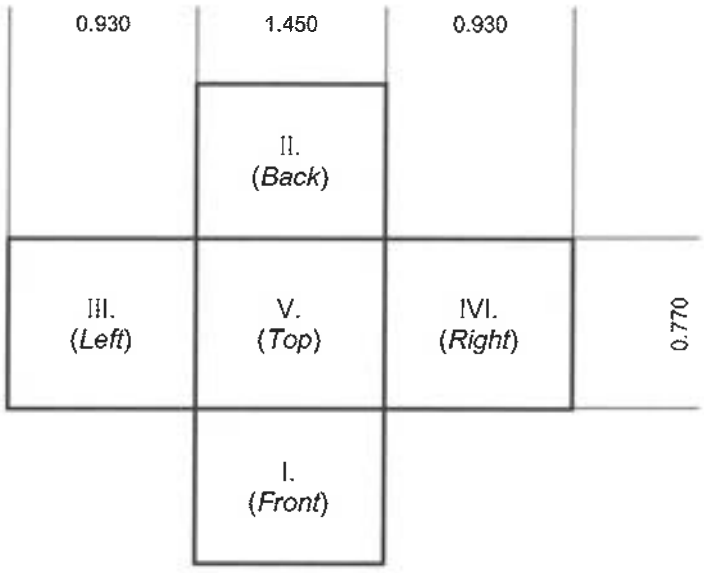
a) Measurement surface

Tested samples were surrounded by a cuboid-shape measuring surface set in distance d [m].

Test sample			**For outdoor unit**	**For indoor unit**
Distance from the test sample	*d*	*[m]*	0.200	0.200
Height of measurement surface	*h*	*[m]*	0.930	0.670
Width of measurement surface	*w*	*[m]*	1.450	0.900
Depth of measurement surface	*l*	*[m]*	0.770	1.320
Total measurement surface area	*S*	*[m^2]*	5.2362	5.3308
Minimal measuring time	t_M	*[s]*	5× 40	5× 40

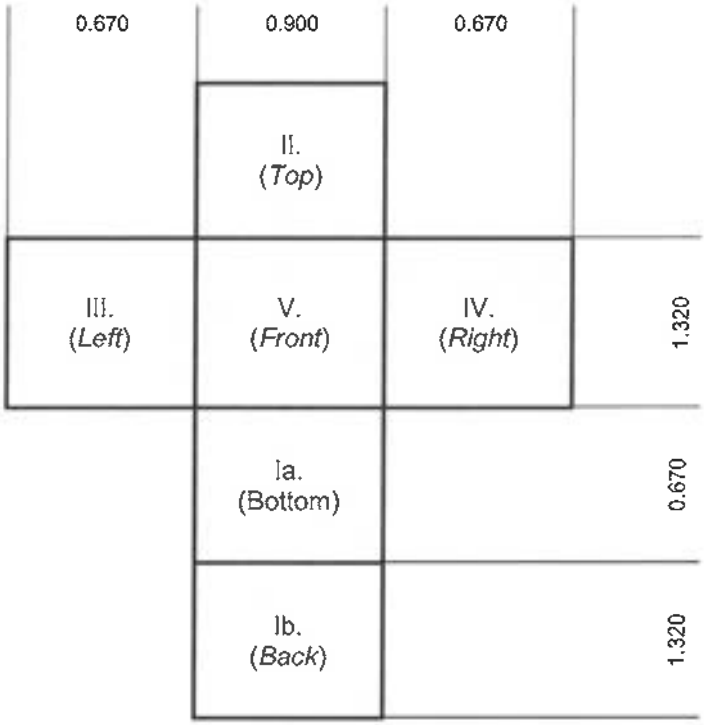
Sketch of measurement surface (not in scale):

Air/Water Heat pump **HPOM006Z0* + HPOM020W#***
– Outdoor unit –



Segment I. *(Front)* was reduced into 1.3390 m^2 because of water pipe connections.

Air/Water Heat pump **HPOM006Z0* + HPOM020W#***
– Indoor unit –



Segment Ia. *(Bottom)* was reduced into 0.5830 m^2 because of water pipe connections.

b) Acoustic environment

The testing samples were placed inside climatic-chambers (with dimensions see below); on walls and ceiling of the chambers were mounted sound absorption panels. Both samples were placed in the middle of the chamber, at a sufficient distance from the surrounding walls, and were rotated by about 5÷10 °.

Climatic-acoustic chamber *(corresponds to free-field over a reflecting plane)*			**For outdoor unit**	**For indoor unit**
Width of testing chamber	l_1	*[m]*	4.500	3.750
Length of testing chamber	l_2	*[m]*	7.100	4.500
Height of testing chamber	l_3	*[m]*	3.600	4.250

c) Measured and calculated data – General overview:

The measured values are in accordance with ČSN EN 12102-1:2018			YES	
The measured values are in accordance with ČSN ISO 9614-2:1997			YES	
Operation mode			Heating	
Specification of the assessment condition			A7/W55*)	
Type of HP capacity regulation			Inverter	
Control settings of heat pump / compressor			Stage 1	
Fan speed settings			AUTO	
Water pump settings – secondary circuit			Minimum	
Test sample			Air/Water Heat pump **HPOM006Z0* + HPOM020W#***	
			– Outdoor unit –	– Indoor unit –
Date of testing			2021-09-16	2021-09-16
Reference air temperature	t_{amb}	*[°C]*	6.9	20.3
Relative humidity of air	*RH*	*[%]*	87.2	44.9
Ambient pressure	p_{amb}	*[hPa]*	981.30	981.42
Overall sound power level (linear)	L_W	*[dB]*	56.3 ± 1.5	49.7 ± 1.5
Overall A-weighted sound power level	L_{WA}	***[dB]***	**50.6 ± 1.5**	**44.4 ± 1.5**
Accuracy class			**Engineering** (grade 2)	**Engineering** (grade 2)

*) *Comment to abbreviated marking: i.e. A7/W55*
A (air), 7 (input air, dry-bulb temperature in °C) / W (water), 55 (outlet heating water temperature in °C)

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

Heat pump **HPOM006Z0* + HPOM020W#*** – Oudoor unit at A7/W55 */ Compressor: stage 1, Fan: AUTO, Water pump: Minimum /*	**Engineering (grade 2)**

f_m	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	L_W	L_{WA}	U	Evaluation
[Hz]	L_d	F_{pl}	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{W(1)}-L_{W(2)} \leq s$		[dB]	[dB(A)]	[dB]	
125	22.7	6.4	YES	0.0	YES	YES	YES	51.8	36.9	± 3.0	c
250	21.9	1.7	YES	0.0	YES	YES	YES	51.3	42.4	± 2.0	passed
500	**22.4**	**1.7**	**YES**	**0.0**	**YES**	**YES**	**YES**	**49.7**	**46.1**	**± 1.5**	**passed**
1000	22.0	2.4	YES	0.0	YES	YES	YES	45.8	45.8	± 1.5	passed
2000	21.7	1.8	YES	0.0	YES	YES	YES	39.1	40.2	± 1.5	passed
4000	20.6	2.4	YES	0.0	YES	YES	YES	35.0	36.0	± 1.5	c
8000**)	20.7	3.7	YES	0.0	YES	YES	YES	33.1	33.0	± 2.5	c
Total								**56.3**	**50.7**	**± 1.5**	

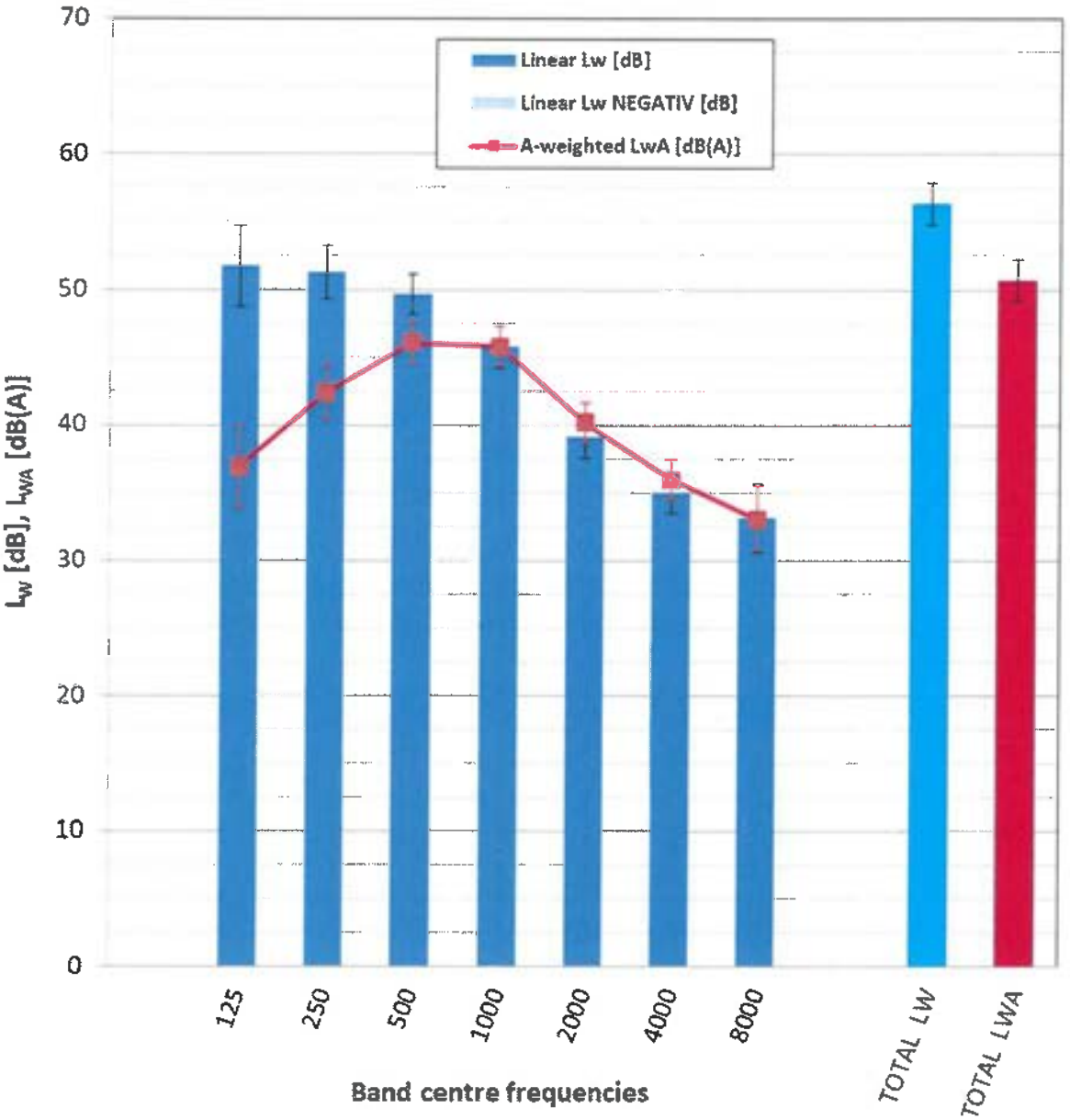
**) *Due to the sound intensity method, the frequency of 6300 Hz was measured only.*

Legend:

passed	*Third frequency bands with this description are significant for calculation of A-weighted total sound power level L_{WA}. Required accuracy class is fulfilled in this band.*
not passed	*Third frequency bands with this description are significant for calculation of A-weighted total sound power level L_{WA}. Required accuracy class isn't fulfilled in this band.*
c	*Third frequency bands with this description are not significant for calculating of A-weighted total sound power level L_{WA}. These bands are evaluated in calculating of L_{WA}.*
nc	*Third frequency bands with this description are not significant for calculating of A-weighted total sound power level L_{WA}. This bands aren't evaluated in calculating of L_{WA}.*

Spectrum of Sound power level L_W – octave bands

Heat pump **HPOM006Z0* + HPOM020W#*** – Oudoor unit at A7/W55 */ Compressor: stage 1, Fan: AUTO, Water pump: Minimum /*	**Engineering (grade 2)**



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

Heat pump **HPOM006Z0* + HPOM020W#*** – Oudoor unit at A7/W55 */ Compressor: stage 1, Fan: AUTO, Water pump: Minimum /*	**Engineering (grade 2)**

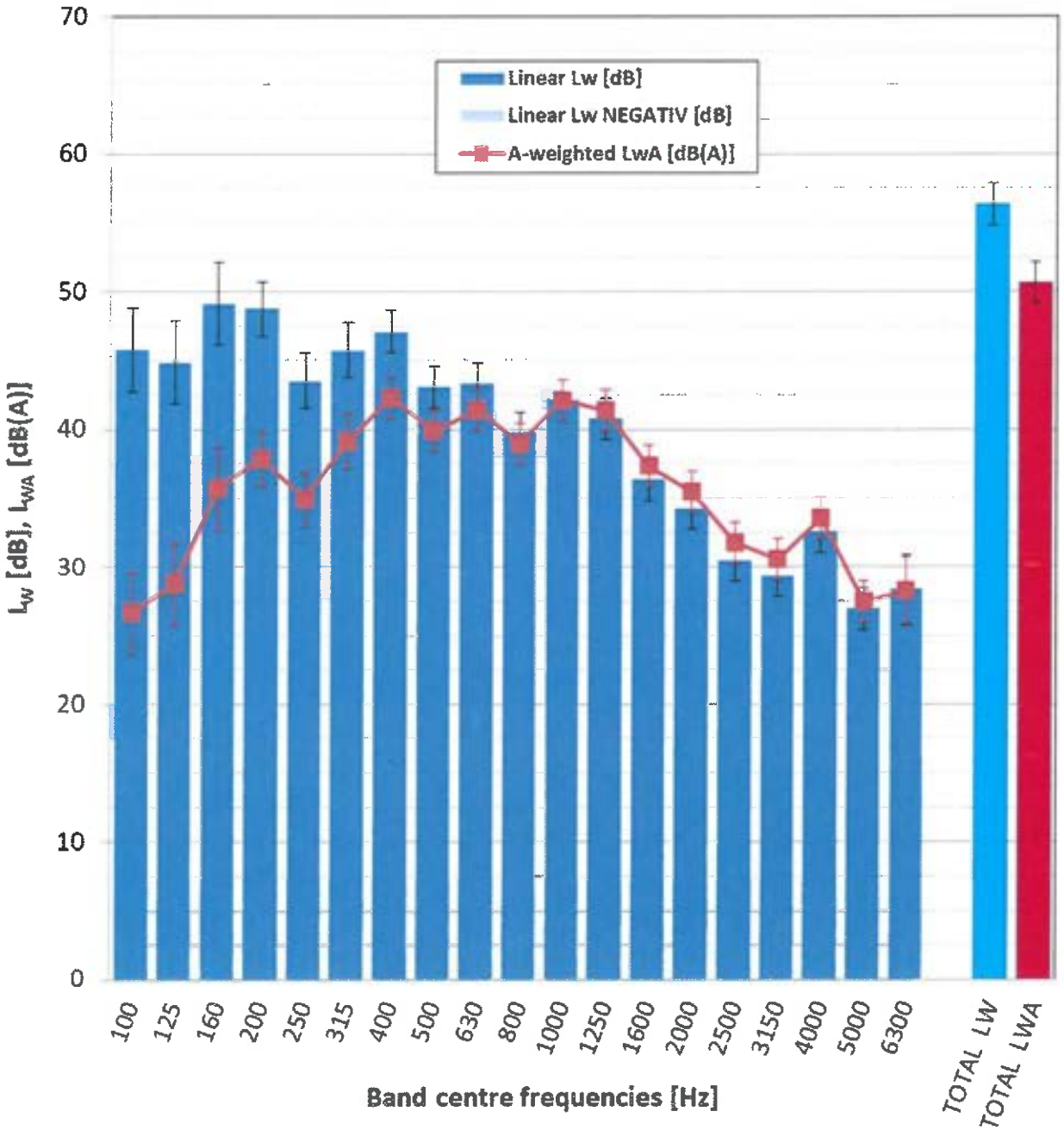
f_m	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	L_W	L_{WA}	U	Evaluation
[Hz]	L_d	F_{pl}	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{W(1)}-L_{W(2)} \leq s$		[dB]	[dB(A)]	[dB]	
100	23.2	3.5	YES	0.0	YES	YES	YES	45.8	26.7	± 3.0	c
125	22.7	6.4	YES	0.0	YES	YES	YES	44.9	28.8	± 3.0	c
160	21.9	2.4	YES	0.0	YES	YES	YES	49.1	35.7	± 3.0	passed
200	21.8	2.2	YES	0.0	YES	YES	YES	48.8	37.9	± 2.0	passed
250	21.9	1.7	YES	0.0	YES	YES	YES	43.5	34.9	± 2.0	passed
315	21.8	1.7	YES	0.0	YES	YES	YES	45.7	39.1	± 2.0	passed
400	**22.2**	**1.6**	**YES**	**0.0**	**YES**	**YES**	**YES**	**47.1**	**42.3**	**± 1.5**	**passed**
500	22.4	1.7	YES	0.0	YES	YES	YES	43.1	39.9	± 1.5	passed
630	22.3	1.9	YES	0.0	YES	YES	YES	43.3	41.4	± 1.5	passed
800	22.4	2.4	YES	0.0	YES	YES	YES	39.8	39.0	± 1.5	passed
1000	22.0	2.4	YES	0.0	YES	YES	YES	42.1	42.1	± 1.5	passed
1250	22.2	2.2	YES	0.0	YES	YES	YES	40.8	41.4	± 1.5	passed
1600	22.5	2.0	YES	0.0	YES	YES	YES	36.4	37.4	± 1.5	passed
2000	21.7	1.8	YES	0.0	YES	YES	YES	34.3	35.5	± 1.5	passed
2500	20.5	1.9	YES	0.0	YES	YES	YES	30.5	31.8	± 1.5	c
3150	20.4	2.4	YES	0.0	YES	YES	YES	29.4	30.6	± 1.5	c
4000	20.6	2.4	YES	0.0	YES	YES	YES	32.6	33.6	± 1.5	passed
5000	20.4	3.2	YES	0.0	YES	YES	YES	27.0	27.5	± 1.5	c
6300	20.7	3.7	YES	0.0	YES	YES	YES	28.4	28.3	± 2.5	c
Total								**56.3**	**50.6**	**± 1.5**	

Legend:

passed	*Third frequency bands with this description are significant for calculation of A-weighted total sound power level L_{WA}. Required accuracy class is fulfilled in this band.*
not passed	*Third frequency bands with this description are significant for calculation of A-weighted total sound power level L_{WA}. Required accuracy class isn't fulfilled in this band.*
c	*Third frequency bands with this description are not significant for calculating of A-weighted total sound power level L_{WA}. These bands are evaluated in calculating of L_{WA}.*
nc	*Third frequency bands with this description are not significant for calculating of A-weighted total sound power level L_{WA}. This bands aren't evaluated in calculating of L_{WA}.*

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

Heat pump **HPOM006Z0* + HPOM020W#*** – Oudoor unit at A7/W55 */ Compressor: stage 1, Fan: AUTO, Water pump: Minimum /*	**Engineering (grade 2)**



2A) **Measurement results** – octave bands

Heat pump **HPOM006Z0* + HPOM020W#*** – Indoor unit at A7/W55 */ Compressor: stage 1, Fan: AUTO, Water pump: Minimum /*	**Engineering (grade 2)**

f_m	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	L_W	L_{WA}	U	Evaluation
[Hz]	L_d	F_{pl}	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{W(1)}-L_{W(2)} \leq s$		[dB]	[dB(A)]	[dB]	
125	20.4	1.6	YES	0.0	YES	YES	YES	40.9	24.8	± 3.0	c
250	21.1	2.1	YES	0.0	YES	YES	YES	43.9	37.1	± 2.0	passed
500	**21.7**	**4.0**	**YES**	**0.7**	**YES**	**YES**	**YES**	**47.2**	**42.5**	**± 1.5**	**passed**
1000	22.3	2.2	YES	0.0	YES	YES	YES	34.3	34.4	± 1.5	passed
2000	20.7	3.4	YES	0.0	YES	YES	YES	28.5	29.6	± 1.5	c
4000	20.6	3.6	YES	0.0	YES	YES	YES	28.4	29.3	± 1.5	c
8000**)	20.7	5.1	YES	2.0	YES	YES	YES	24.1	24.0	± 2.5	c
Total								**49.7**	**44.5**	**± 1.5**	

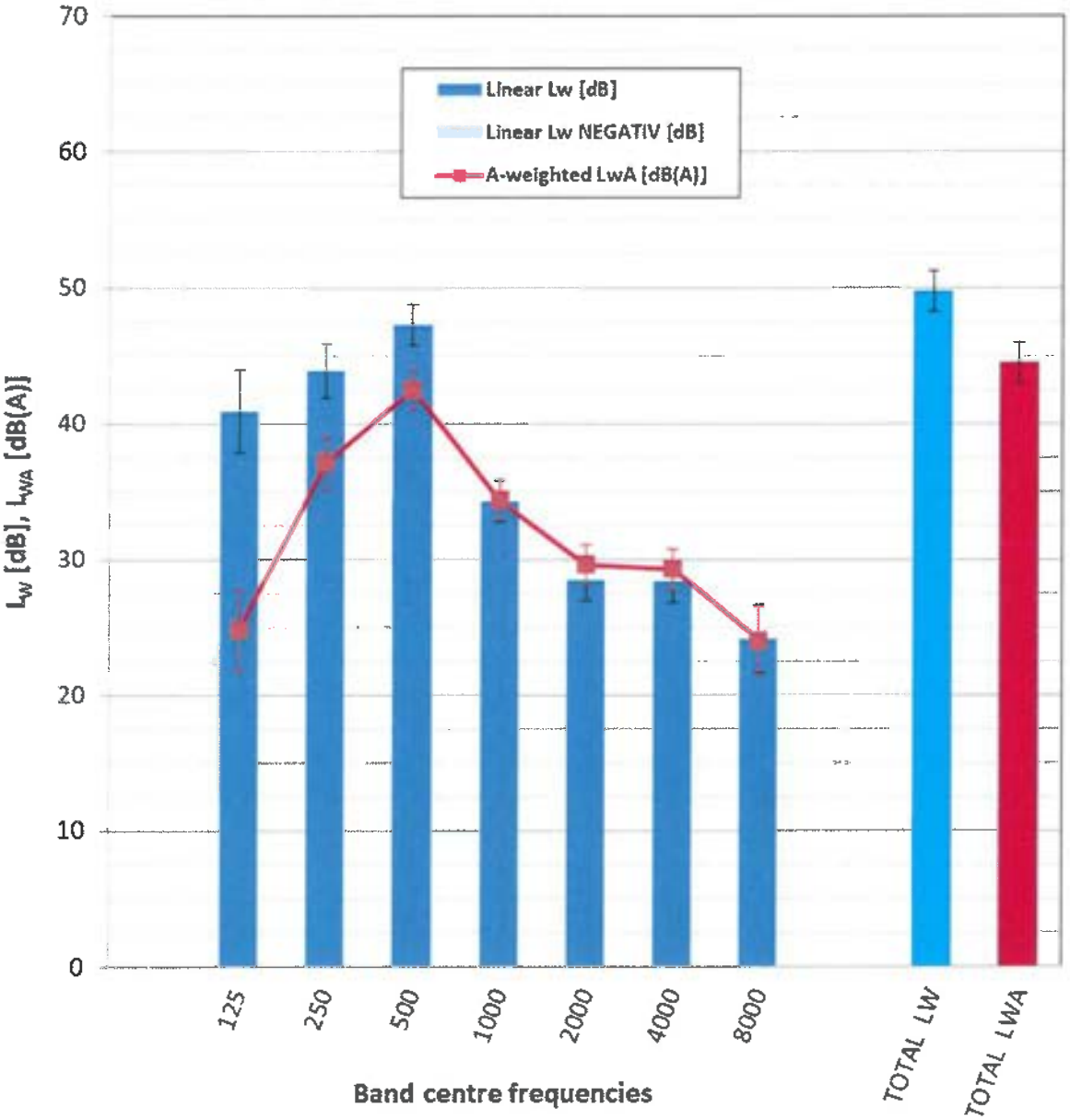
**) *Due to the sound intensity method, the frequency of 6300 Hz was measured only.*

Legend:

passed	*Third frequency bands with this description are significant for calculation of A-weighted total sound power level L_{WA}. Required accuracy class is fulfilled in this band.*
not passed	*Third frequency bands with this description are significant for calculation of A-weighted total sound power level L_{WA}. Required accuracy class isn't fulfilled in this band.*
c	*Third frequency bands with this description are not significant for calculating of A-weighted total sound power level L_{WA}. These bands are evaluated in calculating of L_{WA}.*
nc	*Third frequency bands with this description are not significant for calculating of A-weighted total sound power level L_{WA}. This bands aren't evaluated in calculating of L_{WA}.*

Spectrum of Sound power level L_W – octave bands

Heat pump **HPOM006Z0* + HPOM020W#*** – Indoor unit at A7/W55 */ Compressor: stage 1, Fan: AUTO, Water pump: Minimum /*	**Engineering (grade 2)**



2B) **Measurement results** – one-third octave bands

Heat pump **HPOM006Z0* + HPOM020W#*** – Indoor unit at A7/W55 */ Compressor: stage 1, Fan: AUTO, Water pump: Minimum /*	**Engineering (grade 2)**

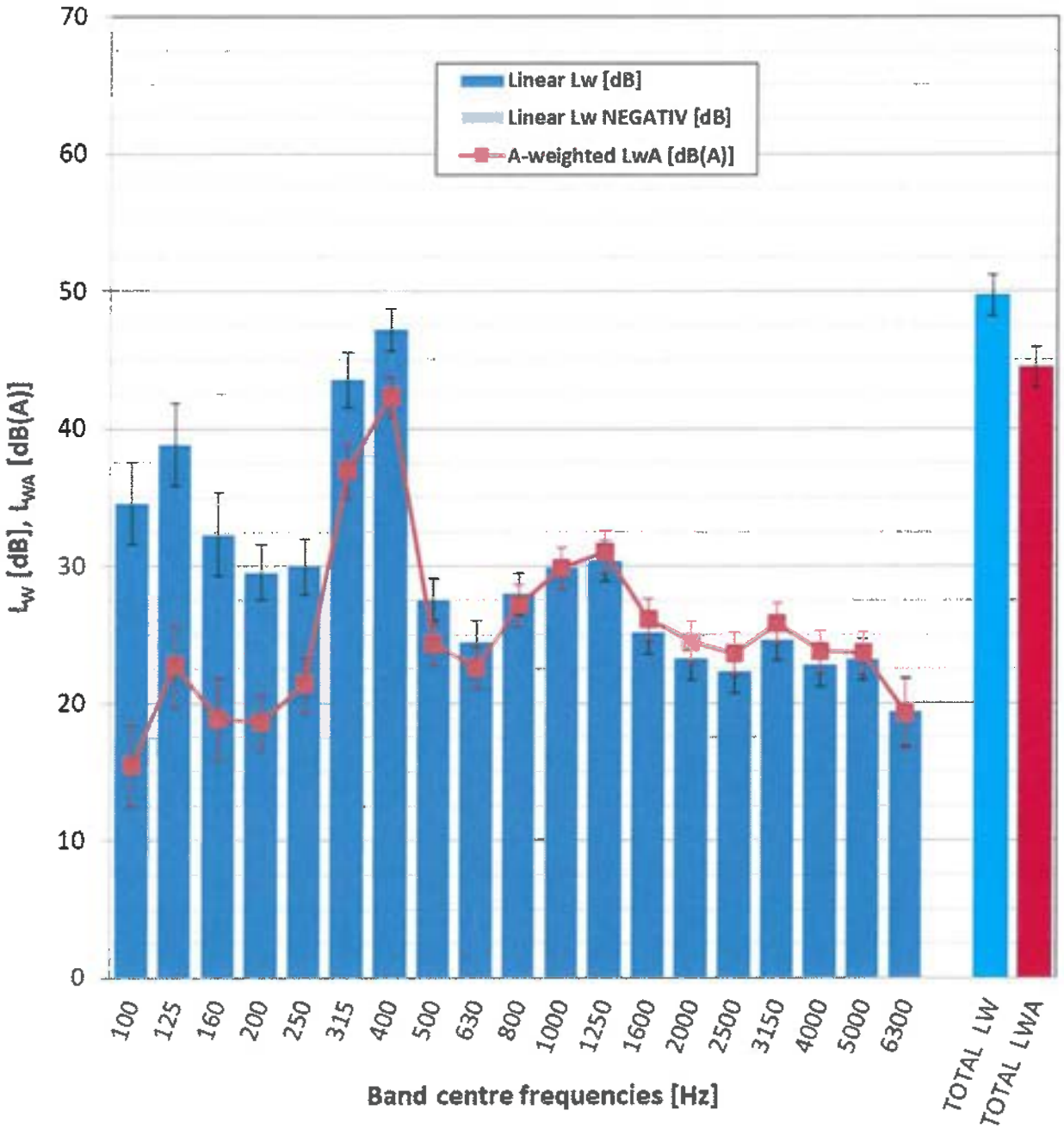
f_m	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	L_W	L_{WA}	U	Evaluation
[Hz]	L_d	F_{pl}	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{W(1)}-L_{W(2)} \leq s$		[dB]	[dB(A)]	[dB]	
100	21.3	3.1	YES	0.0	YES	YES	YES	34.6	15.5	± 3.0	c
125	20.4	1.6	YES	0.0	YES	YES	YES	38.9	22.8	± 3.0	c
160	20.4	1.4	YES	0.0	YES	YES	YES	32.3	18.9	± 3.0	c
200	20.7	1.9	YES	0.0	YES	YES	YES	29.5	18.6	± 2.0	c
250	21.1	2.1	YES	0.0	YES	YES	YES	30.0	21.4	± 2.0	c
315	21.4	1.6	YES	0.0	YES	YES	YES	43.5	36.9	± 2.0	passed
400	**21.5**	**1.0**	**YES**	**0.0**	**YES**	**YES**	**YES**	**47.2**	**42.4**	**± 1.5**	**passed**
500	21.7	4.0	YES	0.7	YES	YES	YES	27.5	24.3	± 1.5	c
630	21.8	4.5	YES	0.0	YES	YES	YES	24.5	22.6	± 1.5	c
800	21.6	3.3	YES	1.5	YES	YES	YES	28.0	27.2	± 1.5	c
1000	22.3	2.2	YES	0.0	YES	YES	YES	29.9	29.9	± 1.5	c
1250	22.2	2.0	YES	0.0	YES	YES	YES	30.4	31.0	± 1.5	c
1600	21.5	4.0	YES	0.0	YES	YES	YES	25.2	26.2	± 1.5	c
2000	20.7	3.4	YES	0.0	YES	YES	YES	23.2	24.4	± 1.5	c
2500	20.9	3.2	YES	0.0	YES	YES	YES	22.3	23.6	± 1.5	c
3150	20.8	3.0	YES	0.0	YES	YES	YES	24.6	25.8	± 1.5	c
4000	20.6	3.6	YES	0.0	YES	YES	YES	22.8	23.8	± 1.5	c
5000	20.4	3.8	YES	0.0	YES	YES	YES	23.2	23.7	± 1.5	c
6300	20.7	5.1	YES	2.0	YES	YES	YES	19.4	19.3	± 2.5	c
Total								**49.7**	**44.4**	**± 1.5**	

Legend:

passed	*Third frequency bands with this description are significant for calculation of A-weighted total sound power level L_{WA}. Required accuracy class is fulfilled in this band.*
not passed	*Third frequency bands with this description are significant for calculation of A-weighted total sound power level L_{WA}. Required accuracy class isn't fulfilled in this band.*
c	*Third frequency bands with this description are not significant for calculating of A-weighted total sound power level L_{WA}. These bands are evaluated in calculating of L_{WA}.*
nc	*Third frequency bands with this description are not significant for calculating of A-weighted total sound power level L_{WA}. This bands aren't evaluated in calculating of L_{WA}.*

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

Heat pump **HPOM006Z0* + HPOM020W#*** – Indoor unit at A7/W55 */ Compressor: stage 1, Fan: AUTO, Water pump: Minimum /*	**Engineering (grade 2)**



Tested and reviewed by: Ing. Antonín Kolbábek, Ph.D. Date: 2021-09-30 Signed:

V. A list of other referenced documents

- Order B-73632 of 2021-06-01 (Order reg. no. B-73632 delivered on 2021-07-02)
- Contract B-73632/39

- ČSN EN 14511-2:2019 - 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 14511-3:2019 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling a process chillers with electrically driven compressors - Part 3: Test methods
- ČSN EN 14511-4:2019 - 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 14825:2020 - Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance

- ČSN EN 12102-1:2018 - 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

- EHPA Testing regulation – Testing of Air/Water Heat Pumps – Additional requirements for granting the international quality label for heat pumps – Version 2.4a

- Background of the SZÚ task No. 39-15772

- Record measurement file: 39-15772 Hewalex (2x EHPA).zip

Test Report compiled by:
Ing. Antonín Kolbábek, Ph.D. – Head of Acoustics and Ventilation systems department / Test engineer

Test Report approved by:

Accredited Testing Laboratory No. 1045.1 * STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. * 1

Milan Holomek
Head of Heat and Environment-Friendly Equipment Test Station

-End of text-

L 1045.1

TEST REPORT
39-15772/1/T

Product:	Outdoor Air/Water Heat Pumps – monobloc
Type designation	**HPOM006Z0* + HPOM020W#***
Customer:	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Manufacturer:	HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k. ul. Słowackiego 33 43-502 Czechowice-Dziedzice POLAND
Employee responsible:	Ing. Mario Jankola
Report issue date:	2021-11-22
Distribution list:	1 copy to the Engineering Test Institute (SZU) 1 copy to the Customer

The tests were performed based on these documents:
- Order B-73632 of 2021-06-01 (Order reg. no. B-73632 delivered on 2021-07-02)
- Contract B-73632/39
- Amendment to Contract B-73632/39.Z1 of 2021-10-29

I. Description of product tested

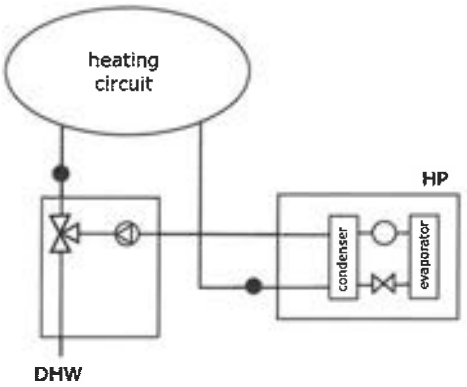
The Heat pump **HPOM006Z0A + HPOM020W6A** supplied by the company **HEWALEX Spółka z ograniczoną odpowiedzialnością Sp.k.** is structurally adapted to operate in air/water system. Device is designed as monobloc, divided to the outdoor unit **HPOM006Z0A**, placed outside on a pedestal and an indoor hydraulic unit **HPOM020W6A**. Outdoor and indoor units are connected by water pipes and electrical wires. Refrigerant R32 is used with charge 0.9kg. Power supply is a one-phase. Heat pump is able to work in heating and cooling mode.

Main components of the outdoor unit **HPOM006Z0A**:
- Serial number HPOM006Z12PA1010
- Cuboid shape with dimensions 700 × 370 × 1010 mm (W × D × H)
- Frame and casing made of varnished steel sheets
- L-shaped evaporator, 2 rows, dimensions 920 × 40 × 980 mm (W × D × H), spacing 1.8 mm
- Plate condenser SWEP B26Hx20/1P-SC-M, dimensions 150 × 75 × 400 mm (W × D × H) including insulation
- Compressor Mitsubishi 2V3140FCAMC
- Refrigerant R32 (0.9 kg)
- Electric expansion valve Sanhua PQH10060
- 4-way reversing valve Sanhua SHF-7H-340-P
- Refrigerant accumulator Hong Shan GCCYQ
- Axial fan NIDEC with motor ø 480 mm with motor SIC-65FV-F162-1
- 2x Pressure sensors
- Temperature sensors on water, refrigerant pipes, outside
- Air vent

Main components of the indoor unit **HPOM020W6A**:
- Serial number AK0305, HPOM020W12PA3011
- Cuboid shape with dimensions 500 × 275 × 720 mm (W × D × H)
- Frame and casing made of varnished steel
- Electric backup heater
- Circulation pump Wilo Para 25/9-87/iPWM1
- 3-way valve LK Armatur EMV 110-M 89i0
- Battery MW power MW 22-12 12 V 22 Ah
- Display
- Regulation Geco G922-PZHX
- Air vent
- Temperature sensors

HPOM006Z0* + HPOM020W#* is a general name, * represents different product versions that do not differ in fundamental elements and construction or anything that could change the performance of the unit.
represents electric heater (e.g. 6 = 6kW).

Scheme:

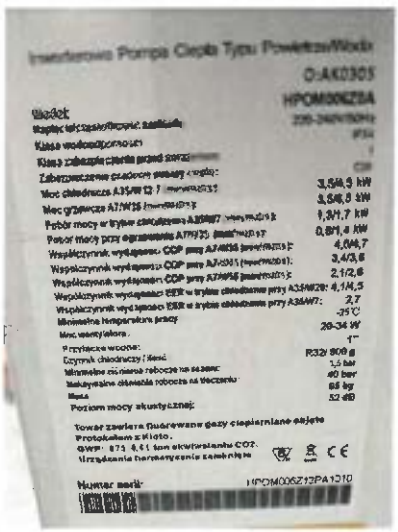


Photos:

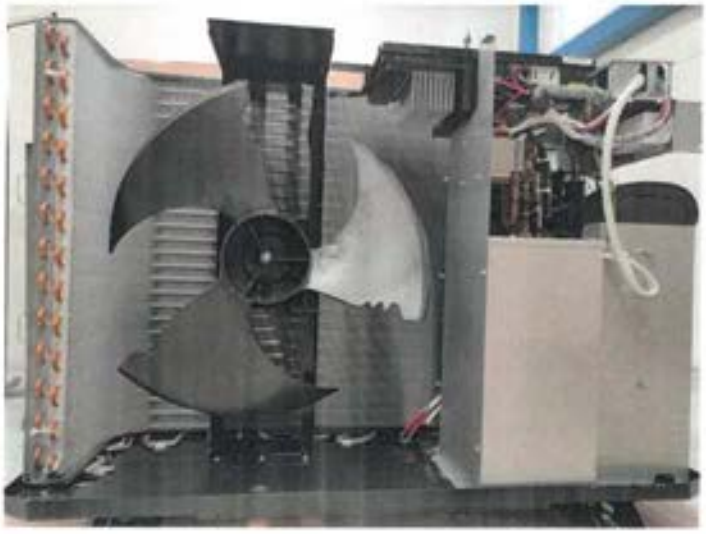
Heat pump **HPOM006Z0A**
– Front view –

Heat pump **HPOM006Z0A**
– Back view –

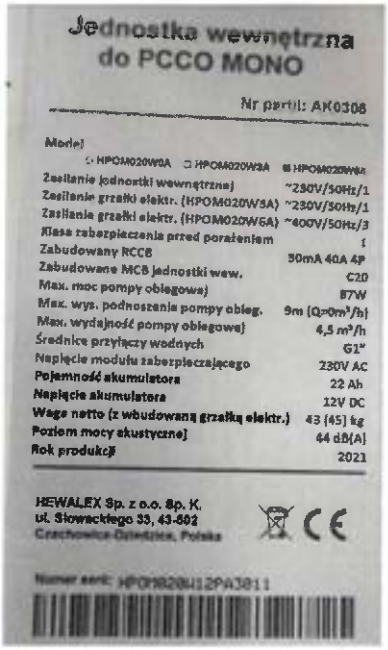
Heat pump **HPOM006Z0A**
– Compressor label –



Heat pump **HPOM006Z0A**
– Outdoor unit label –



Heat pump **HPOM006Z0A**
– Without cover –



Indoor unit **HPOM020W6A**
– Label –

Indoor unit **HPOM020W6A**
– Without cover –

Indoor unit **HPOM020W6A**
– Without cover –

II. Sample tested

Reg. No. SZÚ	Product	Date of submission
0213.21.35166.001-002	Heat pump **HPOM006Z0A + HPOM020W6A**	2021-08-30

The visual inspection, tests and verification were carried out by Ing. Jan Uryč – Test engineer at the test station of SZU.

Description of sampling method: The sample was selected according to ratio numbers from model range data provided by customer.

III. Methods, results of tests and verifications

The tests were carried out with the use of validly calibrated measuring and test equipment.

No.	Name:	Inventory number:	Calibration is valid to:	Accuracy see Calibration Sheet number:
1.	Electrical energy meter	E3.1	05/2031	0004/21
2.	Digital watt meter	1.2.3 ENERGIE ANALYZATOR_3	05/2023	K21050741
3.	Flow meter Krohne Optiflux	8.1.2 TECH_K2_V_DN15	04/2025	6015-KL-P0352-21
4.	Barometer	2.4 MAR18_1_PB	06/2023	4952/2021
5.	Differential pressure gauge	3.2 MAR18_2_dP	06/2023	KL-P-0061-21
6.	Temperature-humidity meter HF532	14.1.1 K3_VLHKOST_1	04/2026	6036-KL-V0118-21
7.	Temperature-humidity meter HF532	14.1.3 K3_VLHKOST_2	04/2026	6036-KL-V0119-21
8.	Thermometers	3.4 MAR18_T	05/2024	KL-T-0058-21
9.	Thermometers	14.4 MAR18_T	05/2024	KL-T-0086-21

Accredited test number: **T 037*** Test title: **Tests of leakage, pressure resistance, thermal and technical parameters, combustion efficiency, safety functions**

Testing method	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14511-4:2019, ČSN EN 14825:2020, EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a
Sample tested	Heat pump **HPOM006Z0* + HPOM020W#***
Measuring equipment used	See table above

Place of testing:	at the Engineering Test Institute	☒	at the Manufacturer´s premises	☐	at the Customer´s premises	☐	*other:*

Measured quantity	Unit	Uncertainty of measurement	Evaluation
Liquid			
- temperature difference (dT)	[K]	± 0,15 K	fulfilled
- temperature inlet/outlet	[°C]	± 0,15 K	fulfilled
- volume flow	[m³/s]	± 1 %	fulfilled
- static pressure difference	[kPa]	± 1 kPa (Δp ≤ 20 kPa) nebo ± 5 % (Δp > 20 kPa)	fulfilled
Air			
- dry bulb temperature	[°C]	± 0,2 K	fulfilled
- wet bulb temperature	[°C]	± 0,4 K	fulfilled
- volume flow	[m³/s]	± 5 %	not applied
- static pressure difference	[Pa]	± 5 Pa (Δp ≤ 100 Pa) nebo ± 5 % (Δp > 100 Pa)	not applied
Refrigerant			
- pressure at compressor outlet	[kPa]	± 1 %	not applied
- temperature	[°C]	± 0,5 K	not applied
Concentration (in volume)			
- heat transfer medium	[%]	± 2	not related
Electrical quantities			
- electric power	[W]	± 1 %	fulfilled
- voltage	[V]	± 0,5 %	fulfilled
- current	[A]	± 0,5 %	fulfilled
- electric energy	[kWh]	± 1 %	not applied
Compressor rotational speed	[min⁻¹]	± 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

The following expanded measurement uncertainties have been calculated as the coefficient of measurement uncertainty and the expanded coefficient k = 2, which corresponds to a coverage probability of 95% for normal distribution. The uncertainties do not take into account the effects of sampling and the inhomogeneity of the sample. The standard uncertainty has been determined in accordance with EA 4/02.
If a statement of conformity is given, the binary statement for the simple acceptance rule pursuant to ILAC-G8: 09/2019 shall be used.

a) Rating conditions:

Measurement results:

Heat pump **HPOM006Z0* + HPOM020W#***

Test number		1	2
Assessment condition		**Rating conditions**	
Specification of the assessment condition*		**A7/W35**	**A7/W55****
Date of testing		**2021-09-02**	**2021-09-17**
Transient test procedure	YES / NO	NO	NO
Average defrost time of 1 cycle	[min]	–	–
Average time of 1 cycle	[min]	–	–
Calculation time	[min]	70.0	70.0
Output heating water – temperature calculation	[°C]	35.01	55.03
Input heating water – temperature calculation	[°C]	30.01	48.41
Output heating water temperature	[°C]	35.01	55.03
Input heating water temperature	[°C]	30.01	48.41
Air temperature – dry bulb temperature	[°C]	6.99	7.00
Air temperature – wet bulb temperature	[°C]	6.02	6.01
Relative humidity	[%]	87.06	87.02
Barometric pressure	[kPa]	99.368	98.179
Ambient temperature	[°C]	20.27	20.27
Secondary circuit pressure difference	[kPa]	16.006	1.311
Efficiency of the secondary liquid pump	[–]	0.175	0.116
Volume flow rate of heating water	$[m^3 \cdot h^{-1}]$	1.1018	0.8039
Density of heating water	$[kg \cdot m^{-3}]$	994.2	986.4
Specific heat capacity of heating water	$[kJ \cdot kg^{-1} \cdot K^{-1}]$	4.175	4.179
Voltage	[V]	232.04	231.41
Total current	[A]	6.15	9.78
Overall power input	[kW]	1.424	2.253
Capacity correction of sec. liquid pump	[W]	23.148	2.230
Power input correction of sec. liquid pump	[W]	28.05	2.52
Heating capacity – heating water	[kW]	6.349	6.095
Corrected heating capacity – heating water	**[kW]**	**6.325**	**6.093**
Uncertainty of corrected heating capacity	[kW]	± 0.110	± 0.082
Effective electric power input	**[kW]**	**1.396**	**2.251**
COP	**[–]**	**4.530**	**2.707**
Uncertainty of COP	[–]	± 0.080	± 0.037
Control settings	**[stage]**	**8**	**10**
Circulation pump settings – heating water	[stage]	12	10

*Comment to abbreviated marking: e.g. A7/W35
A (air) 7 (input air, dry-bulb temperature in °C) / W (water), 35 (output heating water temperature in °C)
** Minimal water flowrate is increased by heat pump software for this condition to 0.8 m^3/h.

b) Seasonal performance tests and SCOP calculation – Low temperature application for reference heating seasons:

„A" = average (reference water temperature 35 °C, reference design conditions for heating Tdesignh = -10 °C)
„W" = warmer (reference water temperature 35 °C, reference design conditions for heating Tdesignh = +2 °C)
„C" = colder (reference water temperature 35 °C, reference design conditions for heating Tdesignh = -22 °C)

Model	Heat pump **HPOM006Z0* + HPOM020W#***
Design	Air / Water – monobloc

Conditions specification according to ČSN EN 14825:2020	Temperature application	**Low** (reference water temperature 35 °C)
	Reference heating season	**A, W, C**
	Outlet water temperature - indoor heat exchanger	Variable
	Compressor speed control	Variable
	Water flow rate – primary circuit	—
	Water flow rate – secondary circuit	Variable

Seasonal space heating energy efficiency	Heating	Average	η_s / A	**178.9**		%
		Warmer	η_s / W	240.8	(Not tested)	%
		Colder	η_s / C	147.9	(Not tested)	%
Seasonal efficiency according to ČSN EN 14825:2020	Heating	Average	**SCOP / A**	**4.55**		–
		Warmer	SCOP / W	6.09	(Not tested)	–
		Colder	SCOP / C	3.77	(Not tested)	–

Function	Cooling			Yes	
	Heating	Yes	Reference heating season: Average	Yes	
			Warmer	Yes	
			Colder	Yes	

Full heating load	Cooling		$P_{designc}$	–	kW
	Heating	Average	$P_{designh}$	**5.39**	kW
		Warmer	$P_{designh}$	**4.82**	kW
		Colder	$P_{designh}$	**6.34**	kW
Bivalent temperatures	Heating	Average	$T_{bivalent}$	-7	°C
		Warmer	$T_{bivalent}$	2	°C
		Colder	$T_{bivalent}$	-10	°C
Operation limit temperatures	Heating	Average	TOL	-10	°C
		Warmer	TOL	2	°C
		Colder	TOL	-22	°C
Seasonal power consumption according to ČSN EN 14825:2020	Cooling		Q_{CE}	–	kWh
	Heating	Average	Q_{HE}/A	2450	kWh
		Warmer	Q_{HE}/W	1056 (Not tested)	kWh
		Colder	Q_{HE}/C	4146 (Not tested)	kWh

Modes other than „active mode"	Off mode	P_{OFF}	22.1	W
	Thermostat off mode	P_{TO}	21.4	W
	Standby mode	P_{SB}	28.0	W
	Crankcase heater mode	P_{CK}	0.0	W

(Not tested): The technical data were declared by the Manufacturer and were not tested by the Testing Laboratory.

Calculation of SCOP according to ČSN EN 14825:2020:

Number of hours used for calculation of reference SCOP (Annex B – Table B.2, B.3)
- For heating only heat pumps and reference heating season „A" = average

H_{HE}	2066	[h]
H_{TO}	178	[h]
H_{SB}	0	[h]
H_{CK}	178	[h]
H_{OFF}	0	[h]

Measured data:

P_{TO}	0.0214	[kW]
P_{SB}	0.0280	[kW]
P_{CK}	0.0000	[kW]
P_{OFF}	0.0221	[kW]
$P_{designh}$	5.39	[kW]
$SCOP_{ON}$	4.55	[–]

Coefficient and correction:

F(1)	3	[%]
F(2)	0	[%]
CC	2.5	[–]

Calculation of SCOP:

7.3 Calculation of the reference annual heating demand (Q_H)

$Q_H = P_{designh} \cdot H_{HE}$ [kWh]

$Q_H = 5.39 \cdot 2066 = 11143$ [kWh]

7.4 Calculation of the annual electricity consumption (Q_{HE})

$Q_{HE} = Q_H / SCOP_{on} + H_{TO} \cdot P_{TO} + H_{SB} \cdot P_{SB} + H_{CK} \cdot P_{CK} + H_{OFF} \cdot P_{OFF}$ [kWh]

$Q_{HE} = 11143 / 4.55 + 178 \cdot 0.0214 + 0 \cdot 0.028 + 178 \cdot 0 + 0 \cdot 0.0221 = 2450$ [kWh]

7.2 General formula for calculation of reference SCOP

$SCOP = Q_H / Q_{HE}$ [–]

$SCOP = 11143 / 2450 = 4.55$ [–]

7.1 Calculation of the seasonal space heating efficiency η_s

$\Sigma F(i) = F(1) + F(2)$ [–]

$\Sigma F = 0.03 + 0 = 0.03$ [–]

$\eta_s = 1 / CC \cdot SCOP - \Sigma F(i)$ [–]

$\eta_s (A) = (1 / 2.5) \cdot 4.55 - 0.03 = 1.789$ [–]

Test results for single part load conditions

Measurement results: Heat pump **HPOM006Z0* + HPOM020W#***

Test number		**3**	**4**
Temperature level		Low temperature application (reference water temperature 35 °C)	
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)	
Assessment condition		**A, Tbiv (F)**	**B**
Specification of the assessment condition*		**A-7/W34**	**A2/W30*** **
Date of testing		**2021-09-03**	**2021-09-18**
Transient test procedure	YES / NO	NO	YES
Average defrost time of 1 cycle	[min]	–	6.2
Average time of 1 cycle	[min]	–	249.5
Calculation time	[min]	70.0	249.5
Output heating water – temperature calculation	[°C]	33.93	29.84
Input heating water – temperature calculation	[°C]	28.94	26.18
Output heating water temperature	[°C]	33.93	30.06
Input heating water temperature	[°C]	28.94	26.19
Air temperature – dry bulb temperature	[°C]	-7.00	2.00
Air temperature – wet bulb temperature	[°C]	-8.00	1.01
Relative humidity	[%]	74.97	83.99
Barometric pressure	[kPa]	98.725	98.312
Ambient temperature	[°C]	19.92	19.88
Secondary circuit pressure difference	[kPa]	9.189	5.051
Efficiency of the secondary liquid pump	[–]	0.140	0.125
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.8304	0.7095
Density of heating water	[$kg \cdot m^{-3}$]	994.6	995.8
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.176
Voltage	[V]	232.86	231.05
Total current	[A]	6.66	3.14
Overall power input	[kW]	1.536	0.683
Capacity correction of sec. liquid pump	[W]	13.073	5.687
Power input correction of sec. liquid pump	[W]	15.19	6.76
Heating capacity – heating water	[kW]	4.784	2.966
Corrected heating capacity – heating water	**[kW]**	**4.771**	**2.960**
Uncertainty of corrected heating capacity	[kW]	± 0.084	± 0.071
Effective electric power input	**[kW]**	**1.521**	**0.676**
COP	**[–]**	**3.137**	**4.376**
Uncertainty of COP	[–]	± 0.055	± 0.105
Control settings	**[stage]**	**10**	**1**
Circulation pump settings – heating water	[stage]	**10**	**10**

* Comment to abbreviated marking: e.g. A7/W35
A (air) 7 (input air, dry-bulb temperature in °C) / W (water), 35 (output heating water temperature in °C)
*** The condition was measured as transient since the compressor was periodically changing its speed because of oil recovery.

Test results for single part load conditions

Measurement results: Heat pump **HPOM006Z0* + HPOM020W#***

Test number		5	6	7
Temperature level		Low temperature application (reference water temperature 35 °C)		
Reference heating season		A" = average ($T_{designh}$ = -10 °C)		
Assessment condition		C	D	TOL (E)
Specification of the assessment condition*		A7/W29.06 ***	A12/W27.89 ***	A-10/W35
Date of testing		2021-09-10	2021-09-14	2021-09-06
Transient test procedure	YES / NO	YES	YES	NO
Average defrost time of 1 cycle	[min]	–	–	–
Average time of 1 cycle	[min]	–	–	–
Calculation time	[min]	180.0	180.0	70.0
Output heating water – temperature calculation	[°C]	29.09	28.07	34.92
Input heating water – temperature calculation	[°C]	25.16	23.48	29.92
Output heating water temperature	[°C]	29.09	28.07	34.92
Input heating water temperature	[°C]	25.16	23.48	29.92
Air temperature – dry bulb temperature	[°C]	7.00	12.00	-10.00
Air temperature – wet bulb temperature	[°C]	6.02	11.01	-10.81
Relative humidity	[%]	87.07	89.01	75.48
Barometric pressure	[kPa]	98.719	98.576	99.303
Ambient temperature	[°C]	20.04	20.12	20.14
Secondary circuit pressure difference	[kPa]	4.535	7.459	9.947
Efficiency of the secondary liquid pump	[–]	0.124	0.131	0.138
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.7011	0.7042	0.7388
Density of heating water	[$kg \cdot m^{-3}$]	996.0	996.3	994.3
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.176	4.177	4.175
Voltage	[V]	231.78	232.46	232.48
Total current	[A]	3.11	2.87	6.56
Overall power input	[kW]	0.534	0.485	1.517
Capacity correction of sec. liquid pump	[W]	6.263	9.681	12.698
Power input correction of sec. liquid pump	[W]	7.15	11.14	14.74
Heating capacity – heating water	[kW]	3.180	3.734	4.257
Corrected heating capacity – heating water	**[kW]**	**3.174**	**3.724**	**4.244**
Uncertainty of corrected heating capacity	[kW]	± 0.070	± 0.071	± 0.075
Effective electric power input	**[kW]**	**0.527**	**0.473**	**1.503**
COP	**[–]**	**6.026**	**7.867**	**2.824**
Uncertainty of COP	[–]	± 0.133	± 0.150	± 0.050
Control settings	**[stage]**	**1**	**1**	**10**
Circulation pump settings – heating water	[stage]	**8**	**8**	**9**

* Comment to abbreviated marking: e.g. A7/W35
A (air) 7 (input air, dry-bulb temperature in °C) / W (water), 35 (output heating water temperature in °C)
*** The condition was measured as transient since the compressor was periodically changing its speed because of oil recovery.

Test results for single part load conditions

Measurement results: Heat pump **HPOM006Z0* + HPOM020W#***

Test number		8	9	10
Temperature level		Low temperature application (reference water temperature 35 °C)		
Reference heating season		„W" = warmer ($T_{designh}$ = 2°C)	„C" = colder ($T_{designh}$ = -22 °C)	
Assessment condition		B, Tbiv (F), TOL (E)	D	Tbiv (F)
Specification of the assessment condition*		A2/W35	A12/W28.1 ***	A-10/W30.75
Date of testing		2021-09-07	2021-09-14	2021-09-08
Transient test procedure	YES / NO	YES	YES	NO
Average defrost time of 1 cycle	[min]	6.5	–	–
Average time of 1 cycle	[min]	97.9	–	–
Calculation time	[min]	97.9	180.0	70.0
Output heating water – temperature calculation	[°C]	34.41	28.07	30.73
Input heating water – temperature calculation	[°C]	30.00	23.48	25.73
Output heating water temperature	[°C]	34.93	28.07	30.73
Input heating water temperature	[°C]	30.02	23.48	25.73
Air temperature – dry bulb temperature	[°C]	1.99	12.00	-10.00
Air temperature – wet bulb temperature	[°C]	1.02	11.01	-10.92
Relative humidity	[%]	84.13	89.01	72.14
Barometric pressure	[kPa]	99.400	98.576	98.880
Ambient temperature	[°C]	19.95	20.12	20.08
Secondary circuit pressure difference	[kPa]	11.950	7.459	7.843
Efficiency of the secondary liquid pump	[–]	0.153	0.131	0.133
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.9593	0.7042	0.7540
Density of heating water	[$kg \cdot m^{-3}$]	994.4	996.3	995.6
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.177	4.176
Voltage	[V]	230.87	232.46	230.61
Total current	[A]	6.79	2.87	6.13
Overall power input	[kW]	1.560	0.485	1.406
Capacity correction of sec. liquid pump	[W]	15.116	9.681	10.676
Power input correction of sec. liquid pump	[W]	18.28	11.14	12.32
Heating capacity – heating water	[kW]	4.832	3.734	4.351
Corrected heating capacity – heating water	**[kW]**	**4.817**	**3.724**	**4.341**
Uncertainty of corrected heating capacity	[kW]	± 0.096	± 0.071	± 0.076
Effective electric power input	**[kW]**	**1.542**	**0.473**	**1.394**
COP	**[–]**	**3.124**	**7.867**	**3.114**
Uncertainty of COP	[–]	± 0.062	± 0.150	± 0.055
Control settings	**[stage]**	**10**	**1**	**10**
Circulation pump settings – heating water	[stage]	**10**	**8**	**9**

* Comment to abbreviated marking: e.g. A7/W35
A (air) 7 (input air, dry-bulb temperature in °C) / W (water), 35 (output heating water temperature in °C)
*** The condition was measured as transient since the compressor was periodically changing its speed because of oil recovery.

Data for SCOP calculation (Heat pump **HPOM006Z0* + HPOM020W#***)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average

	Outdoor heat exchanger Outdoor air inlet	Indoor heat exchanger Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	34.00	88.46	4.77	4.771	3.137	0.900	1.00	3.137	–
B	2	30.00	53.85	2.90	2.960	4.376	0.900	1.00	4.376	–
C	7	29.06	34.62	1.87	3.174	6.026	0.959	0.59	5.859	0.0214
D	12	27.89	15.38	0.83	3.724	7.867	0.955	0.22	6.795	0.0214
TOL (E)	-10	35.00	100.00	5.39	4.244	2.824	0.900	1.00	2.824	–
Tbiv (F)	-7	34.00	88.46	4.77	4.771	3.137	0.900	1.00	3.137	–

Adaption of water temperature – according to ČSN EN 14825:2020, Annex F
- Low temperature application (reference water temperature 35 °C)
- Reference season „A"– average
- Condition D
- Variable water flow rate – secondary circuit

General formulas and derivation:

$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (t_{outlet,\ capacity\ test} - t_{inlet,\ capacity\ test}) \cdot CR$ [°C]

$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (\Delta t) \cdot CR$ [°C]

$t_{outlet,\ average} = t_{outlet,\ capacity\ test} - \Delta t + \Delta t \cdot CR$ [°C]

$t_{outlet,\ capacity\ test} = t_{outlet,\ average} + \Delta t - \Delta t \cdot CR$ [°C]

For variable flow:

$\Delta t = 5$

$CR \cdot \Delta t$ = Part load / Declared capacity · 5

$t_{outlet,\ capacity\ test,\ variable\ flow} = t_{outlet,\ average} + 5 -$ Part load / Declared capacity · 5

Measured data:

$t_{outlet,\ average}$	24.00	[°C]
Declared capacity	3.724	[kW]
Declared capacity standard rating condition A7/W35	–	[kW]
Part load	0.83	[kW]

Calculation of water temperature

$t_{outlet,\ capacity\ test,\ fixed\ flow} = = 24 + 5 - 0.83 / 3.724 \cdot 5 = 27.89$ [°C]

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$
(Heat pump **HPOM006Z0* + HPOM020W#***)

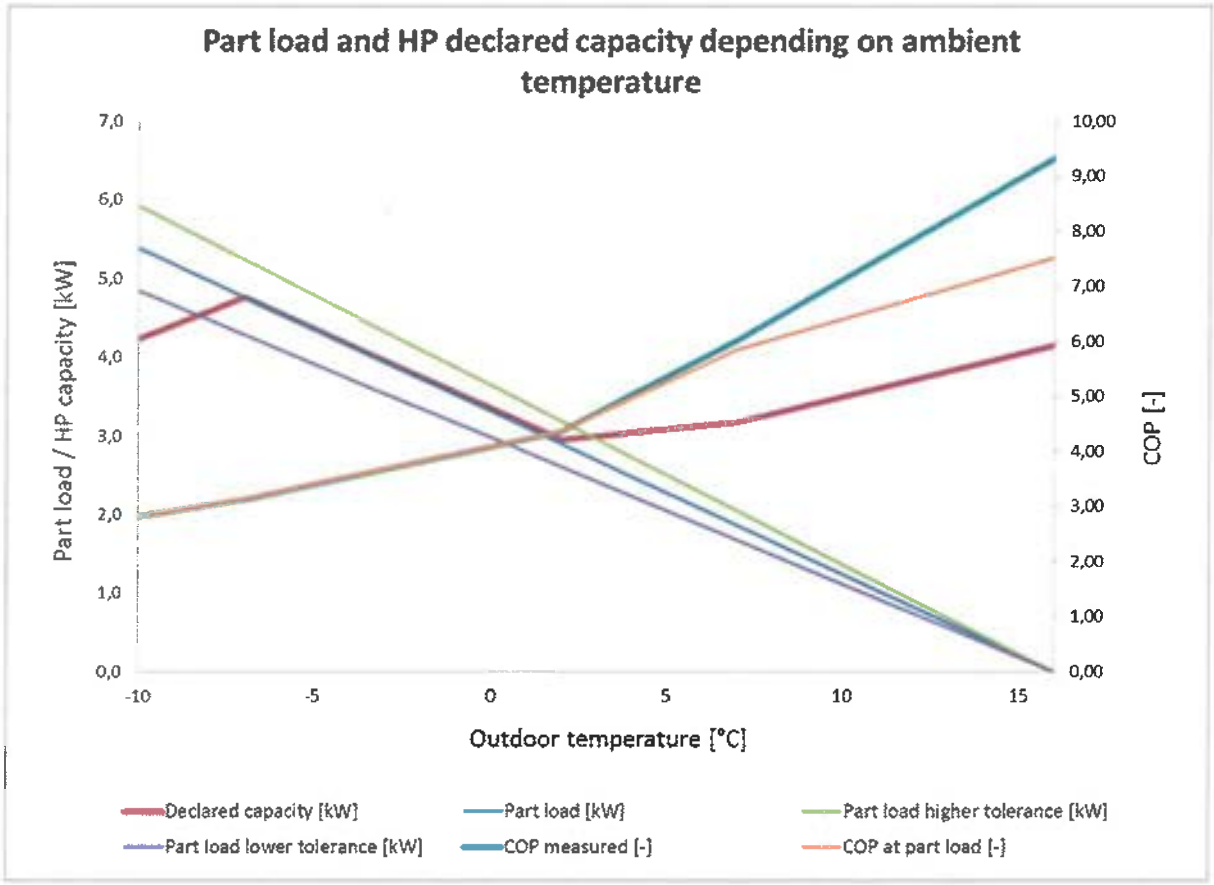
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average

	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	T_j	h_j		$P_{h(T_j)}$			$elbu_{(Tj)}$	$h_j \times elbu_{(Tj)}$	COPb in (Tj)	$h_j \times P_{h(T_j)}$		$h_j \times (P_{h(T_j)} - elbu_{(Tj)})$	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
TOL(E)	21	-10	1	100.00	5.39	4.24	4.24	1.15	1.15	2.82	5	3	4	2
	22	-9	25	96.15	5.19	4.42	4.42	0.77	19.16	2.93	130	57	110	38
	23	-8	23	92.31	4.98	4.60	4.60	0.38	8.81	3.03	115	44	106	35
A, Tbiv(F)	24	-7	24	88.46	4.77	4.77	4.77	0.00	0.00	3.14	115	37	115	37
	25	-6	27	84.62	4.56	4.57	4.56	0.00	0.00	3.27	123	38	123	38
	26	-5	68	80.77	4.36	4.37	4.36	0.00	0.00	3.41	296	87	296	87
	27	-4	91	76.92	4.15	4.17	4.15	0.00	0.00	3.55	378	106	378	106
	28	-3	89	73.08	3.94	3.97	3.94	0.00	0.00	3.69	351	95	351	95
	29	-2	165	69.23	3.73	3.76	3.73	0.00	0.00	3.83	616	161	616	161
	30	-1	173	65.38	3.53	3.56	3.53	0.00	0.00	3.96	610	154	610	154
	31	0	240	61.54	3.32	3.36	3.32	0.00	0.00	4.10	797	194	797	194
	32	1	280	57.69	3.11	3.16	3.11	0.00	0.00	4.24	871	206	871	206
B	33	2	320	53.85	2.90	2.96	2.90	0.00	0.00	4.38	929	212	929	212
	34	3	357	50.00	2.70	3.00	2.70	0.00	0.00	4.67	963	206	963	206
	35	4	356	46.15	2.49	3.05	2.49	0.00	0.00	4.97	886	178	886	178
	36	5	303	42.31	2.28	3.09	2.28	0.00	0.00	5.27	691	131	691	131
	37	6	330	38.46	2.07	3.13	2.07	0.00	0.00	5.56	685	123	685	123
C	38	7	326	34.62	1.87	3.17	1.87	0.00	0.00	5.86	609	104	609	104
	39	8	348	30.77	1.66	3.28	1.66	0.00	0.00	6.05	577	96	577	96
	40	9	335	26.92	1.45	3.39	1.45	0.00	0.00	6.23	486	78	486	78
	41	10	315	23.08	1.24	3.50	1.24	0.00	0.00	6.42	392	61	392	61
	42	11	215	19.23	1.04	3.61	1.04	0.00	0.00	6.61	223	34	223	34
D	43	12	169	15.38	0.83	3.72	0.83	0.00	0.00	6.80	140	21	140	21
	44	13	151	11.54	0.62	3.83	0.62	0.00	0.00	6.98	94	13	94	13
	45	14	105	7.69	0.41	3.94	0.41	0.00	0.00	7.17	44	6	44	6
	46	15	74	3.85	0.21	4.05	0.21	0.00	0.00	7.36	15	2	15	2
		Σ	4910							Σ	11140	2446	11111	2417

SCOPon	4.55	SCOPnet	4.60
		SCOP	**4.55**

Power diagram (Heat pump **HPOM006Z0* + HPOM020W#***)

- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average



c) Seasonal performance tests and SCOP calculation – Medium temperature application for reference heating seasons:

„A" = average (reference water temperature 55 °C, reference design conditions for heating Tdesignh = -10 °C)
„W" = warmer (reference water temperature 55 °C, reference design conditions for heating Tdesignh = +2 °C)
„C" = colder (reference water temperature 55 °C, reference design conditions for heating Tdesignh = -22 °C)

Model	Heat pump **HPOM006Z0* + HPOM020W#***
Design	Air / Water – monobloc

Conditions specification according to ČSN EN 14825:2020	Temperature application	**Medium** (reference water temperature 55 °C)
	Reference heating season	**A, W, C**
	Outlet water temperature - indoor heat exchanger	Variable
	Compressor speed control	Variable
	Water flow rate – primary circuit	—
	Water flow rate – secondary circuit	Fixed

Seasonal space heating energy efficiency	Heating	Average	η_s / A	**127.1**	(Not tested)	%
		Warmer	η_s / W	158.1	(Not tested)	%
		Colder	η_s / C	107.9	(Not tested)	%
Seasonal efficiency according to ČSN EN 14825:2020	Heating	Average	**SCOP / A**	**3.25**	(Not tested)	–
		Warmer	SCOP / W	4.03	(Not tested)	–
		Colder	SCOP / C	2.77	(Not tested)	–

Function	Cooling			Yes	
	Heating	Yes	Reference heating season: Average	Yes	
			Warmer (if designated)	Yes	
			Colder (if designated)	Yes	

Full heating load	Cooling		$P_{designc}$	–	kW
	Heating	Average	$P_{designh}$	**4.52**	kW
		Warmer	$P_{designh}$	**4.47**	kW
		Colder	$P_{designh}$	**5.68**	kW
Bivalent temperatures	Heating	Average	$T_{bivalent}$	-7	°C
		Warmer	$T_{bivalent}$	2	°C
		Colder	$T_{bivalent}$	-10	°C
Operation limit temperatures	Heating	Average	TOL	-10	°C
		Warmer	TOL	2	°C
		Colder	TOL	-20	°C
Seasonal power consumption according to ČSN EN 14825:2020	Cooling		Q_{CE}	–	kWh
	Heating	Average	Q_{HE}/A	2873 (Not tested)	kWh
		Warmer	Q_{HE}/W	1481 (Not tested)	kWh
		Colder	Q_{HE}/C	5053 (Not tested)	kWh

Modes other than „active mode"	Off mode	P_{OFF}	22.1	W
	Thermostat off mode	P_{TO}	**21.4**	W
	Standby mode	P_{SB}	28.0	W
	Crankcase heater mode	P_{CK}	0.0	W

(Not tested): The technical data were declared by the Manufacturer and were not tested by the Testing Laboratory.

Calculation of SCOP according to ČSN EN 14825:2020:

Number of hours used for calculation of reference SCOP (Annex B – Table B.2, B.3)
- For reversible heat pumps and reference heating season „A" = average

H_{HE}	2066	[h]
H_{TO}	178	[h]
H_{SB}	0	[h]
H_{CK}	178	[h]
H_{OFF}	0	[h]

Measured data:

P_{TO}	0.0214	[kW]
P_{SB}	0.0280	[kW]
P_{CK}	0.0000	[kW]
P_{OFF}	0.0221	[kW]
$P_{designh}$	4.52	[kW]
$SCOP_{ON}$	3.26	[–]

Coefficient and correction:

F(1)	3	[%]
F(2)	0	[%]
CC	2.5	[–]

Calculation of SCOP:

7.3 Calculation of the reference annual heating demand (Q_H)

$Q_H = P_{designh} \cdot H_{HE}$ [kWh]

$Q_H = 4.52 \cdot 2066 = 9347$ [kWh]

7.4 Calculation of the annual electricity consumption (Q_{HE})

$Q_{HE} = Q_H / SCOP_{on} + H_{TO} \cdot P_{TO} + H_{SB} \cdot P_{SB} + H_{CK} \cdot P_{CK} + H_{OFF} \cdot P_{OFF}$ [kWh]

$Q_{HE} = 9347 / 3.26 + 178 \cdot 0.0214 + 0 \cdot 0.028 + 178 \cdot 0 + 0 \cdot 0.0221 = 2873$ [kWh]

7.2 General formula for calculation of reference SCOP

$SCOP = Q_H / Q_{HE}$ [–]

$SCOP = 9347 / 2873 = 3.25$ [–]

7.1 Calculation of the seasonal space heating efficiency η_s

$\Sigma F(i) = F(1) + F(2)$ [–]

$\Sigma F = 0.03 + 0 = 0.03$ [–]

$\eta_s = 1 / CC \cdot SCOP - \Sigma F(i)$ [–]

$\eta_s (A) = (1 / 2.5) \cdot 3.25 - 0.03 = 1.271$ [–]

Test results for single part load conditions

Measurement results: Heat pump **HPOM006Z0* + HPOM020W#***

Test number		**11**	**12**
Temperature level		Medium temperature application (reference water temperature 55 °C)	
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)	
Assessment condition		**A, Tbiv (F)**	**D**
Specification of the assessment condition*		**A-7/W52****	**A12/W36.42*****
Date of testing		**2021-09-13**	**2021-09-14**
Transient test procedure	YES / NO	NO	YES
Average defrost time of 1 cycle	[min]	–	–
Average time of 1 cycle	[min]	–	–
Calculation time	[min]	70.0	180.0
Output heating water – temperature calculation	[°C]	52.00	36.36
Input heating water – temperature calculation	[°C]	47.60	32.00
Output heating water temperature	[°C]	52.00	36.36
Input heating water temperature	[°C]	47.60	32.00
Air temperature – dry bulb temperature	[°C]	-7.00	12.00
Air temperature – wet bulb temperature	[°C]	-8.01	11.00
Relative humidity	[%]	74.93	88.97
Barometric pressure	[kPa]	98.558	98.652
Ambient temperature	[°C]	20.16	20.24
Secondary circuit pressure difference	[kPa]	40.478	7.597
Efficiency of the secondary liquid pump	[–]	0.221	0.131
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.8001	0.7028
Density of heating water	[$kg \cdot m^{-3}$]	987.8	993.8
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.178	4.175
Voltage	[V]	231.67	232.32
Total current	[A]	9.39	2.86
Overall power input	[kW]	2.157	0.653
Capacity correction of sec. liquid pump	[W]	31.795	9.813
Power input correction of sec. liquid pump	[W]	40.79	11.30
Heating capacity – heating water	[kW]	4.033	3.535
Corrected heating capacity – heating water	**[kW]**	**4.002**	**3.525**
Uncertainty of corrected heating capacity	[kW]	± 0.080	± 0.070
Effective electric power input	**[kW]**	**2.116**	**0.642**
COP	**[–]**	**1.891**	**5.494**
Uncertainty of COP	[–]	± 0.038	± 0.110
Control settings	**[stage]**	**10**	**1**
Circulation pump settings – heating water	[stage]	20	8

* Comment to abbreviated marking: e.g. A7/W35
A (air) 7 (input air, dry-bulb temperature in °C) / W (water), 35 (output heating water temperature in °C)
** Minimal water flowrate is increased by heat pump software for this condition to 0.8 m^3/h.
*** The condition was measured as transient since the compressor was periodically changing its speed because of oil recovery.

Test results for single part load conditions

Measurement results: Heat pump **HPOM006Z0* + HPOM020W#***

Test number		13	14	15
Temperature level		Medium temperature application (reference water temperature 55 °C)		
Reference heating season		„W" = warmer ($T_{designh}$ = 2 °C)	„C" = colder ($T_{designh}$ = -22 °C)	
Assessment condition		**B, Tbiv (F), TOL (E)**	**B**	**Tbiv (F)**
Specification of the assessment condition*		**A2/W55****	**A2/W37.79 ***	**A-10/W45.88 ****
Date of testing		**2021-09-17**	**2021-09-18**	**2021-09-16**
Transient test procedure	YES / NO	YES	YES	NO
Average defrost time of 1 cycle	[min]	6.6	4.3	–
Average time of 1 cycle	[min]	163.2	247.5	–
Calculation time	[min]	163.2	247.5	70.0
Output heating water – temperature calculation	[°C]	54.39	38.07	45.98
Input heating water – temperature calculation	[°C]	49.53	35.20	41.73
Output heating water temperature	[°C]	54.83	38.23	45.98
Input heating water temperature	[°C]	49.53	35.20	41.73
Air temperature – dry bulb temperature	[°C]	2.00	2.00	-10.00
Air temperature – wet bulb temperature	[°C]	1.01	1.01	-10.82
Relative humidity	[%]	83.96	83.99	75.25
Barometric pressure	[kPa]	98.267	98.286	98.307
Ambient temperature	[°C]	20.24	20.19	19.97
Secondary circuit pressure difference	[kPa]	3.951	4.867	13.976
Efficiency of the secondary liquid pump	[–]	0.124	0.125	0.152
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.8136	0.7104	0.8009
Density of heating water	[$kg \cdot m^{-3}$]	986.7	993.2	990.3
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.179	4.175	4.176
Voltage	[V]	231.44	232.53	232.35
Total current	[A]	9.25	3.18	7.98
Overall power input	[kW]	2.124	0.708	1.840
Capacity correction of sec. liquid pump	[W]	4.504	5.600	17.315
Power input correction of sec. liquid pump	[W]	5.48	6.63	20.42
Heating capacity – heating water	[kW]	4.471	2.327	3.907
Corrected heating capacity – heating water	**[kW]**	**4.466**	**2.322**	**3.889**
Uncertainty of corrected heating capacity	[kW]	± 0.081	± 0.070	± 0.080
Effective electric power input	**[kW]**	**2.119**	**0.701**	**1.819**
COP	**[–]**	**2.108**	**3.310**	**2.138**
Uncertainty of COP	[–]	± 0.038	± 0.100	± 0.044
Control settings	**[stage]**	**10**	**1**	**10**
Circulation pump settings – heating water	[stage]	10	10	**10**

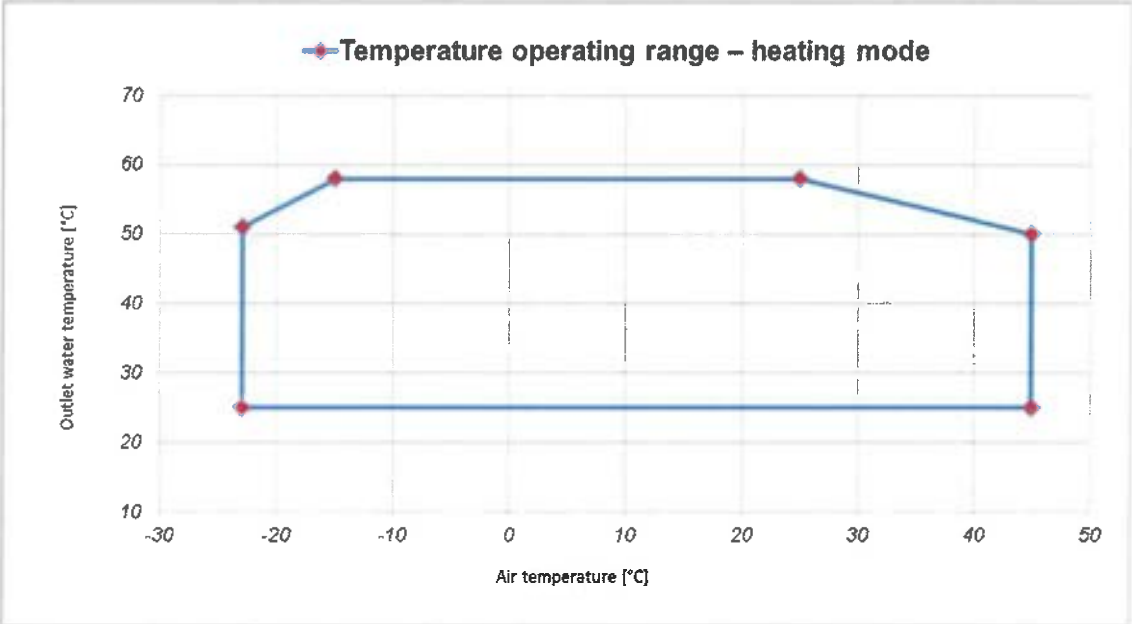
* Comment to abbreviated marking: e.g. A7/W35
A (air) 7 (input air, dry-bulb temperature in °C) / W (water), 35 (output heating water temperature in °C)
** Minimal water flowrate is increased by heat pump software for this condition to 0.8 m^3/h.
*** The condition was measured as transient since the compressor was periodically changing its speed because of oil recovery.

Accredited test number:	**T 037***	Test title:	**Tests of leakage, pressure resistance, thermal and technical parameters, combustion efficiency, safety functions**

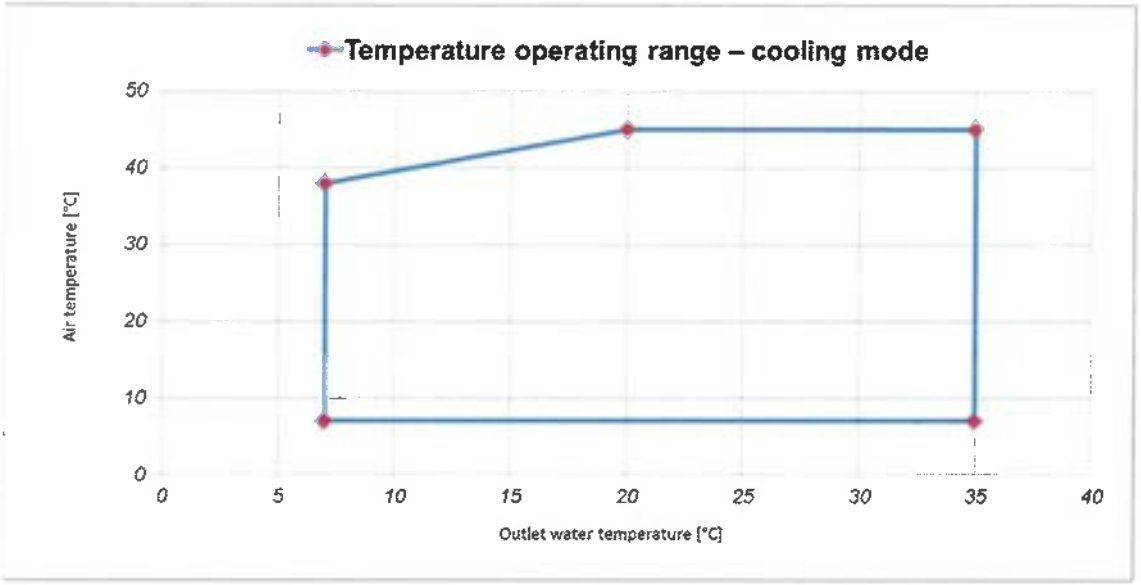
Testing method	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14511-4:2019 EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a
Sample tested	Heat pump **HPOM006Z0* + HPOM020W#***
Measuring equipment used	See chapter II.

Place of testing:	at the Engineering Test Institute	☒	at the Manufacturer´s premises	☐	at the Customer´s premises	☐	*other:*

1) Temperature operating range



Test point	Inlet air dry bulb temperature [°C]		Outlet heating water temperature [°C]		Water flow rate in condenser [m³/h]	Note
1.	A	-23	W	25	Minimum	Minimum water flow rate: **0.7000 m³·h⁻¹**
2.	A	-23	W	51	Minimum	Maximum water flow rate: **2.9400 m³·h⁻¹**



Test point	Inlet air dry bulb temperature [°C]		Outlet heating water temperature [°C]		Water flow rate in condenser [m³/h]	Note
1.	A	7	W	7	Minimum	Minimum water flow rate: **0.8000 m³·h⁻¹**
2.	A	45	W	35	Maximum	Maximum water flow rate: **2.0200 m³·h⁻¹**

Heat pump **HPOM006Z0* + HPOM020W#*** is fully operational in the temperature operating range.

Starting and operating tests (heating mode)
Test according to Article 4.2.1.2 of ČSN EN 14511-4:2019

Operational requirements conditions for air-to-water units					
Test point	**Inlet temperature at outdoor heat exchanger (°C)**	**Inlet temperature at indoor heat exchanger (°C)**	**Water flow rate at indoor heat exchanger**	**Voltage (V)**	**Test result**
1 (starting)	Lower limit of use	Lower limit of use	minimum	Rated voltage	+
2 (operating)	Lower limit of use	Upper limit of use	minimum	Rated voltage	+

Evaluation:
+... For a starting test, the unit shall start and operate during 15 min, for an operating test, the unit shall be able to operate during 1 h, without tripping of the motor overload protective devices.
–... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

Starting and operating tests (cooling mode)
Test according to Article 4.2.1.3 of ČSN EN 14511-4:2019

Operational requirements conditions for air-to-water units					
Test point	**Inlet temperature at outdoor heat exchanger (°C)**	**Inlet temperature at indoor heat exchanger (°C)**	**Water flow rate at indoor heat exchanger**	**Voltage (V)**	**Test result**
1 (starting)	Lower limit of use	Lower limit of use	minimum	Rated voltage	x
2 (starting)	Upper limit of use	Upper limit of use	maximum	Rated voltage	x

Evaluation:
+... For a starting test, the unit shall start and operate during 15 min, without tripping of the motor overload protective devices.
–... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

2) Outside the operating range

Requirements for outside the operating range	Requirement specification	Test result	Note
If operating outside the temperature range can cause damage to the unit, it shall be provided with safety devices which ensure that the unit suffers no damage when the operating limits of use indicated by the manufacturer are exceeded and remains capable of operating when coming back within these limits. A safety device that does not automatically reset may trip provided that a warning device is fitted. The manufacturer shall indicate any safety devices provided and their operating conditions according to 7.2.3.	ČSN EN 14511-4:2019 Art. 4.3	x	–

Evaluation:
+... The unit fulfills test requirements.
–... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

3) Freeze-up test in cooling mode

Air-to-air and water(brine)-to-air units

Required operating conditions	Test result	Note
Test according to Article 4.4 of ČSN EN 14511-4:2019	0	–

Evaluation:
+... After the unit has operated for 6 hours or after the last freeze up cycle has been completed after these 6 h, the following requirements shall be fulfilled:
- no ice shall have accumulated on the evaporator;
- no ice shall drip from the unit;
- no water shall drip or be blown off the unit into the room.

–... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

4) Shutting off the heat transfer medium flows

Required operating conditions	Test result	Note
Test for section a) Art. 4.5 ČSN EN 14511-4:2019 – heating	+	Unit kept operating with lower heating capacity
Test for section a) Art. 4.5 ČSN EN 14511-4:2019 – cooling	+	–

Test for section b) Art. 4.5 ČSN EN 14511-4:2019 – heating	+	Immediately shut down by flowmeter – Error "No Flow"
Test for section b) Art. 4.5 ČSN EN 14511-4:2019 – cooling	+	–
Test for section c) Art. 4.5 ČSN EN 14511-4:2019	0	–

Evaluation:
+... The unit shall remain capable of operating after restoration of the flow rates for 30 min once the compressor has restarted.
–... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

5) Complete power supply failure

Required operating conditions	Test result	Note
Test according to Article 4.6 of ČSN EN 14511-4:2019	+	–

Evaluation:
+... The unit has to restart automatically within 30 min. When manufacturer states that the unit does not automatically restart, fault detection is necessary. The unit is checked for any damage sustained during the test and if any safety devices have operated during the test.
–... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

6) Condensate draining and enclosure sweat test

Air-to-air and water(brine)-to-air units

Required operating conditions	Test result	Note
Test according to Article 4.7 of ČSN EN 14511-4:2019	0	–

Evaluation:
+... During the test of 4 hours no condensed water shall drip, run or blow off the unit except through the drain. For indoor units, drain holes shall be provided with suitable pipe connection, the minimum diameter of which shall be 12 mm.
–... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

Test results – Out of accredited tests

SCOP calculations – *based on values provided by the customer*

Testing method:	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14825:2020, EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a
Sample tested:	Heat pump **HPOM006Z0* + HPOM020W#***

Data for SCOP calculation (Heat pump **HPOM006Z0* + HPOM020W#***)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „W" – warmer

	Outdoor heat exchanger: Outdoor air inlet	Indoor heat exchanger: Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	–	–	–	–	–	–	–	–	–	–
B	2	35.00	100.00	4.82	4.817	3.124	0.900	1.00	3.124	–
C	7	31.00	64.29	3.10	3.100	5.800	0.900	1.00	5.800	–
D	12	29.19	28.57	1.38	3.800	7.800	0.956	0.36	7.240	0.0214
TOL (E)	2	35.00	100.00	4.82	4.817	3.124	0.900	1.00	3.124	–
Tbiv (F)	2	35.00	100.00	4.82	4.817	3.124	0.900	1.00	3.124	–

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$
(Heat pump **HPOM006Z0* + HPOM020W#***)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „W" – warmer

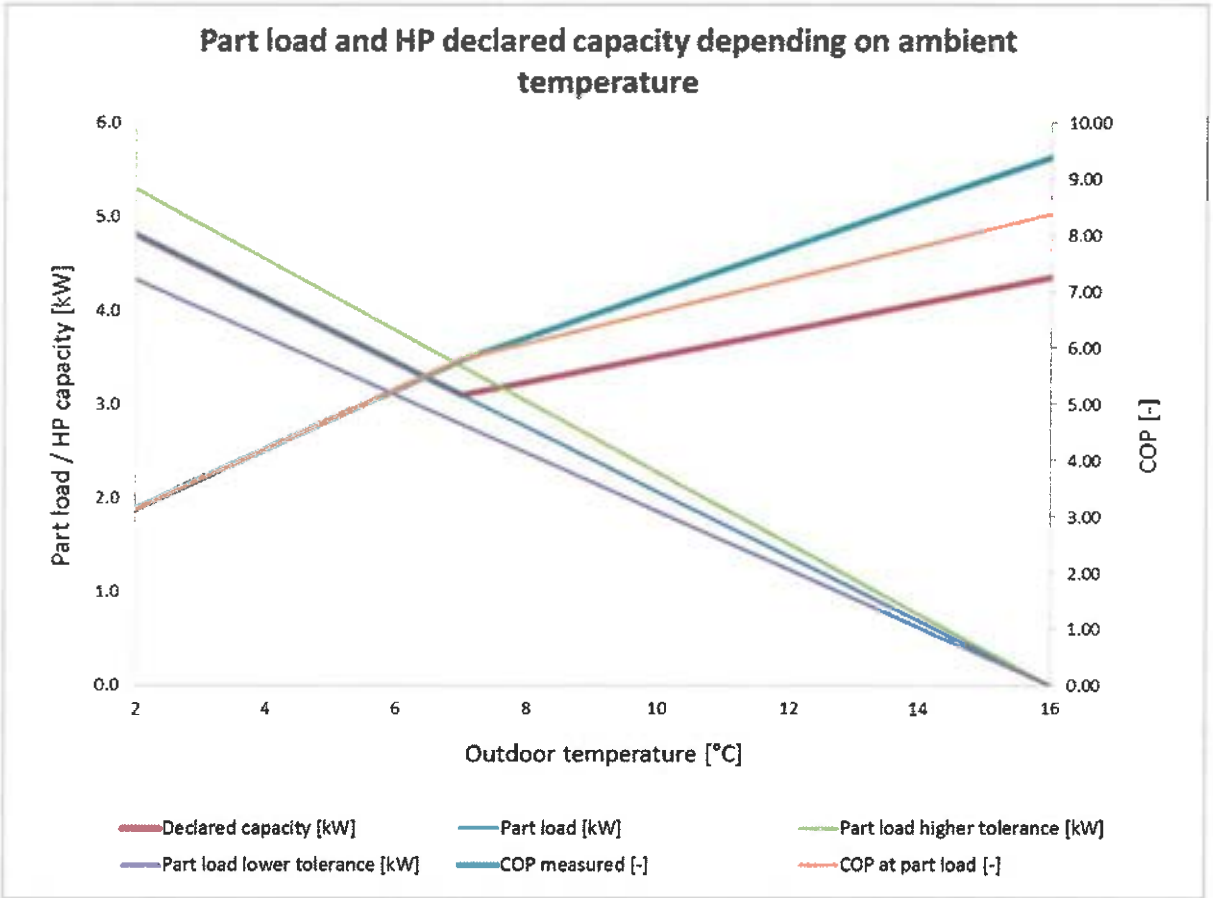
	Bin: j	Outdoor temp. (dry bulb): T_j	Hours: h_j	Part load ratio	Heat load: $P_{h(Tj)}$	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj): $elbu_{(Tj)}$	Annual resistive heat: $h_j \times elbu_{(Tj)}$	COPbin (Tj): COPbin (Tj)	Annual heating demand: $h_j \times P_{h(Tj)}$	Annual power input including electric back up heating	Net annual heating capacity: $h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	Net annual power input without electric back up heating
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
B, TOL(E), Tbiv(F)	33	2	3	100.00	4.82	4.82	4.82	0.00	0.00	3.12	14	5	14	5
	34	3	22	92.86	4.47	4.47	4.47	0.00	0.00	3.66	98	27	98	27

	35	4	63	85.71	4.13	4.13	4.13	0.00	0.00	4.19	260	62	260	62
	36	5	63	78.57	3.78	3.79	3.78	0.00	0.00	4.73	238	50	238	50
	37	6	175	71.43	3.44	3.44	3.44	0.00	0.00	5.26	602	114	602	114
C	38	7	162	64.29	3.10	3.10	3.10	0.00	0.00	5.80	502	86	502	86
	39	8	259	57.14	2.75	3.24	2.75	0.00	0.00	6.09	713	117	713	117
	40	9	360	50.00	2.41	3.38	2.41	0.00	0.00	6.38	867	136	867	136
	41	10	428	42.86	2.06	3.52	2.06	0.00	0.00	6.66	884	133	884	133
	42	11	430	35.71	1.72	3.66	1.72	0.00	0.00	6.95	740	106	740	106
D	43	12	503	28.57	1.38	3.80	1.38	0.00	0.00	7.24	692	96	692	96
	44	13	444	21.43	1.03	3.94	1.03	0.00	0.00	7.53	458	61	458	61
	45	14	384	14.29	0.69	4.08	0.69	0.00	0.00	7.82	264	34	264	34
	46	15	294	7.14	0.34	4.22	0.34	0.00	0.00	8.10	101	12	101	12
		Σ	3590							Σ	6434	1040	6434	1040

SCOPon	6.19	SCOPnet	6.19
		SCOP	**6.09**

Power diagram (Heat pump **HPOM006Z0* + HPOM020W#***)

- Low temperature application (reference water temperature 35 °C)
- Reference heating season „W" – warmer



Data for SCOP calculation (Heat pump **HPOM006Z0* + HPOM020W#***)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C" – colder

	Outdoor heat exchanger Outdoor air inlet	Indoor heat exchanger Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	30.00	60.53	3.84	4.000	3.300	0.900	1.00	3.300	–
B	2	28.10	36.84	2.34	3.000	4.800	0.966	0.78	4.754	0.0214
C	7	27.50	23.68	1.50	3.000	6.500	0.954	0.50	6.213	0.0214
D	12	28.10	10.53	0.67	3.724	7.867	0.955	0.18	6.518	0.0214
TOL (E)	-22	35.00	100.00	6.34	3.000	1.800	0.900	1.00	1.800	–
Tbiv (F)	-10	30.75	68.42	4.34	4.341	3.114	0.900	1.00	3.114	–
G	-15	32.00	81.58	5.18	3.800	2.400	0.900	1.00	2.400	–

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$
(Heat pump **HPOM006Z0* + HPOM020W#***)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C" – colder

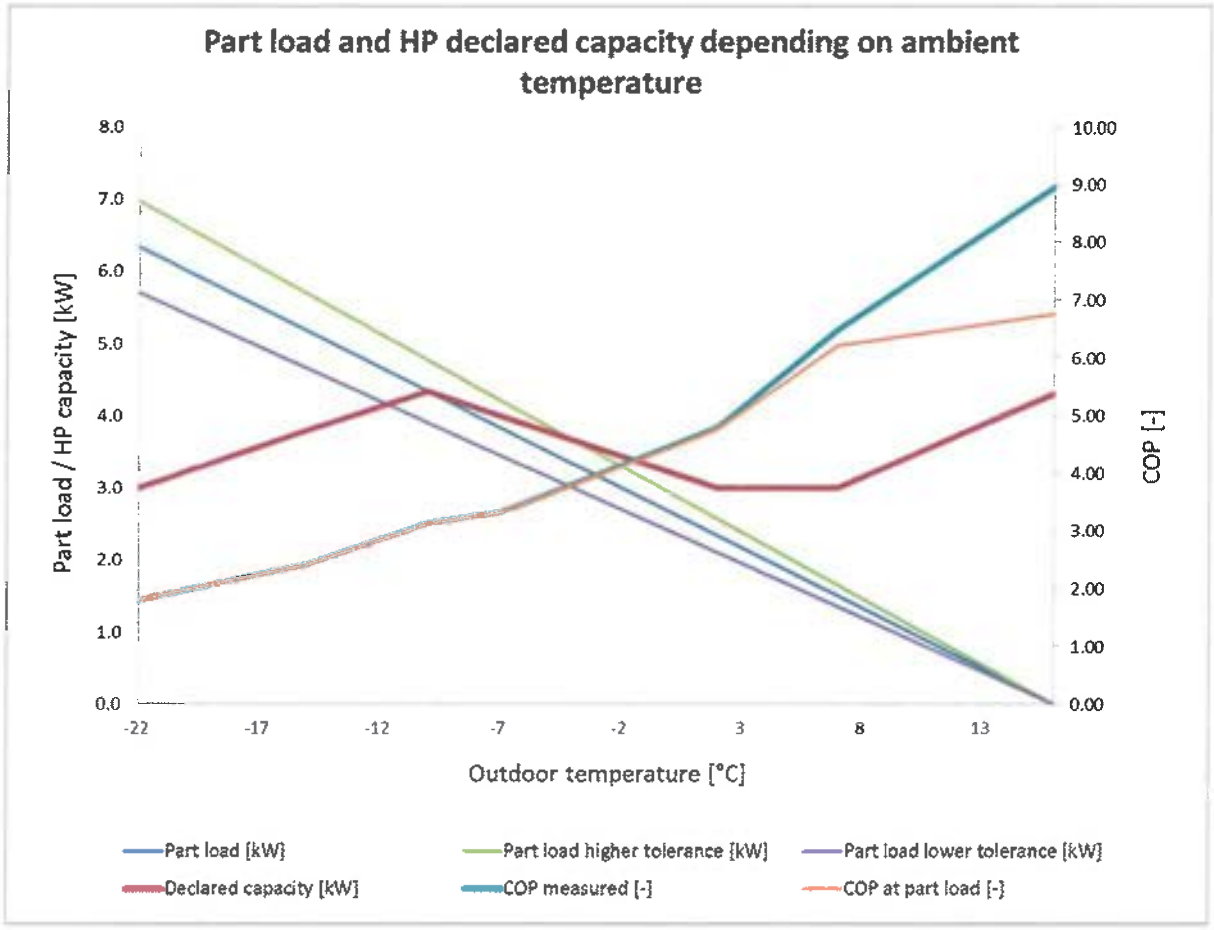
	Bin j	Outdoor temp. (dry bulb) T_j	Hours h_j	Part load ratio	Heat load $P_{h(Tj)}$	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj) $elbu_{(Tj)}$	Annual resistive heat h_j x $elbu_{(Tj)}$	COPbin (Tj) COP bin (Tj)	Annual heating demand h_j x $P_{h(Tj)}$	Annual power input including electric back up heating	Net annual heating capacity h_j × ($P_{h(Tj)}$ - $elbu_{(Tj)}$)	Net annual power input without electric back up heating
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
TOL(E)	9	-22	1	100.00	6.34	3.00	3.00	3.34	3.34	1.80	6	5	3	2
	10	-21	6	97.37	6.18	3.11	3.11	3.06	18.38	1.89	37	28	19	10
	11	-20	13	94.74	6.01	3.23	3.23	2.78	36.17	1.97	78	57	42	21
	12	-19	17	92.11	5.84	3.34	3.34	2.50	42.51	2.06	99	70	57	28
	13	-18	19	89.47	5.68	3.46	3.46	2.22	42.17	2.14	108	73	66	31
	14	-17	26	86.84	5.51	3.57	3.57	1.94	50.40	2.23	143	92	93	42
	15	-16	39	84.21	5.34	3.69	3.69	1.66	64.63	2.31	208	127	144	62
G	16	-15	41	81.58	5.18	3.80	3.80	1.38	56.41	2.40	212	121	156	65
	17	-14	35	78.95	5.01	3.91	3.91	1.10	38.52	2.54	175	92	137	54
	18	-13	52	76.32	4.84	4.02	4.02	0.83	42.93	2.69	252	121	209	78
	19	-12	37	73.68	4.67	4.12	4.12	0.55	20.36	2.83	173	74	153	54
	20	-11	41	71.05	4.51	4.23	4.23	0.28	11.28	2.97	185	70	174	58

Tbiv(F)	21	-10	43	68.42	4.34	4.34	4.34	0.00	0.00	3.11	187	60	187	60
	22	-9	54	65.79	4.17	4.23	4.17	0.00	0.00	3.18	225	71	225	71
	23	-8	90	63.16	4.01	4.11	4.01	0.00	0.00	3.24	361	111	361	111
A	24	-7	125	60.53	3.84	4.00	3.84	0.00	0.00	3.30	480	145	480	145
	25	-6	169	57.89	3.67	3.89	3.67	0.00	0.00	3.46	621	179	621	179
	26	-5	195	55.26	3.51	3.78	3.51	0.00	0.00	3.62	684	189	684	189
	27	-4	278	52.63	3.34	3.67	3.34	0.00	0.00	3.78	928	245	928	245
	28	-3	306	50.00	3.17	3.56	3.17	0.00	0.00	3.95	971	246	971	246
	29	-2	454	47.37	3.01	3.44	3.01	0.00	0.00	4.11	1364	332	1364	332
	30	-1	385	44.74	2.84	3.33	2.84	0.00	0.00	4.27	1093	256	1093	256
	31	0	490	42.11	2.67	3.22	2.67	0.00	0.00	4.43	1309	295	1309	295
	32	1	533	39.47	2.50	3.11	2.50	0.00	0.00	4.59	1335	291	1335	291
B	33	2	380	36.84	2.34	3.00	2.34	0.00	0.00	4.75	888	187	888	187
	34	3	228	34.21	2.17	3.00	2.17	0.00	0.00	5.05	495	98	495	98
	35	4	261	31.58	2.00	3.00	2.00	0.00	0.00	5.34	523	98	523	98
	36	5	279	28.95	1.84	3.00	1.84	0.00	0.00	5.63	512	91	512	91
	37	6	229	26.32	1.67	3.00	1.67	0.00	0.00	5.92	382	65	382	65
C	38	7	269	23.68	1.50	3.00	1.50	0.00	0.00	6.21	404	65	404	65
	39	8	233	21.05	1.34	3.14	1.34	0.00	0.00	6.27	311	50	311	50
	40	9	230	18.42	1.17	3.29	1.17	0.00	0.00	6.34	269	42	269	42
	41	10	243	15.79	1.00	3.43	1.00	0.00	0.00	6.40	243	38	243	38
	42	11	191	13.16	0.83	3.58	0.83	0.00	0.00	6.46	159	25	159	25
D	43	12	146	10.53	0.67	3.72	0.67	0.00	0.00	6.52	98	15	98	15
	44	13	150	7.89	0.50	3.87	0.50	0.00	0.00	6.58	75	11	75	11
	45	14	97	5.26	0.33	4.01	0.33	0.00	0.00	6.64	32	5	32	5
	46	15	61	2.63	0.17	4.16	0.17	0.00	0.00	6.70	10	2	10	2
		Σ	6446							Σ	15638	4143	15211	3716

SCOPon	3.77	SCOPnet	4.09
		SCOP	**3.77**

Power diagram (Heat pump **HPOM006Z0* + HPOM020W#***)

- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C" – colder



Data for SCOP calculation (Heat pump **HPOM006Z0* + HPOM020W#***)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A" – average

	Outdoor heat exchanger: Outdoor air inlet	Indoor heat exchanger: Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	52.00	88.46	4.00	4.002	1.891	0.900	1.00	1.891	–
B	2	42.00	53.85	2.44	2.590	3.270	0.900	1.00	3.270	–
C	7	39.82	34.62	1.57	3.000	4.500	0.968	0.52	4.372	0.0214
D	12	36.42	15.38	0.70	3.525	5.494	0.967	0.20	4.838	0.0214
TOL (E)	-10	55.00	100.00	4.52	3.500	1.500	0.900	1.00	1.500	–
Tbiv (F)	-7	52.00	88.46	4.00	4.002	1.891	0.900	1.00	1.891	–

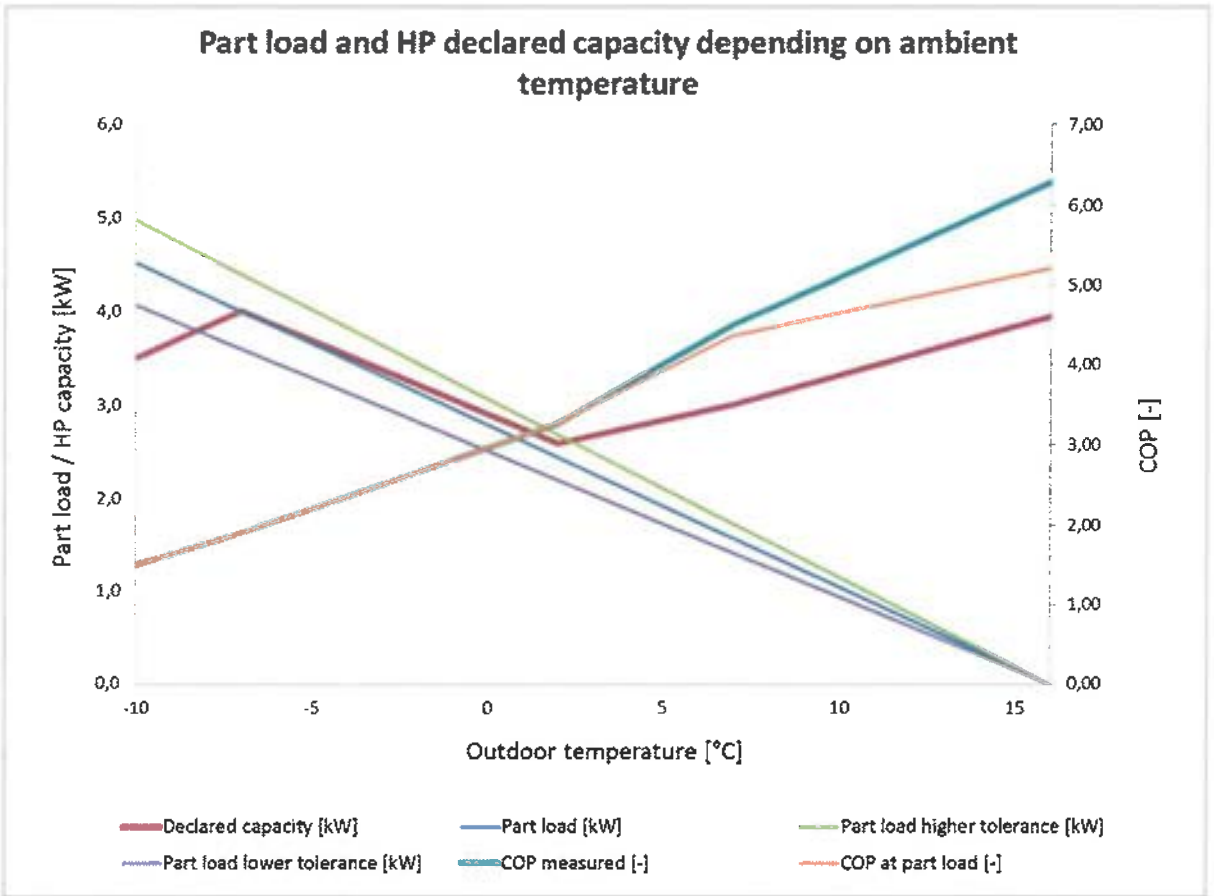
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$
(Heat pump **HPOM006Z0* + HPOM020W#***)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A" – average

	Bin: j	Outdoor temp. (dry bulb): T_j	Hours: h_j	Part load ratio	Heat load: $P_{h(Tj)}$	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj): $elbu_{(Tj)}$	Annual resistive heat: $h_j \times elbu_{(Tj)}$	COPbin (Tj): COPbin (Tj)	Annual heating demand: $h_j \times P_{h(Tj)}$	Annual power input including electric back up heating	Net annual heating capacity: $h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	Net annual power input without electric back up heating
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
TOL(E)	**21**	**-10**	**1**	**100.00**	**4.52**	**3.50**	**3.50**	**1.02**	**1.02**	**1.50**	**5**	**3**	**4**	**2**
	22	-9	25	96.15	4.35	3.67	3.67	0.68	17.07	1.63	109	73	92	56
	23	-8	23	92.31	4.18	3.83	3.83	0.34	7.85	1.76	96	58	88	50
A, Tbiv(F)	**24**	**-7**	**24**	**88.46**	**4.00**	**4.00**	**4.00**	**0.00**	**0.00**	**1.89**	**96**	**51**	**96**	**51**
	25	-6	27	84.62	3.83	3.85	3.83	0.00	0.00	2.04	103	51	103	51
	26	-5	68	80.77	3.65	3.69	3.65	0.00	0.00	2.20	248	113	248	113
	27	-4	91	76.92	3.48	3.53	3.48	0.00	0.00	2.35	317	135	317	135
	28	-3	89	73.08	3.31	3.37	3.31	0.00	0.00	2.50	294	118	294	118
	29	-2	165	69.23	3.13	3.22	3.13	0.00	0.00	2.66	517	194	517	194
	30	-1	173	65.38	2.96	3.06	2.96	0.00	0.00	2.81	512	182	512	182
	31	0	240	61.54	2.78	2.90	2.78	0.00	0.00	2.96	668	225	668	225
	32	1	280	57.69	2.61	2.75	2.61	0.00	0.00	3.12	731	234	731	234
B	**33**	**2**	**320**	**53.85**	**2.44**	**2.59**	**2.44**	**0.00**	**0.00**	**3.27**	**780**	**238**	**780**	**238**

	34	3	357	50.00	2.26	2.67	2.26	0.00	0.00	3.49	808	231	808	231
	35	4	356	46.15	2.09	2.75	2.09	0.00	0.00	3.71	743	200	743	200
	36	5	303	42.31	1.91	2.84	1.91	0.00	0.00	3.93	580	148	580	148
	37	6	330	38.46	1.74	2.92	1.74	0.00	0.00	4.15	574	138	574	138
C	**38**	**7**	**326**	**34.62**	**1.57**	**3.00**	**1.57**	**0.00**	**0.00**	**4.37**	**511**	**117**	**511**	**117**
	39	8	348	30.77	1.39	3.11	1.39	0.00	0.00	4.46	484	108	484	108
	40	9	335	26.92	1.22	3.21	1.22	0.00	0.00	4.56	408	90	408	90
	41	10	315	23.08	1.04	3.32	1.04	0.00	0.00	4.65	329	71	329	71
	42	11	215	19.23	0.87	3.42	0.87	0.00	0.00	4.74	187	39	187	39
D	**43**	**12**	**169**	**15.38**	**0.70**	**3.53**	**0.70**	**0.00**	**0.00**	**4.84**	**118**	**24**	**118**	**24**
	44	13	151	11.54	0.52	3.63	0.52	0.00	0.00	4.93	79	16	79	16
	45	14	105	7.69	0.35	3.74	0.35	0.00	0.00	5.02	37	7	37	7
	46	15	74	3.85	0.17	3.84	0.17	0.00	0.00	5.12	13	3	13	3
		Σ	4910							Σ	9345	2869	9319	2843

SCOPon	3.26	SCOPnet	3.28
		SCOP	**3.25**

Power diagram (Heat pump **HPOM006Z0* + HPOM020W#***)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A" – average



Data for SCOP calculation (Heat pump **HPOM006Z0* + HPOM020W#***)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „W" – warmer

	Outdoor heat exchanger Outdoor air inlet	Indoor heat exchanger Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	–	–	–	–	–	–	–	–	–	–
B	2	55.00	100.00	4.47	4.466	2.108	0.900	1.00	2.108	–
C	7	46.00	64.29	2.87	3.100	3.400	0.900	1.00	3.400	–
D	12	38.60	28.57	1.28	3.000	5.600	0.960	0.43	5.313	0.0214
TOL (E)	2	55.00	100.00	4.47	4.466	2.108	0.900	1.00	2.108	–
Tbiv (F)	2	55.00	100.00	4.47	4.466	2.108	0.900	1.00	2.108	–

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$
(Heat pump **HPOM006Z0* + HPOM020W#***)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „W" – warmer

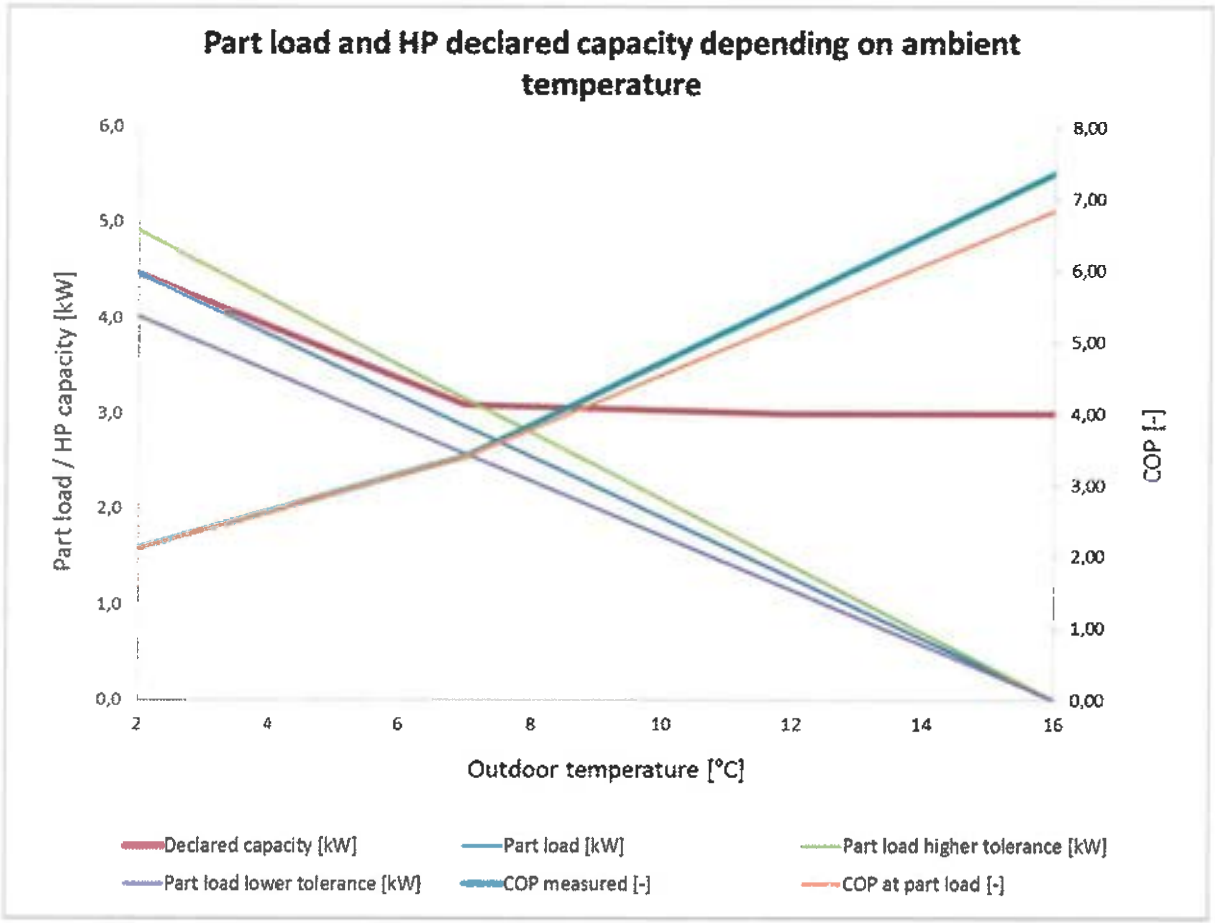
	Bin j	Outdoor temp. (dry bulb) T_j	Hours h_j	Part load ratio	Heat load $P_{h(Tj)}$	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj) $elbu_{(Tj)}$	Annual resistive heat $h_j \times elbu_{(Tj)}$	COPbin (Tj) COPbin (Tj)	Annual heating demand $h_j \times P_{h(Tj)}$	Annual power input including electric back up heating	Net annual heating capacity $h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	Net annual power input without electric back up heating
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
B, TOL(E), Tbiv(F)	**33**	**2**	**3**	**100.00**	**4.47**	**4.47**	**4.47**	**0.00**	**0.00**	**2.11**	**13**	**6**	**13**	**6**
	34	3	22	92.86	4.15	4.19	4.15	0.00	0.00	2.37	91	39	91	39
	35	4	63	85.71	3.83	3.92	3.83	0.00	0.00	2.62	241	92	241	92
	36	5	63	78.57	3.51	3.65	3.51	0.00	0.00	2.88	221	77	221	77
	37	6	175	71.43	3.19	3.37	3.19	0.00	0.00	3.14	558	178	558	178
C	**38**	**7**	**162**	**64.29**	**2.87**	**3.10**	**2.87**	**0.00**	**0.00**	**3.40**	**465**	**137**	**465**	**137**
	39	8	259	57.14	2.55	3.08	2.55	0.00	0.00	3.78	661	175	661	175
	40	9	360	50.00	2.23	3.06	2.23	0.00	0.00	4.17	804	193	804	193
	41	10	428	42.86	1.91	3.04	1.91	0.00	0.00	4.55	819	180	819	180
	42	11	430	35.71	1.60	3.02	1.60	0.00	0.00	4.93	686	139	686	139
D	**43**	**12**	**503**	**28.57**	**1.28**	**3.00**	**1.28**	**0.00**	**0.00**	**5.31**	**642**	**121**	**642**	**121**

	44	13	444	21.43	0.96	2.98	0.96	0.00	0.00	5.70	425	75	425	75
	45	14	384	14.29	0.64	2.96	0.64	0.00	0.00	6.08	245	40	245	40
	46	15	294	7.14	0.32	2.94	0.32	0.00	0.00	6.46	94	15	94	15
		Σ	3590							Σ	5966	1465	5966	1465

SCOPon	4.07	SCOPnet	4.07
		SCOP	**4.03**

Power diagram (Heat pump **HPOM006Z0* + HPOM020W#***)

- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „W" – warmer



Data for SCOP calculation (Heat pump **HPOM006Z0* + HPOM020W#***)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C" – colder

	Outdoor heat exchanger: Outdoor air inlet	Indoor heat exchanger: Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	45.74	60.53	3.44	4.400	2.400	0.988	0.78	2.392	0.0214
B	2	37.79	36.84	2.09	2.322	3.310	0.969	0.90	3.299	0.0214
C	7	36.41	23.68	1.35	3.000	5.400	0.961	0.45	5.156	0.0214
D	12	34.71	10.53	0.60	3.700	7.700	0.955	0.16	6.256	0.0214
TOL (E)	-20	53.29	94.74	5.38	2.416	1.239	0.900	1.00	1.239	–
Tbiv (F)	-10	45.88	68.42	3.89	3.889	2.138	0.900	1.00	2.138	–
G	-15	49.00	81.58	4.64	3.153	1.689	0.900	1.00	1.689	–

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$
(Heat pump **HPOM006Z0* + HPOM020W#***)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C" – colder

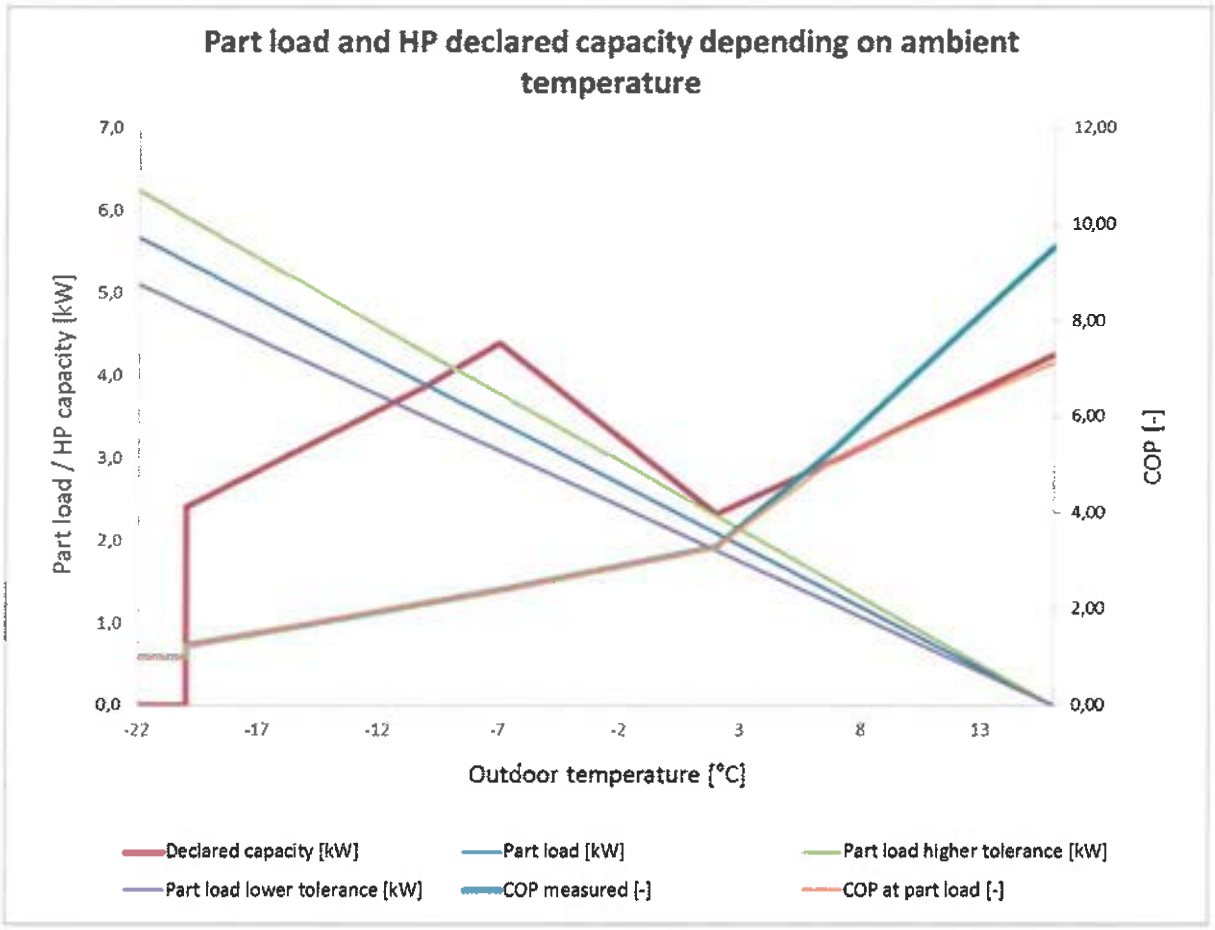
	Bin j [–]	Outdoor temp. (dry bulb) T_j [°C]	Hours h_j [h]	Part load ratio [%]	Heat load $P_{h(Tj)}$ [kW]	Capacity of HP [kW]	Heat load covered by heat pump [kW]	Resistive heat elbu (Tj) $elbu_{(Tj)}$ [kW]	Annual resistive heat h_j x $elbu_{(Tj)}$ [kWh]	COPbin (Tj) COP bin (Tj) [–]	Annual heating demand h_j x $P_{h(Tj)}$ [kWh]	Annual power input including electric back up heating [kWh]	Net annual heating capacity $h_j \times (P_{h(Tj)} - elbu_{(Tj)})$ [kWh]	Net annual power input without electric back up heating [kWh]
	9	-22	1	100.00	5.68	0.00	0.00	5.68	5.68	1.00	6	6	0	0
	10	-21	6	97.37	5.53	0.00	0.00	5.53	33.21	1.00	33	33	0	0
TOL(E)	**11**	**-20**	**13**	**94.74**	**5.38**	**2.42**	**2.42**	**2.97**	**38.59**	**1.24**	**70**	**64**	**31**	**25**
	12	-19	17	92.11	5.24	2.56	2.56	2.67	45.42	1.33	89	78	44	33
	13	-18	19	89.47	5.09	2.71	2.71	2.38	45.13	1.42	97	81	52	36
	14	-17	26	86.84	4.94	2.86	2.86	2.08	54.03	1.51	128	103	**74**	49
	15	-16	39	84.21	4.79	3.01	3.01	1.78	69.47	1.60	187	143	**117**	73
G	**16**	**-15**	**41**	**81.58**	**4.64**	**3.15**	**3.15**	**1.48**	**60.86**	**1.69**	**190**	**137**	**129**	**77**
	17	-14	35	78.95	4.49	3.30	3.30	1.19	41.56	1.78	157	107	**115**	65
	18	-13	52	76.32	4.34	3.45	3.45	0.89	46.31	1.87	226	142	**179**	96

	19	-12	37	73.68	4.19	3.59	3.59	0.59	21.97	1.96	155	90	133	68
	20	-11	41	71.05	4.04	3.74	3.74	0.30	12.17	2.05	166	87	153	75
Tbiv(F)	**21**	**-10**	**43**	**68.42**	**3.89**	**3.89**	**3.89**	**0.00**	**0.00**	**2.14**	**167**	**78**	**167**	**78**
	22	-9	54	65.79	3.74	4.06	3.74	0.00	0.00	2.22	202	91	202	91
	23	-8	90	63.16	3.59	4.23	3.59	0.00	0.00	2.31	323	140	323	140
A	**24**	**-7**	**125**	**60.53**	**3.44**	**4.40**	**3.44**	**0.00**	**0.00**	**2.39**	**430**	**180**	**430**	**180**
	25	-6	169	57.89	3.29	4.17	3.29	0.00	0.00	2.49	556	223	556	223
	26	-5	195	55.26	3.14	3.94	3.14	0.00	0.00	2.59	613	236	613	236
	27	-4	278	52.63	2.99	3.71	2.99	0.00	0.00	2.69	832	309	832	309
	28	-3	306	50.00	2.84	3.48	2.84	0.00	0.00	2.80	870	311	870	311
	29	-2	454	47.37	2.69	3.25	2.69	0.00	0.00	2.90	1222	422	1222	422
	30	-1	385	44.74	2.54	3.01	2.54	0.00	0.00	3.00	979	327	979	327
	31	0	490	42.11	2.39	2.78	2.39	0.00	0.00	3.10	1173	379	1173	379
	32	1	533	39.47	2.24	2.55	2.24	0.00	0.00	3.20	1196	374	1196	374
B	**33**	**2**	**380**	**36.84**	**2.09**	**2.32**	**2.09**	**0.00**	**0.00**	**3.30**	**796**	**241**	**796**	**241**
	34	3	228	34.21	1.94	2.46	1.94	0.00	0.00	3.67	443	121	443	121
	35	4	261	31.58	1.79	2.59	1.79	0.00	0.00	4.04	468	116	468	116
	36	5	279	28.95	1.65	2.73	1.65	0.00	0.00	4.41	459	104	459	104
	37	6	229	26.32	1.50	2.86	1.50	0.00	0.00	4.78	343	72	343	72
C	**38**	**7**	**269**	**23.68**	**1.35**	**3.00**	**1.35**	**0.00**	**0.00**	**5.16**	**362**	**70**	**362**	**70**
	39	8	233	21.05	1.20	3.14	1.20	0.00	0.00	5.38	279	52	279	52
	40	9	230	18.42	1.05	3.28	1.05	0.00	0.00	5.60	241	43	241	43
	41	10	243	15.79	0.90	3.42	0.90	0.00	0.00	5.82	218	37	218	37
	42	11	191	13.16	0.75	3.56	0.75	0.00	0.00	6.04	143	24	143	24
D	**43**	**12**	**146**	**10.53**	**0.60**	**3.70**	**0.60**	**0.00**	**0.00**	**6.26**	**87**	**14**	**87**	**14**
	44	13	150	7.89	0.45	3.84	0.45	0.00	0.00	6.48	67	10	67	10
	45	14	97	5.26	0.30	3.98	0.30	0.00	0.00	6.70	29	4	29	4
	46	15	61	2.63	0.15	4.12	0.15	0.00	0.00	6.92	9	1	9	1
		Σ	6446							Σ	14010	5051	13535	4576

SCOPon	2.77	SCOPnet	2.96
		SCOP	**2.77**

Power diagram (Heat pump **HPOM006Z0* + HPOM020W#***)

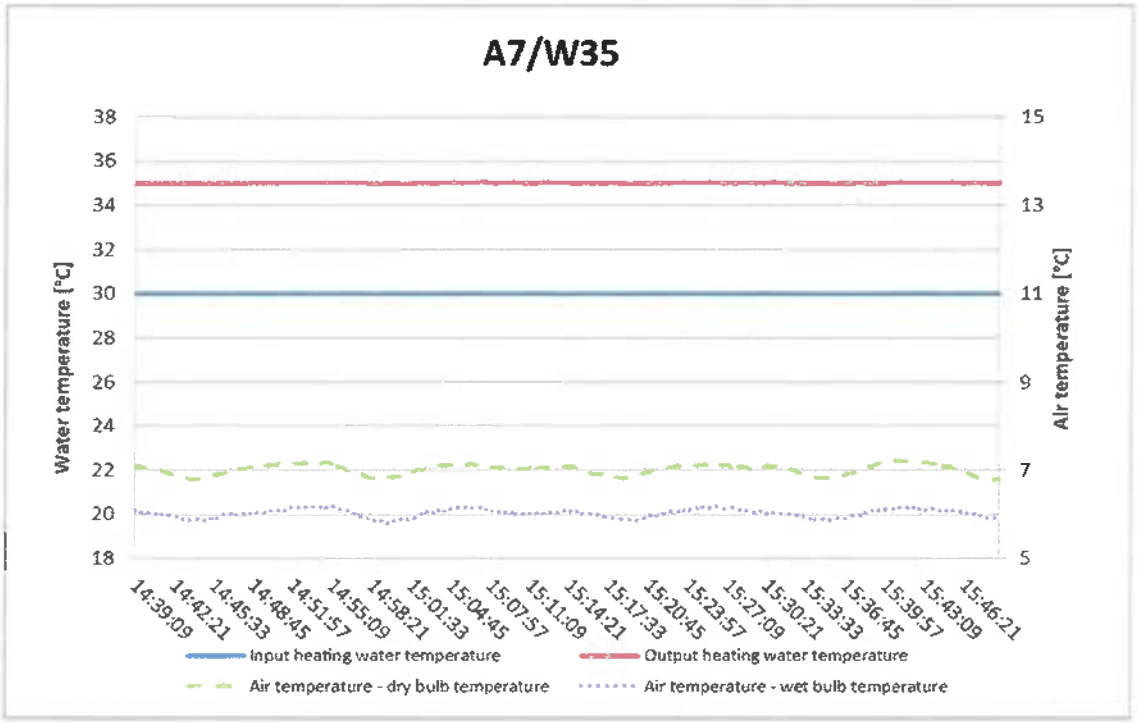
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C" – colder

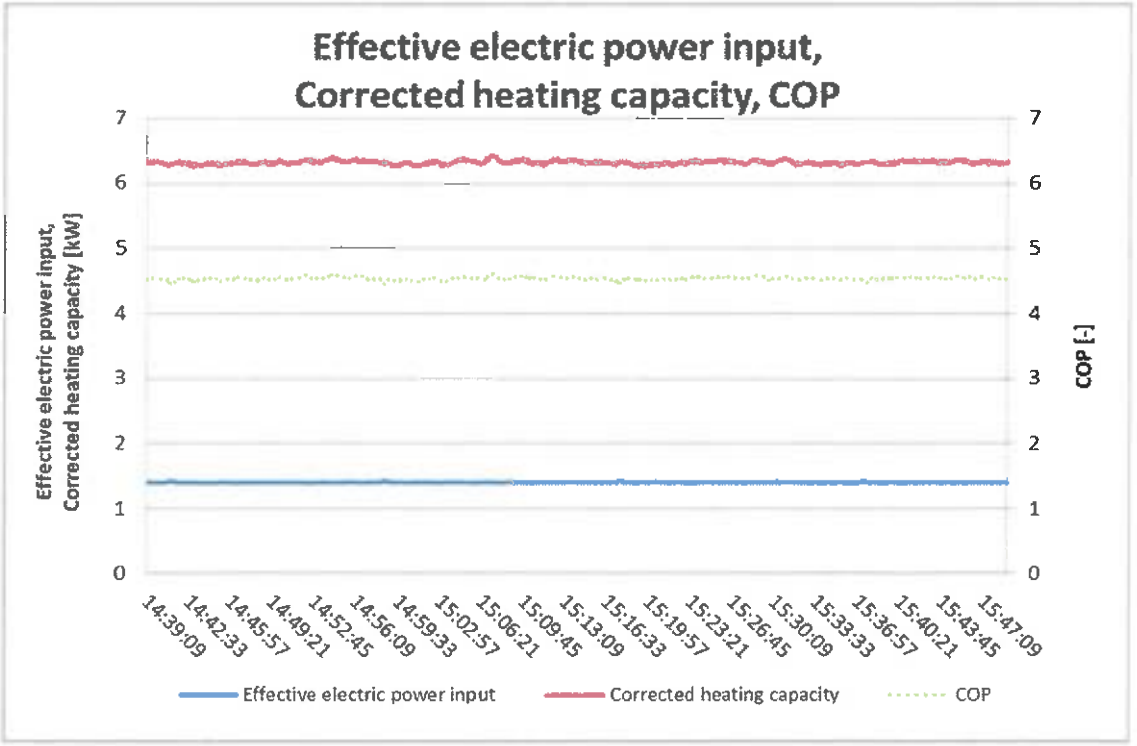


Tested by:	Ing. Tomáš Fiala	Date:	2021-11-22	Signed:	
Reviewed by:	Ing. Mario Jankola	Date:	2021-11-22	Signed:	

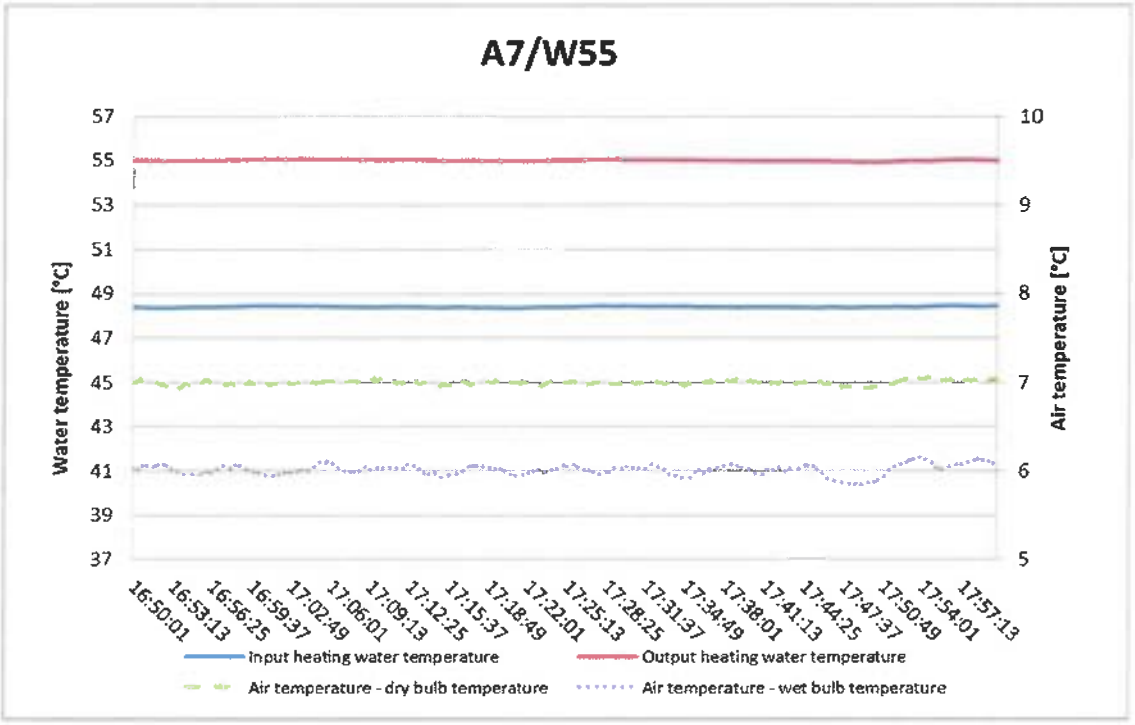
V. Graphs

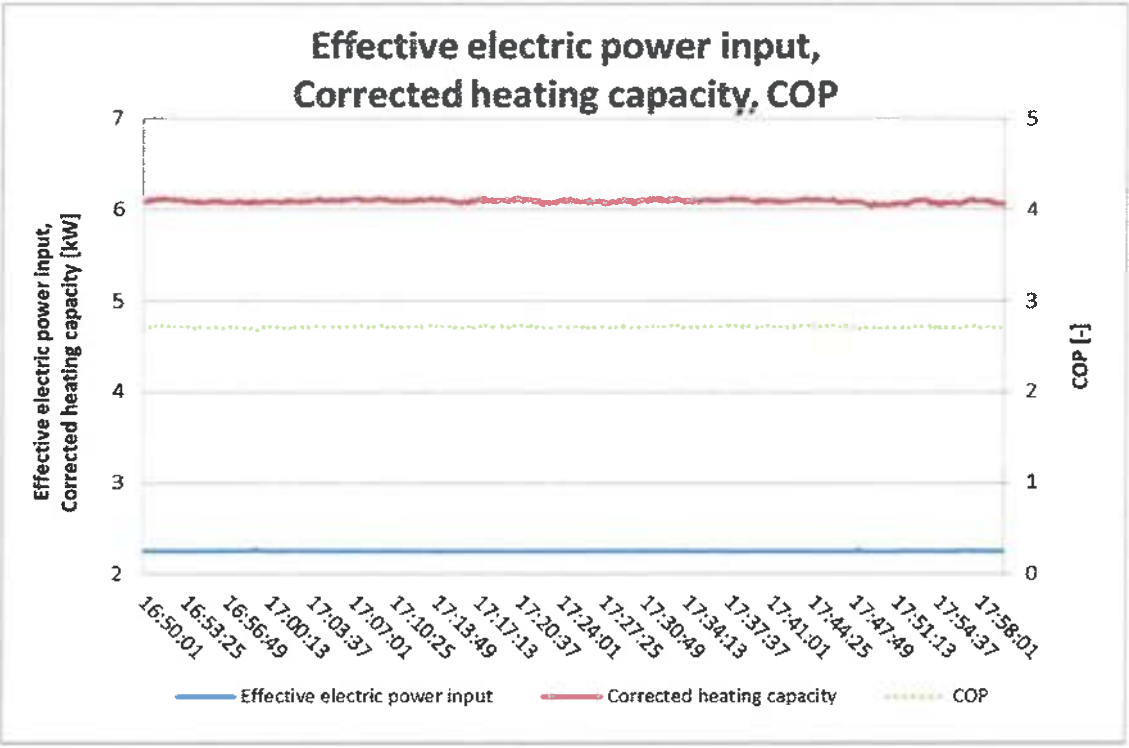
Heat Pump **HPOM006Z0* + HPOM020W#***: A7/W35 (8 Stage)



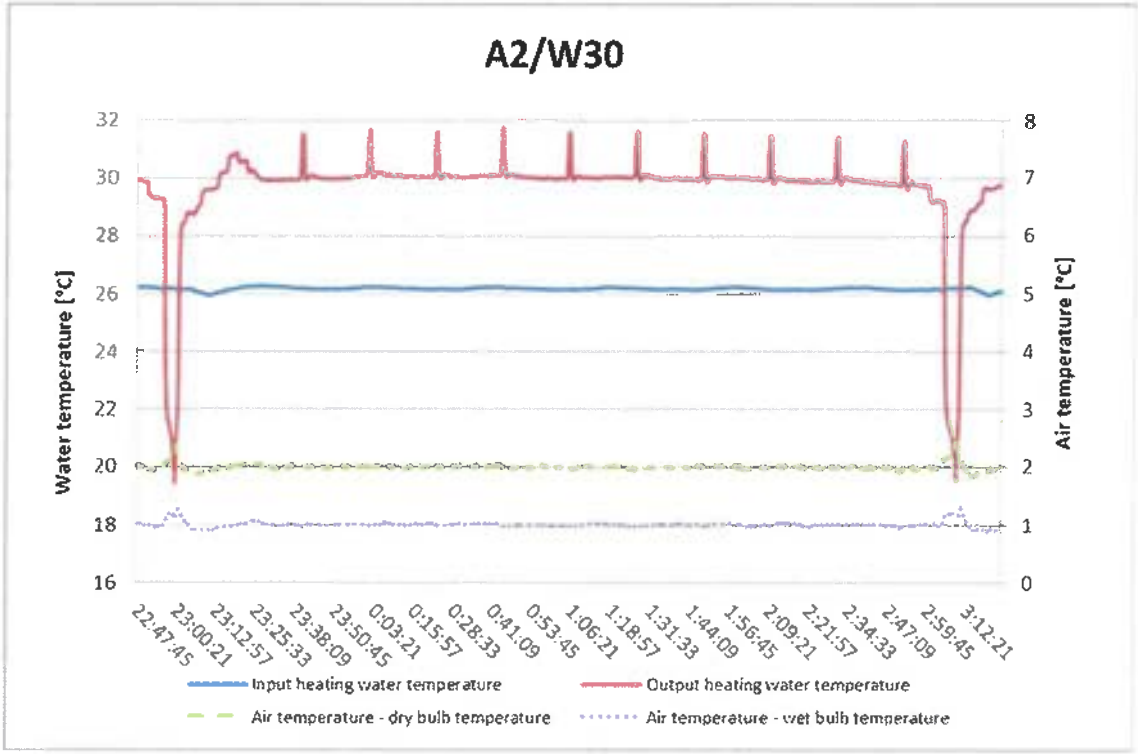


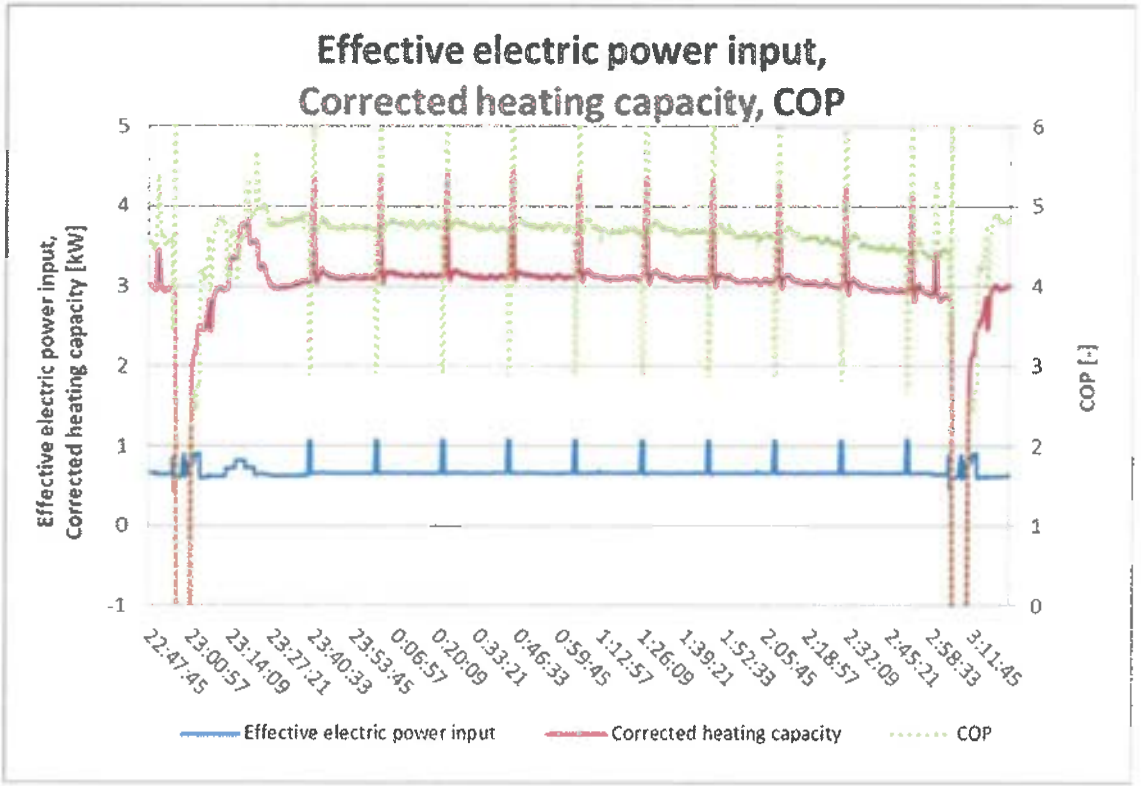
Heat Pump **HPOM006Z0* + HPOM020W#***: A7/W55 (10 Stage)



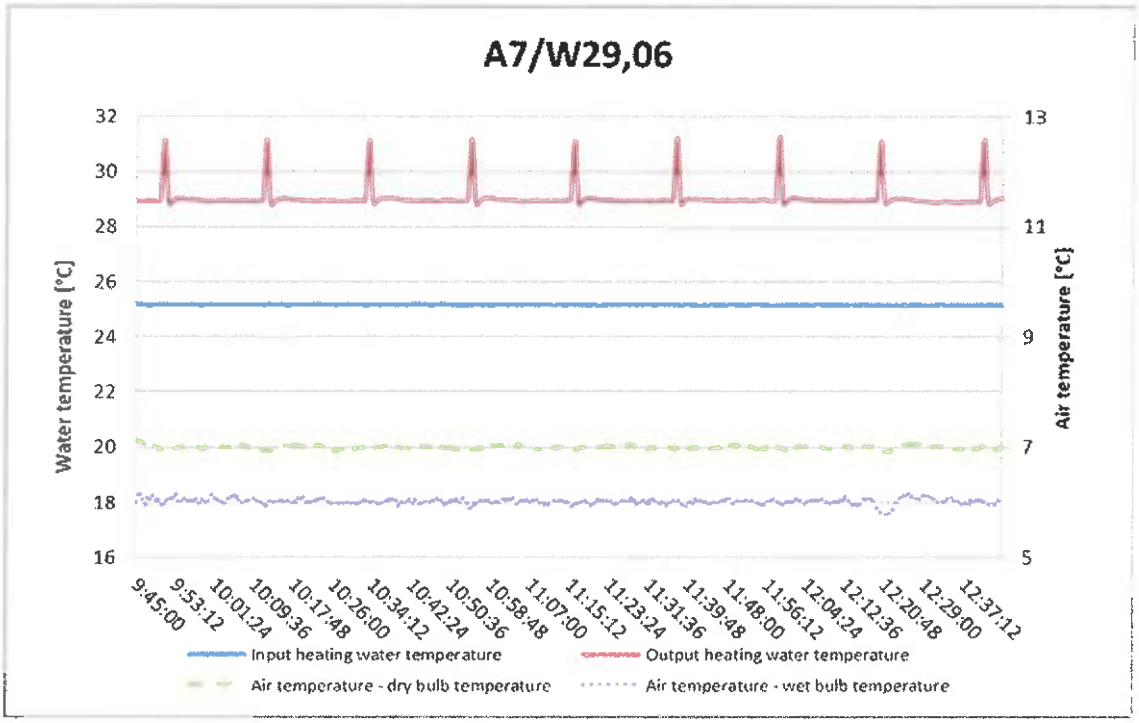


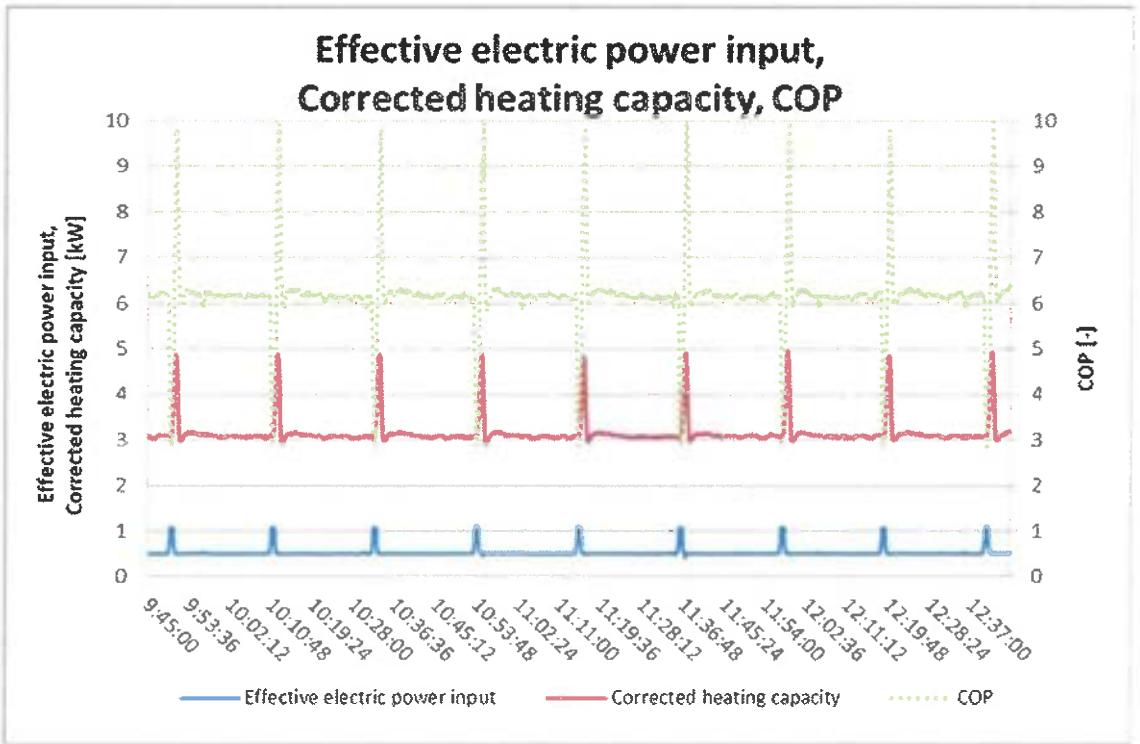
Heat Pump **HPOM006Z0* + HPOM020W#***: A2/W30 (1 Stage)



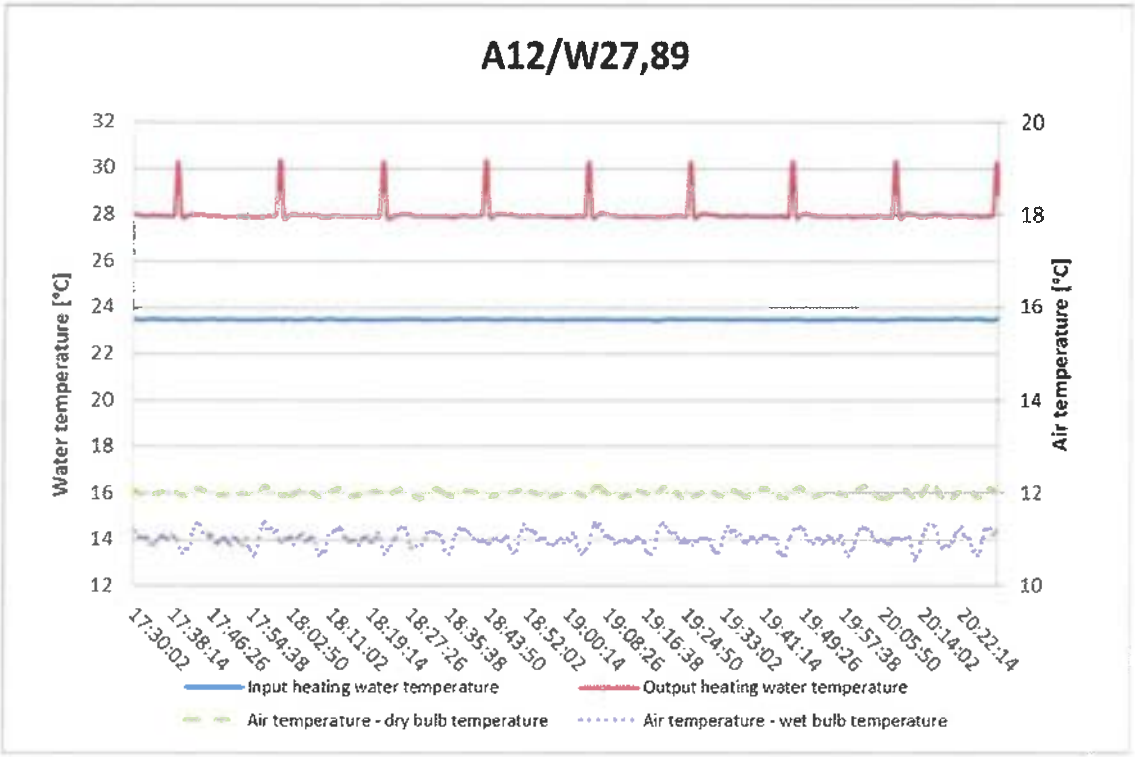


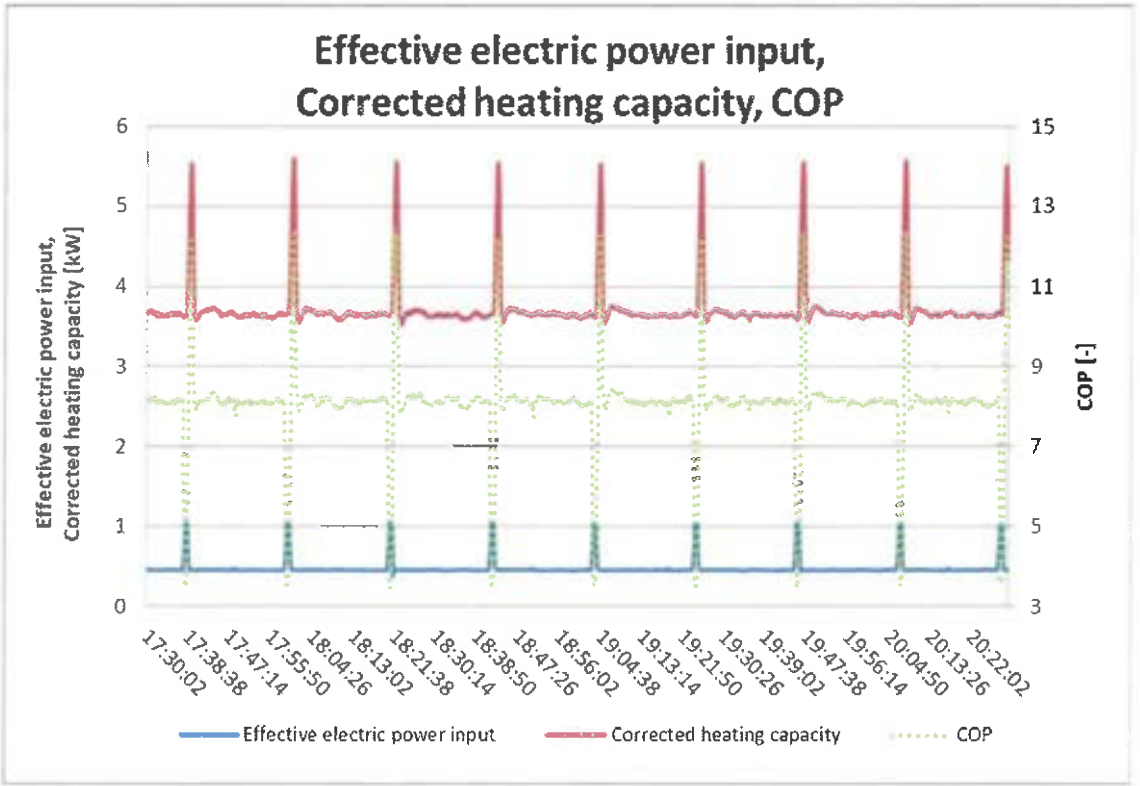
Heat Pump **HPOM006Z0* + HPOM020W#***: A7/W29.06 (1 Stage)



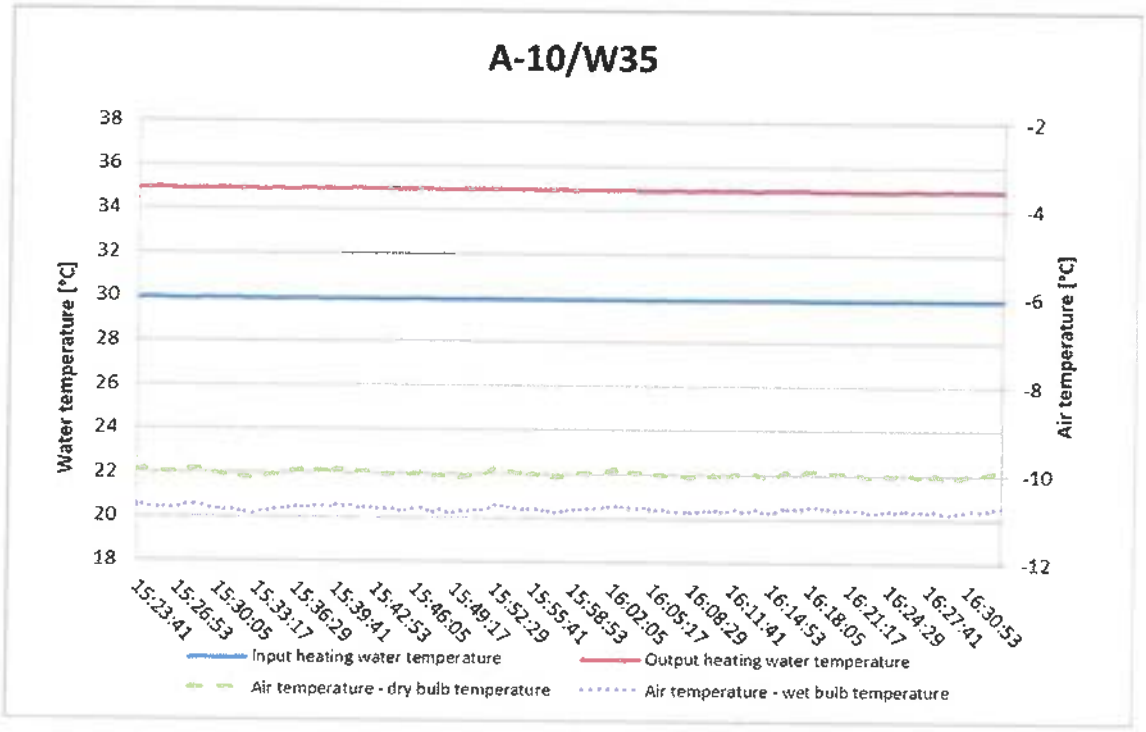


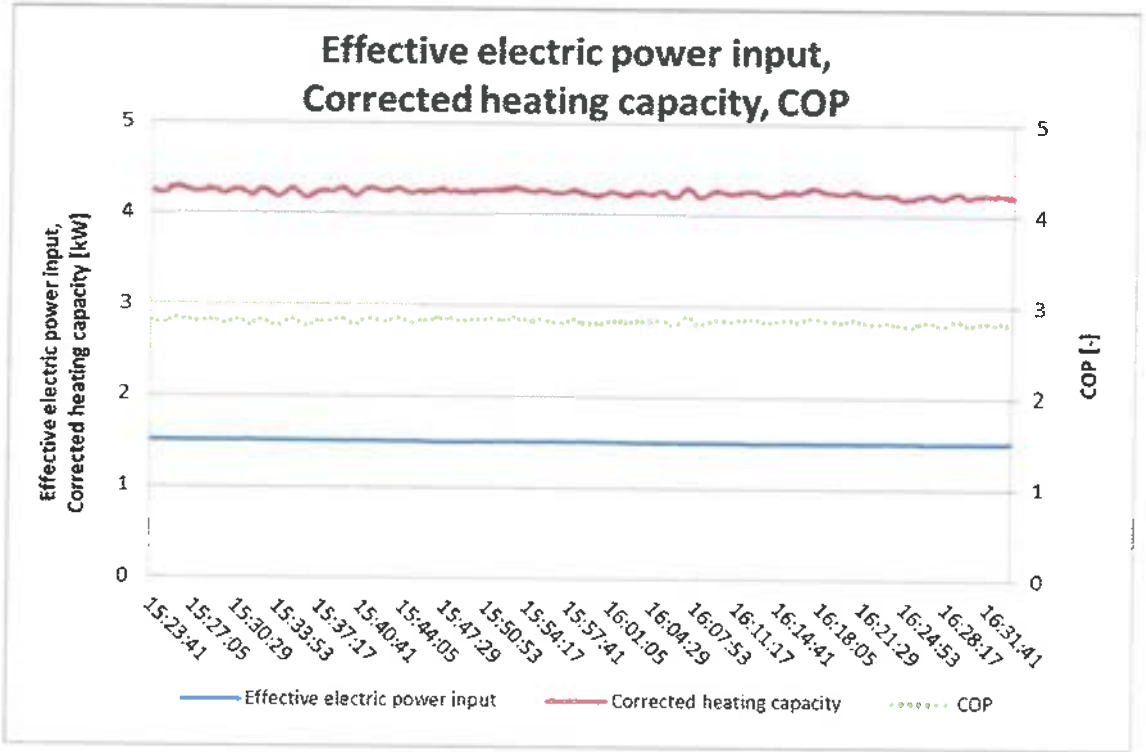
Heat Pump **HPOM006Z0* + HPOM020W#***: A12/W27.89 (1 Stage)



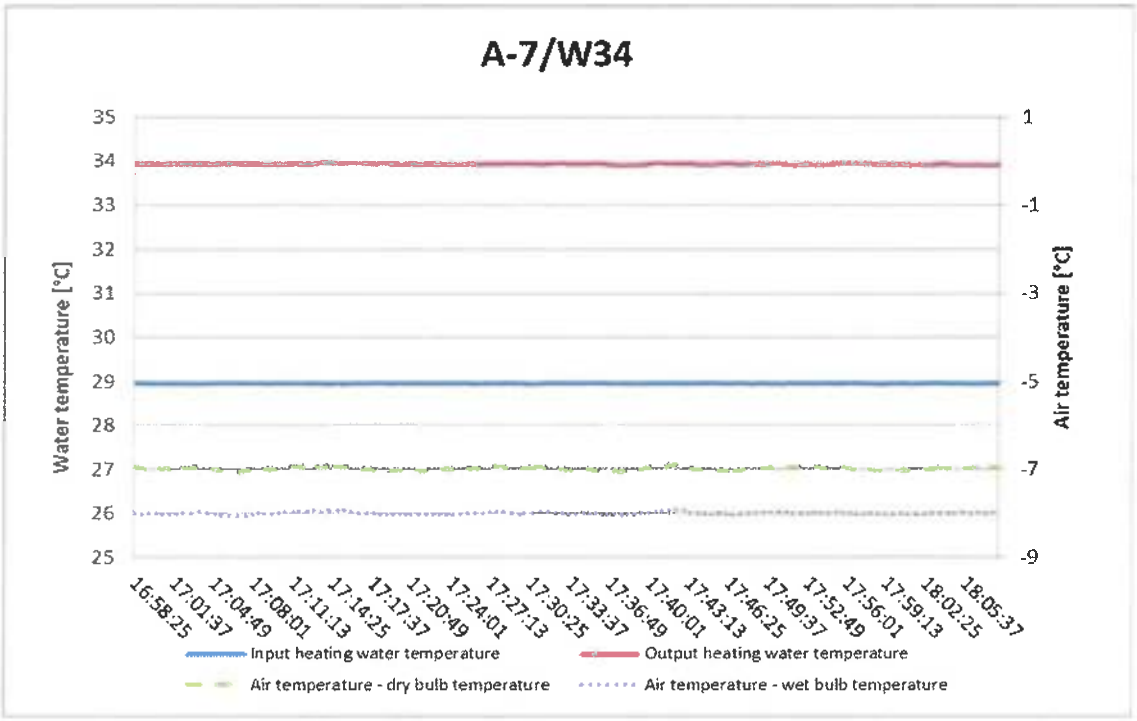


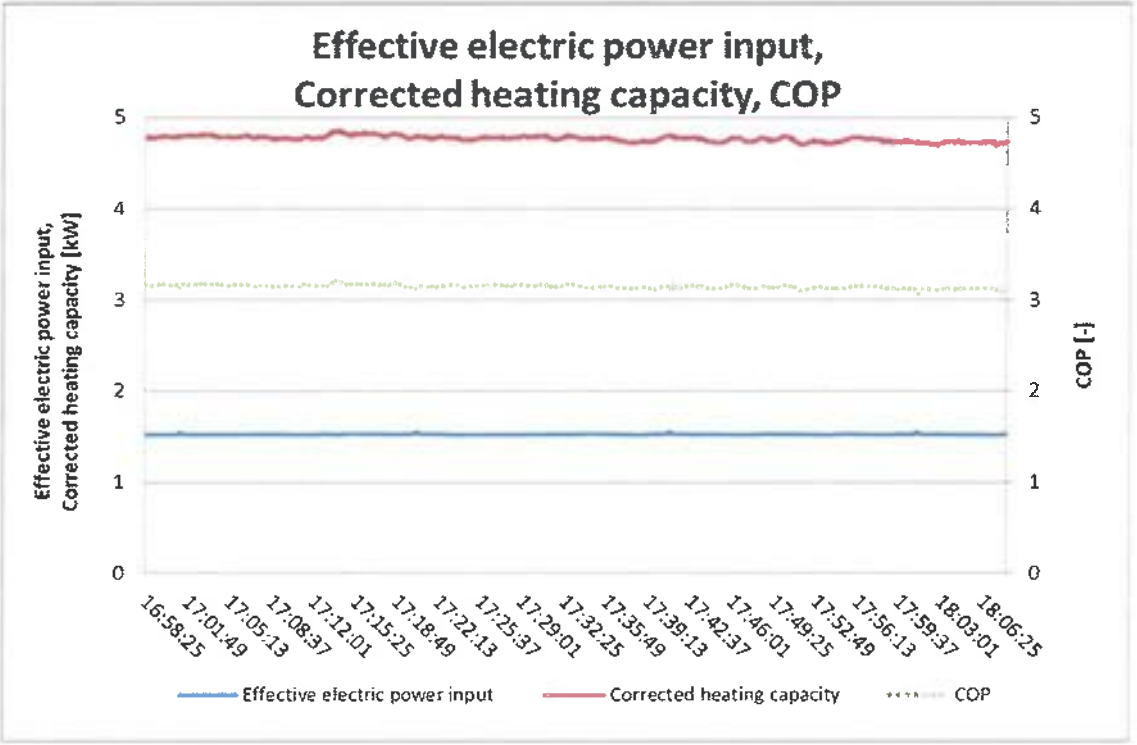
Heat Pump **HPOM006Z0* + HPOM020W#***: A-10/W35 (10 Stage)



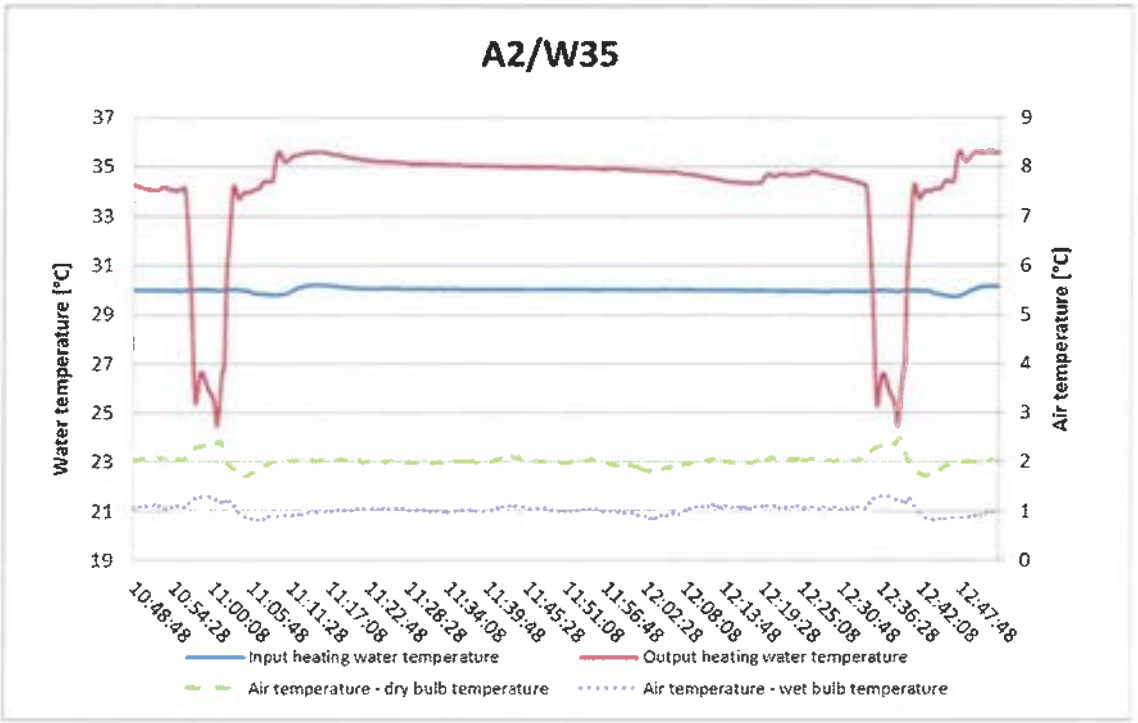


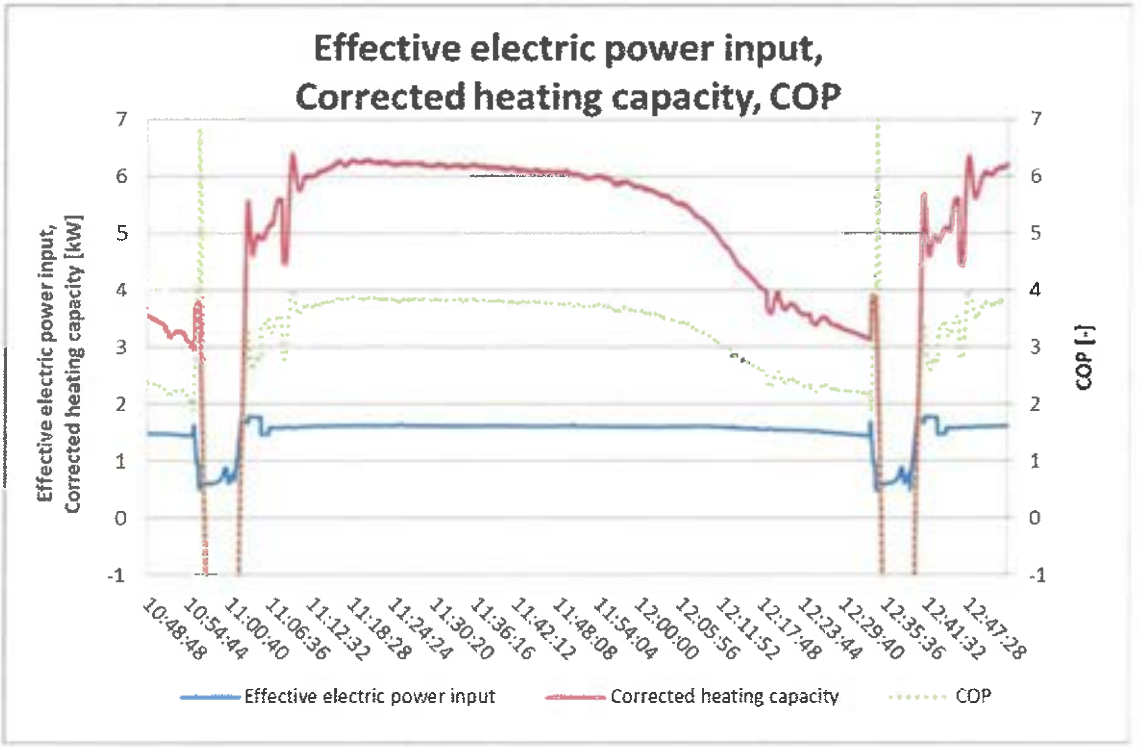
Heat Pump **HPOM006Z0* + HPOM020W#***: A-7/W34 (10 Stage)



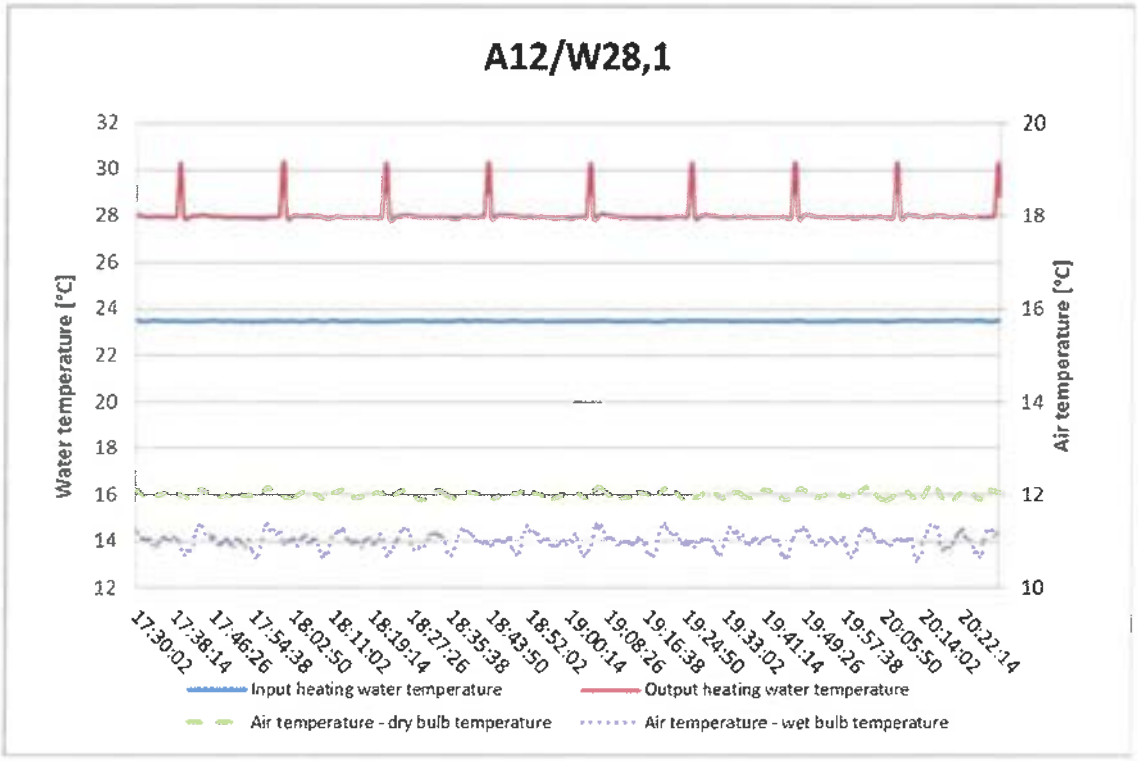


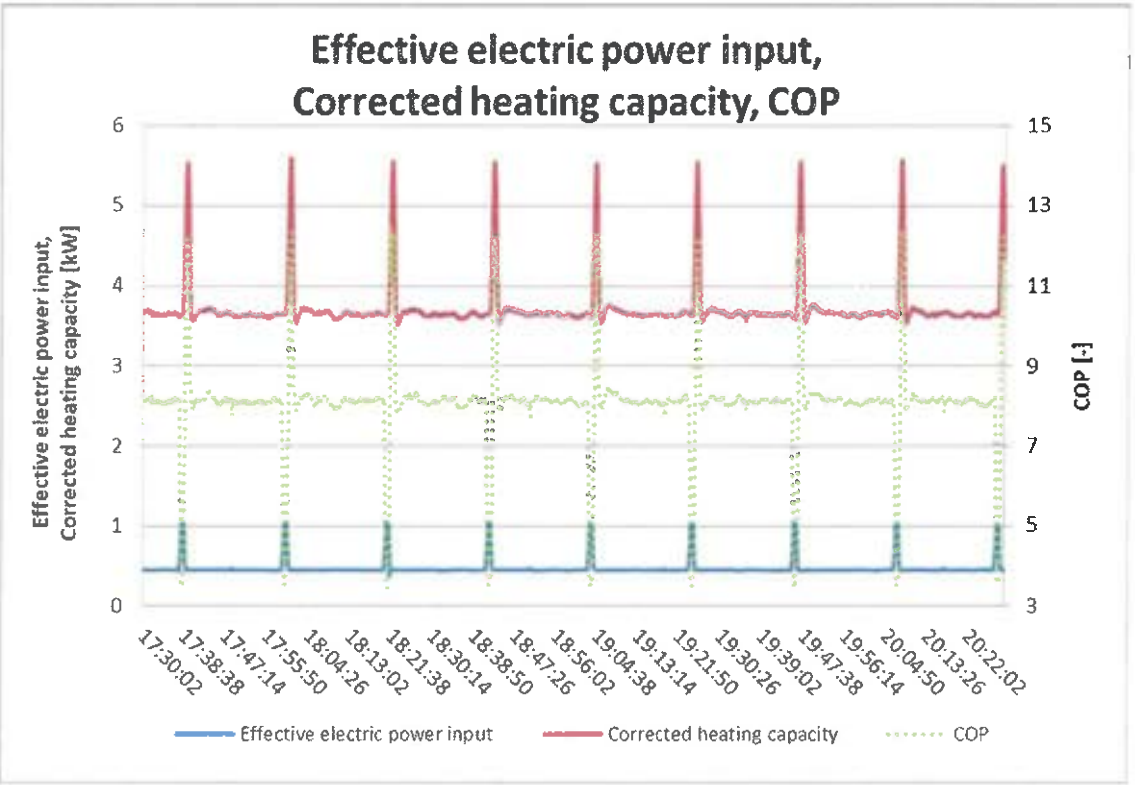
Heat Pump **HPOM006Z0* + HPOM020W#***: A2/W35 (10 Stage)



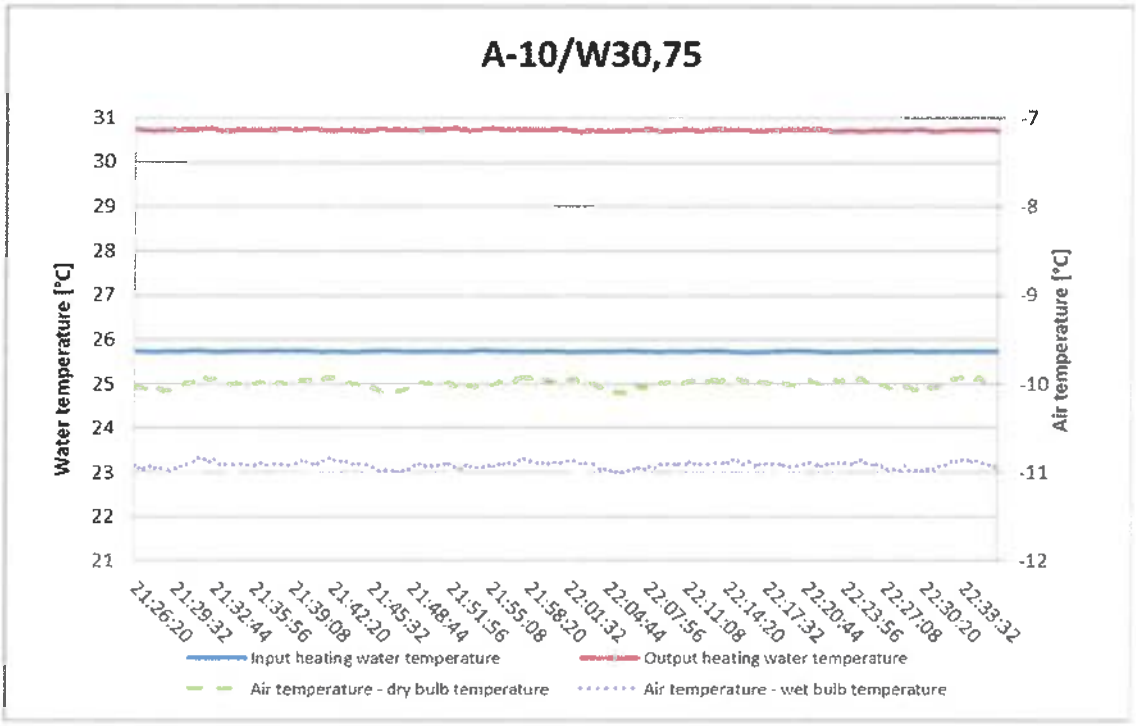


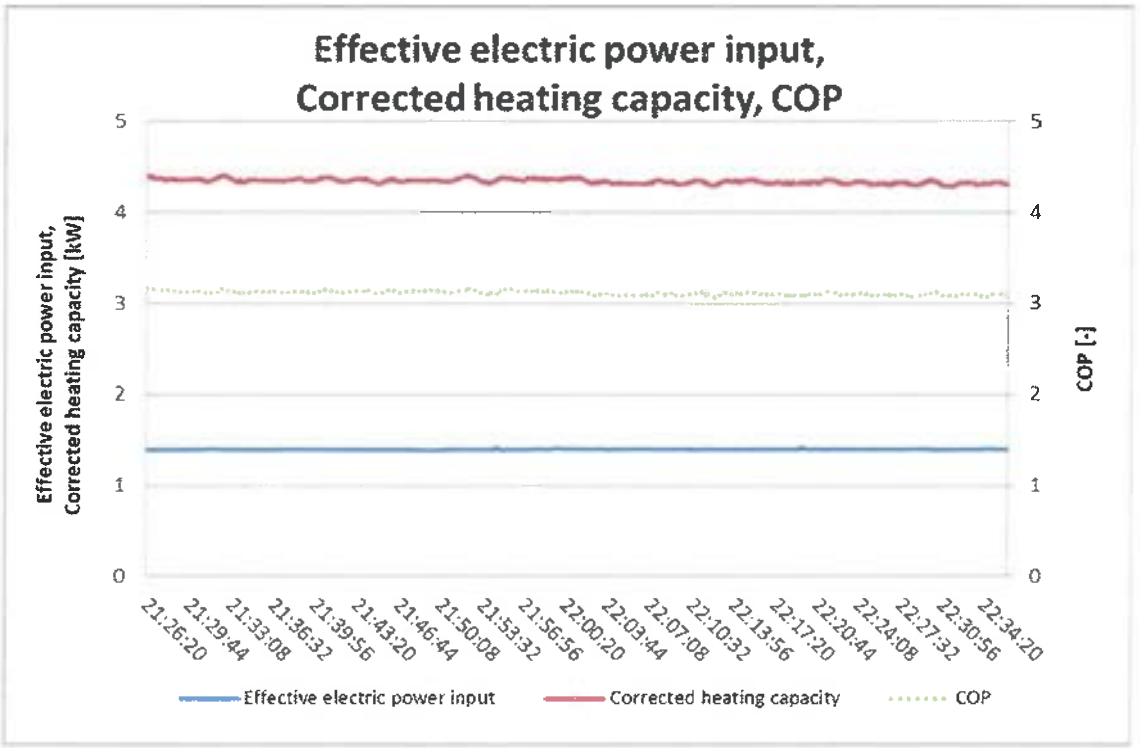
Heat Pump **HPOM006Z0* + HPOM020W#***: A12/W28.1 (1 Stage)



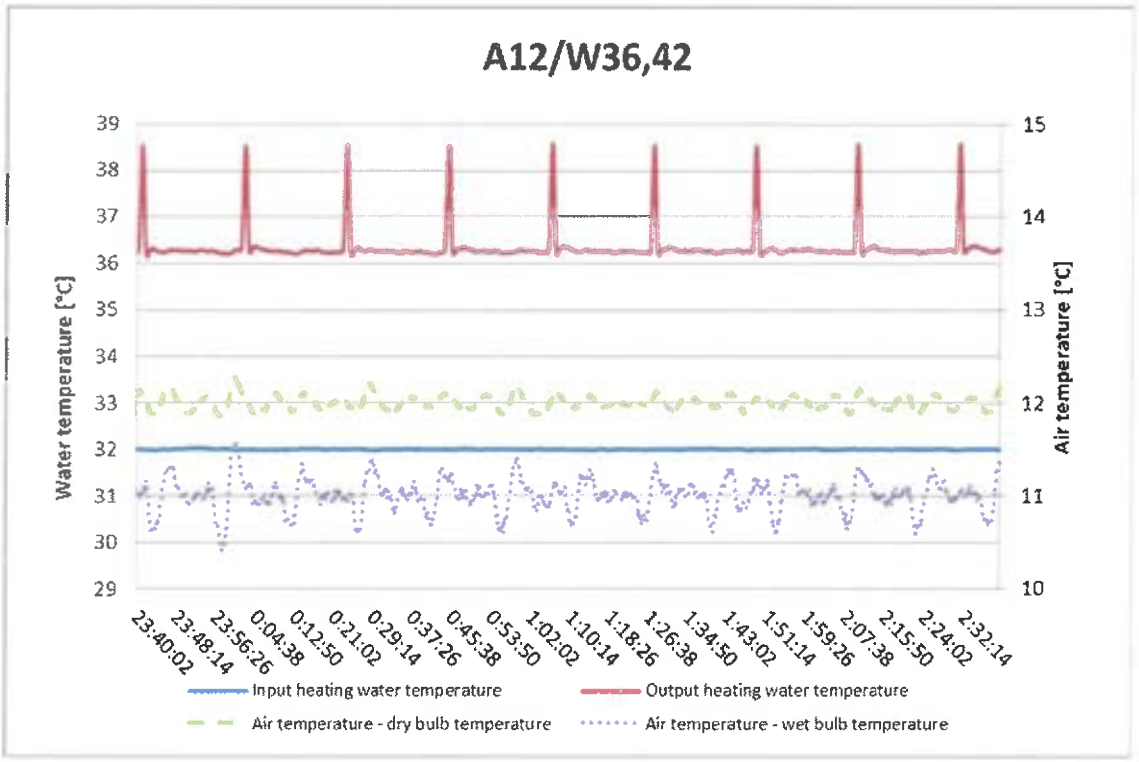


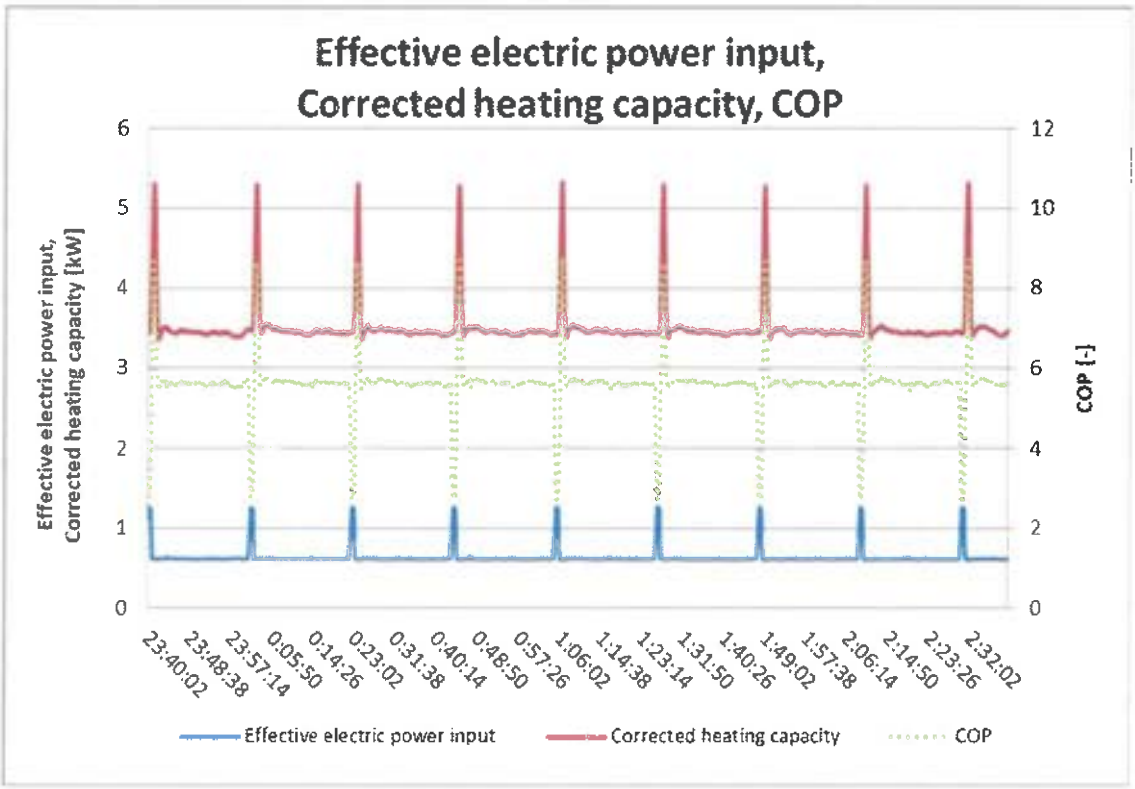
Heat Pump **HPOM006Z0* + HPOM020W#***: A-10/W30.75 (10 Stage)



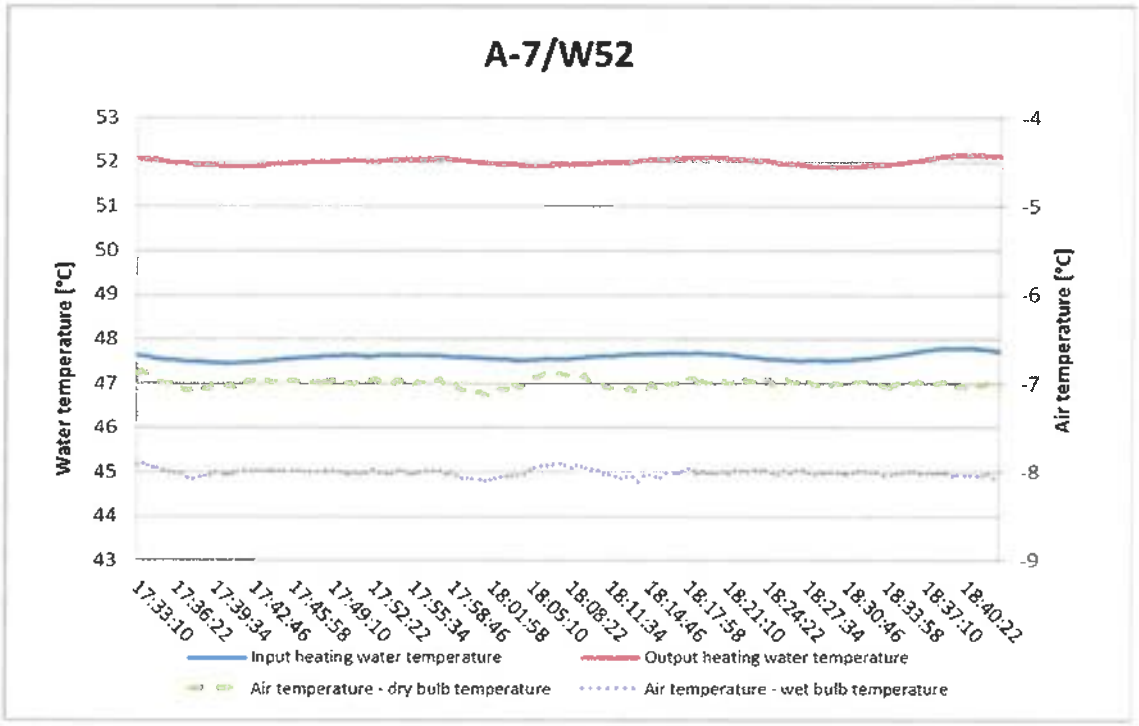


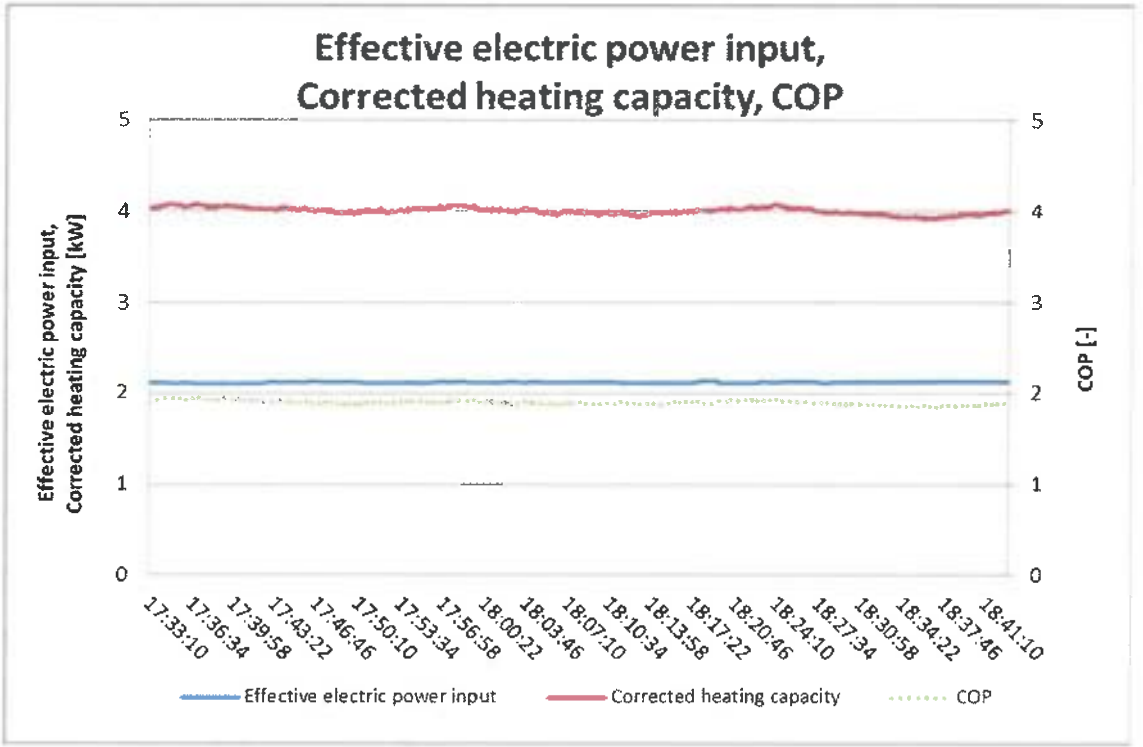
Heat Pump **HPOM006Z0* + HPOM020W#***: A12/W36.42 (1 Stage)



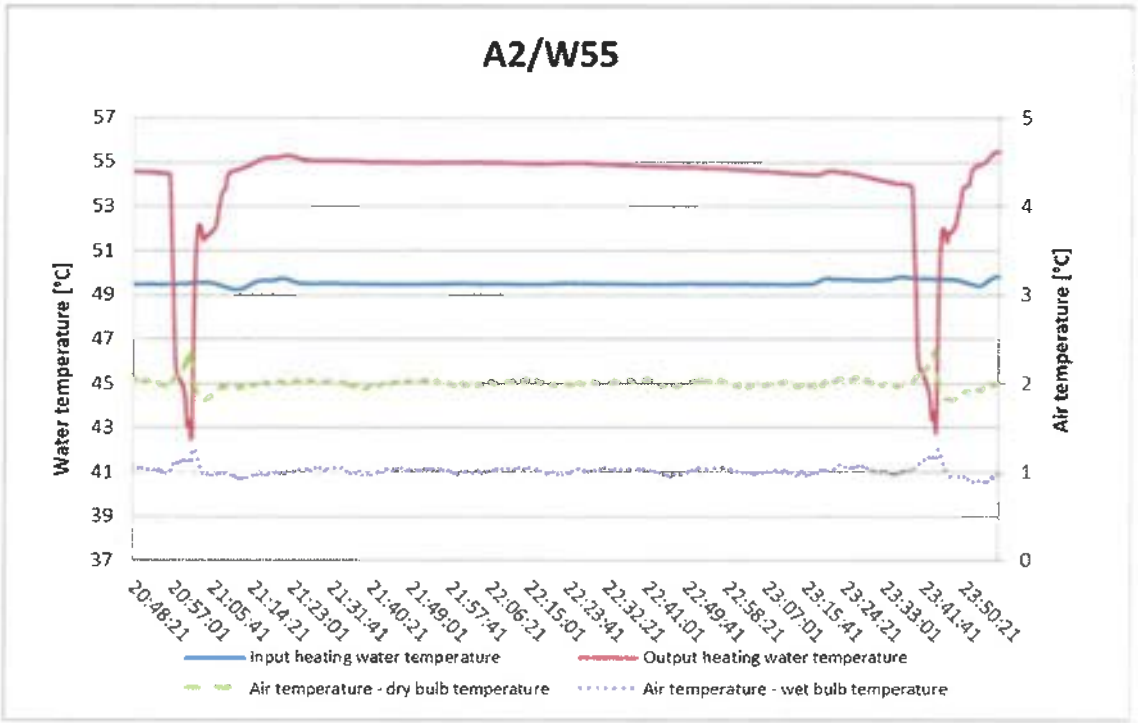


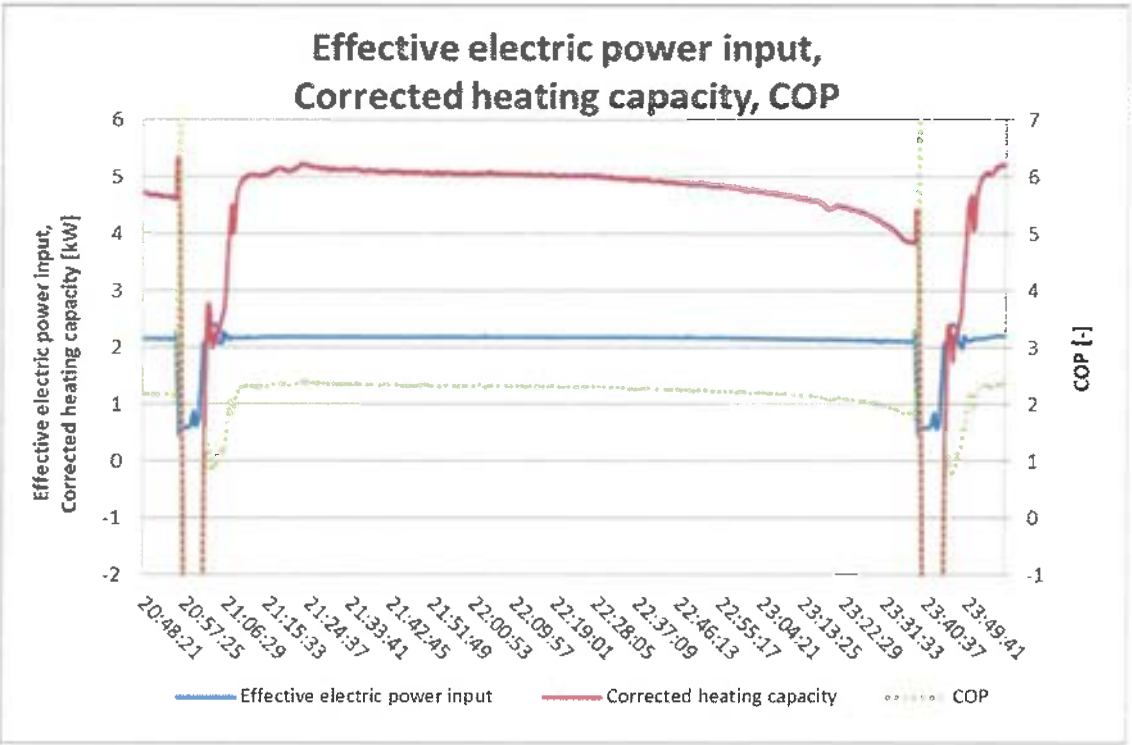
Heat Pump **HPOM006Z0* + HPOM020W#*:** A-7/W52 (10 Stage)



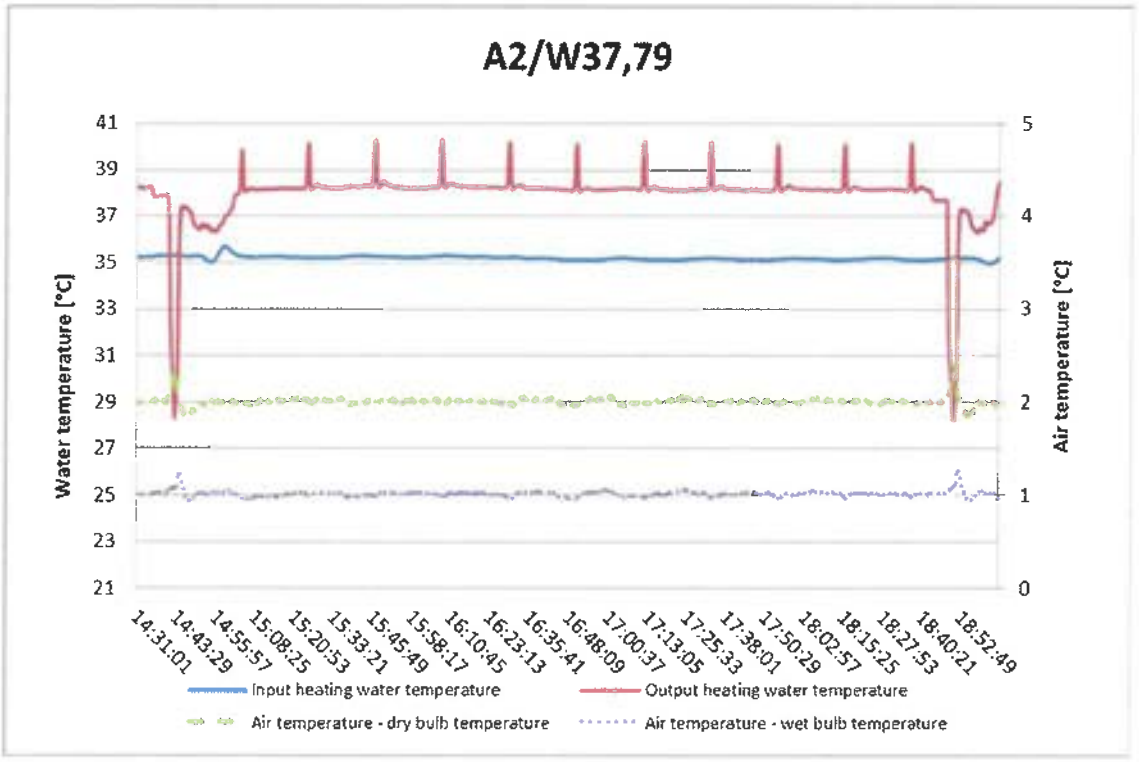


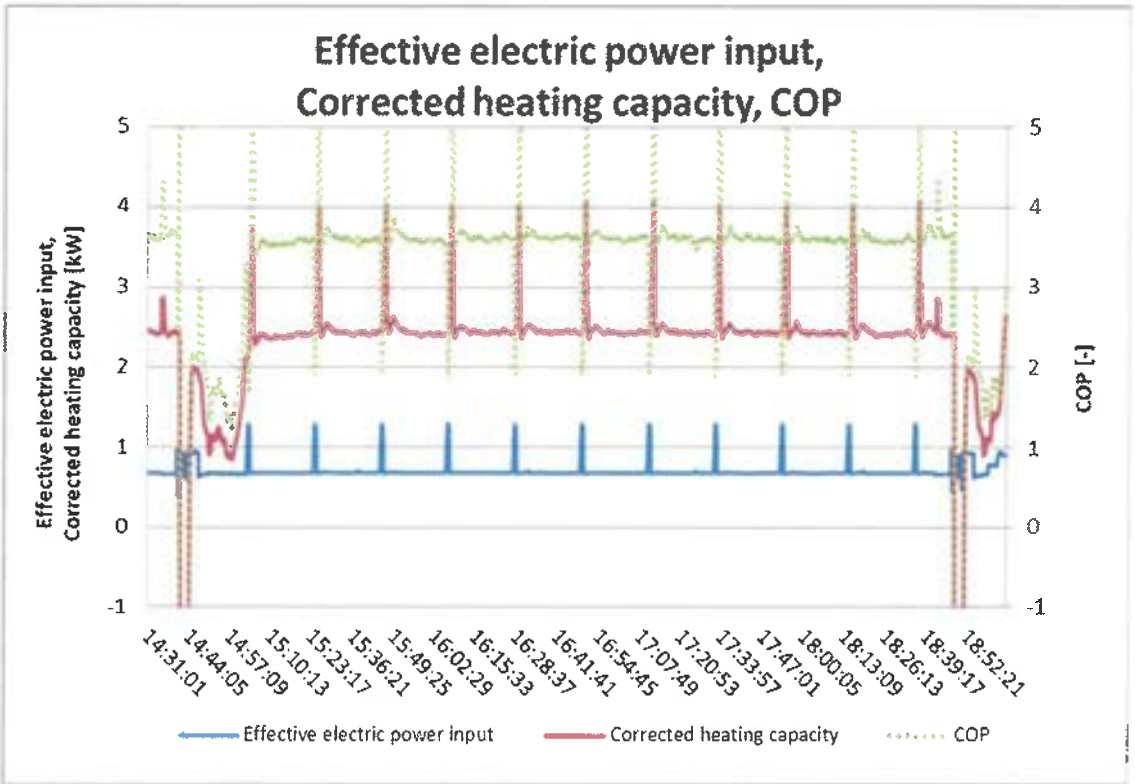
Heat Pump **HPOM006Z0* + HPOM020W#***: A2/W55 (10 Stage)



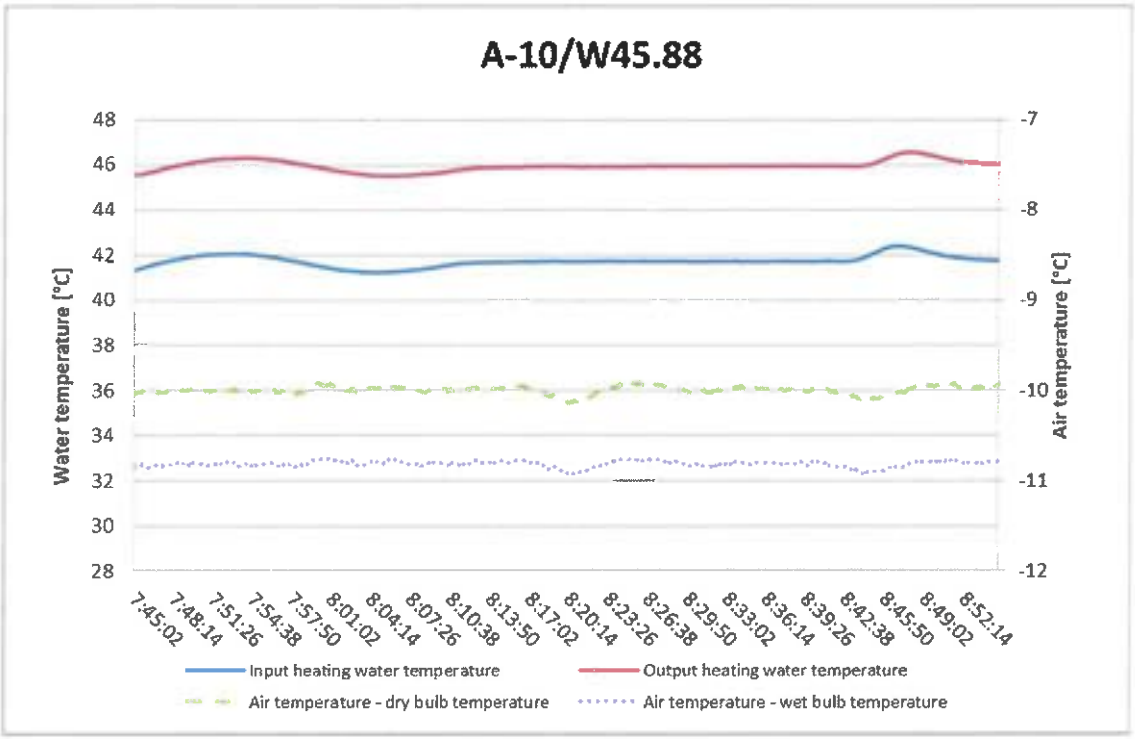


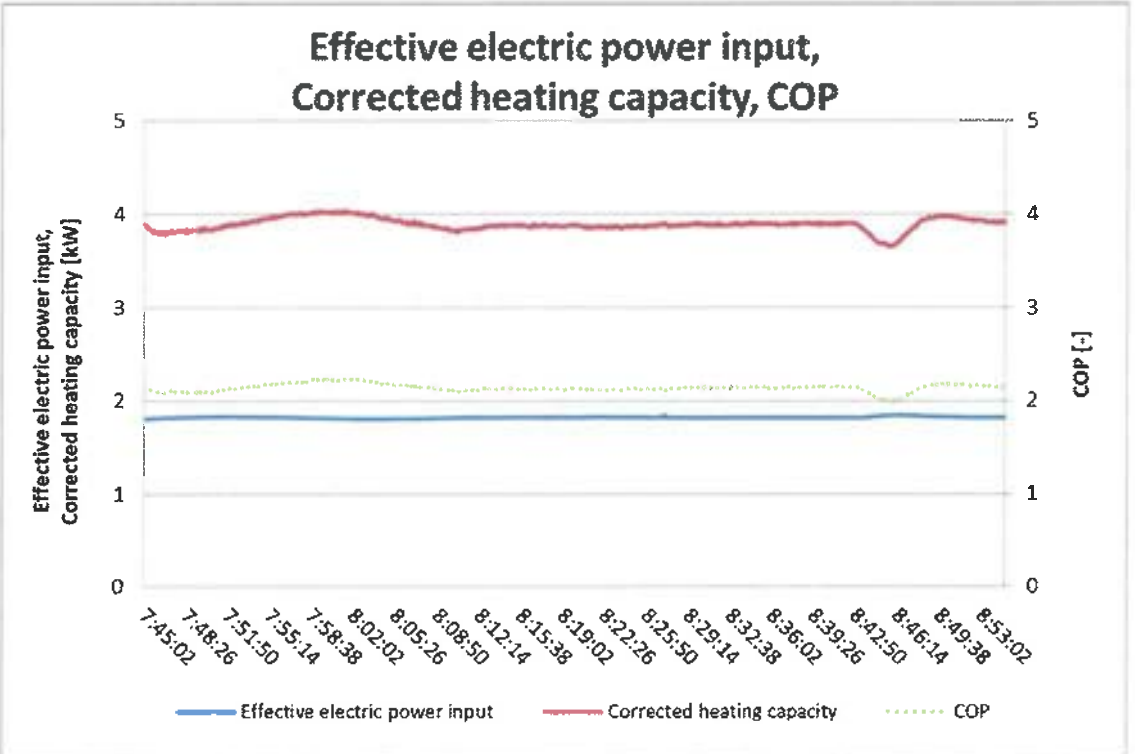
Heat Pump **HPOM006Z0* + HPOM020W#***: A2/W37.79 (1 Stage)





Heat Pump **HPOM006Z0* + HPOM020W#***: A-10/W45.88 (10 Stage)





VI. A list of other referenced documents

- Order B-73632 of 2021-06-01 (Order reg. no. B-73632 delivered on 2021-07-02)
- Contract B-73632/39
- Amendment to Contract B-73632/39.Z1 of 2021-10-29
- ČSN EN 14511-2:2019 - 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 14511-3:2019 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling a process chillers with electrically driven compressors - Part 3: Test methods
- ČSN EN 14511-4:2019 - 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 14825:2020 - Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance
- EHPA Testing regulation – Testing of Air/Water Heat Pumps – Additional requirements for granting the international quality label for heat pumps – Version 2.4a
- Background of the task 39-15772
- Record measurement file: 39-15772 Hewalex (2x EHPA).zip

Test Report compiled by: Ing. Tomáš Fiala – Test engineer

Test Report approved by:

Milan Holomek
Head of Heat and Environment-Friendly Equipment
Test Station

Accredited Testing Laboratory No. 1045.1 * STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. * 1

-End of text-

OŚWIADCZENIE

Producent HEWALEX Sp. z o.o. Sp.K. oświadcza, iż pompy ciepła

1) PCCO MONO 6 (HPOM006ZO*, HPOM02015#*)
Oznaczenie/typ/identyfikator modelu

2) PCCO MONO 9 (HPOM009ZO*, HPOM02015#*)
Oznaczenie/typ/identyfikator modelu

3) PCCO MONO 11 (HPOM011ZO*, HPOM02015#*)
Oznaczenie/typ/identyfikator modelu

4)
Oznaczenie/typ/identyfikator modelu

5)
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.

Czechowice-Dziedzice, 26.III.2024
Miejscowość, data

PROKURENT
Kornel Skiba
Podpis osoby upoważnionej

HEWALEX
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ul. Słowackiego 33
43-502 Czechowice-Dziedzice
NIP 6521703641