

Logo: Strojřrensky zkuřebm ůstav, s.p., Brno, Ceskř republika Engineering Test Institute, Public Enterprise, Brno, Czech Republic /Instytut badař technicznych, Przedsiębiorstwo publiczne, Brno, Republika Czeska/

CERTYFIKAT BADAŃ

Nr

O-B-01929-22 wersja 1

Klient

SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibřrż POLSKA

Produkt

Zewnęřzna pompa ciepła powietrze/woda - monoblok

Oznaczenie typu / znak towarowy

NEXUS M14 PRO  
NEXUS M9 PRO

Metody badař

ČSN EN 14511-2:2019, ČSN EN 14511-3:2019,  
ČSN EN 14511-4:2019, ČSN EN 12102-1 :2018, ČSN EN 12102-1:2018, Przepisy dotyczřce badař EHPA - Badanie pomp ciepła powietrze/woda, wersja 2.4a

Podstawa certyfikatu

Raporty z badař:  
39-15771/T z dnia 2022-12-07 r.  
39-15771/H z dnia 2022-12-07 r.  
Dokumentacja techniczna SUNEX S.A.

Zastosowanie temperatury

**NISKA TEMPERATURA,**  
(Referencyjna temperatura wody 35 °C)  
**ŚREDNIA TEMPERATURA**  
(Referencyjna temperatura wody 55 °C)

Specyfikacja warunków

Kontrola prędkości sprężarki	Zmienna	Objętościowe natężenie przepływu wody grzewczej (wewnęřzny wymiennik ciepła)	Zmienne
Temperatura wody na wylocie (wewnęřzny wymiennik ciepła)	Zmienna	Objętościowe natężenie przepływu cieczy źródlowej (zewnęřzny wymiennik ciepła)	-
Funkcja	Odwracalna		

O-B-01929-22 wersja 1, strona 1 (2)  
/pieczęć i stopka z danymi adresowymi/

WYNIKI

Nazwa modeli				NEXUS M14 PRO	NEXUS N9 PRO
Warunki temperaturowe *				(Badano)	(Nie badano)
A7/W35	skorygowana pojemność cieplna	[kW]		13.592	10.000
	efektywna moc wejřciowa	[kW]		2.896	2.237
	współczynnik wydajności	[-]		4.694	4.470
	ustawienie sterowania	[-]		-	-
A2/W35	skorygowana pojemność cieplna	[kW]		9.917	7.700
	efektywna moc wejřciowa	[kW]		2.737	2.110
	współczynnik wydajności	[-]		3.623	3.650
	ustawienie sterowania	[-]		-	-

2024-03-25, 14:27

## POŚWIADCZONE TŁUMACZENIE Z JĘZYKA ANGIELSKIEGO

Strona 2 z 2

Nr rep. 849/2024

Poziom mocy akustycznej w warunkach temperatury A7/W55\*:

$L_{WA}$	[dB(A)]	$57,9 \pm 1,5$	$58,0 \pm 1,5$
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Klasa dokładności: Inżynierska (klasa 2)

(\*) Komentarz do skróconego oznaczenia: np. A7/W55

A (powietrze), 7 (powietrze wejściowe - temperatura termometru suchego w °C) / W (woda), 35 (wyjściowa temperatura wody grzewczej)

(Badano) Ta próbka badawcza została przebadana w Laboratorium Badawczym.

(Nie badano) Dane techniczne zostały zadeklarowane przez Producenta zgodnie ze specyfikacją gamy modeli i nie zostały przebadane przez Laboratorium Badawcze.

Engineering Test Institute, Public Enterprise, potwierdza niniejszym certyfikatem, że badania przedmiotowego produktu zostały przeprowadzone i uzyskały wyniki podane powyżej. Engineering Test Institute, Public Enterprise jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-12-07

Milan Homolek, Kierownik Działu Badań Urządzeń Grzewczych i Przyjaznych Środowisku /podpis odręczny/

/Pieczęć okrągła/

- KONIEC CERTYFIKATU -  
O-B-01929-22 wersja.1, strona 2 (2)

Niniejszym poświadczam zgodność powyższego tłumaczenia z oryginałem dokumentu w języku angielskim. Rafał Wisiński, tłumacz przysięgły języka angielskiego wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod numerem TP/329/05.

Rep. Nr 849/2024



2024-03-25, 14:27

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CERTYFIKAT BADAŃ

Nr O-B-01931-22 wersja 1

Klient SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibórz POLSKA

Produkt Zewnętrzna pompa ciepła powietrze/woda - monoblok

Oznaczenie typu / znak towarowy NEXUS M14 PRO  
NEXUS M9 PRO

Metody badań ČSN EN 14511-2:2019, ČSN EN 14511-3:2019,  
ČSN EN 14511-4:2019, ČSN EN 12102-1 :2018, ČSN EN 12102-  
1:2018, Przepisy dotyczące badań EHPA - Badanie pomp ciepła powietrze/woda,  
wersja 2.4a

Podstawa certyfikatu Raporty z badań:  
39-15771/T z dnia 2022-12-07 r.  
39-15771/H z dnia 2022-12-07 r.  
Dokumentacja techniczna SUNEX S.A.

Zastosowanie temperatury NISKA TEMPERATURA  
(Referencyjna temperatura wody 35 °C)

Referencyjny sezon grzewczy "A" = średnia / "W" = cieplejsza / "C" =zimniejsza (Referencyjna temperatura projektowa T<sub>designh</sub> =  
-10 °C / +2°C)

Specyfikacja warunków

Kontrola prędkości sprężarki	Zmienna	Objętościowe natężenie przepływu wody grzewczej (wewnętrzny wymiennik ciepła)	Zmienne
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	Zmienna	Objętościowe natężenie przepływu cieczy źródłowej (zewewnętrzny wymiennik ciepła)	-
Funkcja	Odwracalna		

O-B-01930-22 wersja 1, strona 1 (2)  
/pieczęć i stopka z danymi adresowymi/  
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WYNIKI

NISKA TEMPERATURA  
(Referencyjna temperatura wody 35 °C)

Nazwa modeli			NEXUS M14 PRO	NEXUS N9 PRO
Warunki temperaturowe *			(Badano)	(Nie badano)
Ogrzewanie przy pełnym obciążeniu	P <sub>designh</sub> [kW]	A	9.71	7.52
		W	9.92	7.70
		C	14.23	10.85

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POŚWIADCZONE TŁUMACZENIE Z JĘZYKA ANGIELSKIEGO				
Strona 2 z 2		Nr rep. 852/2024		
Temperatura biwalentna	T <sub>biwalentna</sub> [°C]	A	-7	-7
		W	2	2
		C	-7	-7
Sezonowy współczynnik wydajności	SCOP [-]	A	3.73	4.79
		W	4.39 (nie badano)	5.91
		C	3.07 (nie badano)	3.59
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	n <sub>s</sub> [%]	A	197.8	188.7
		W	237.8 (nie badano)	233.6
		C	144.3 (nie badano)	140.5

(\*)Komentarz do skróconego oznaczenia: np. A7/W55  
A (powietrze), 7 (powietrze wejściowe - temperatura termometru suchego w °C) / W (woda), 35 (wyjściowa temperatura wody grzewczej)

(Badano) Ta próbka badawcza została przebadana w Laboratorium Badawczym.

(Nie badano) Dane techniczne zostały zadeklarowane przez Producenta zgodnie ze specyfikacją gamy modeli i nie zostały przebadane przez Laboratorium Badawcze.

Engineering Test Institute, Public Enterprise, potwierdza niniejszym certyfikatem, że badania przedmiotowego produktu zostały przeprowadzone i uzyskały wyniki podane powyżej. Engineering Test Institute, Public Enterprise jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-12-07  
Milan Homolek, Kierownik Działu Badań Urządzeń Grzewczych i Przyjaznych Środowisku /podpis odręczny/  
/Pieczęć okrągła/

- KONIEC CERTYFIKATU -  
O-B-01930-22 wersja.1, strona 2 (2)

Niniejszym poświadczam zgodność powyższego tłumaczenia z oryginałem dokumentu w języku angielskim. Rafał Wisiński, tłumacz przysięgły języka angielskiego wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod numerem TP/329/05.  
Rep. Nr 852/2024

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CERTYFIKAT BADAŃ

Nr

O-B-01931-22 wersja 1

Klient

SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibóř POLSKA

Produkt

Zewnętrzna pompa ciepła powietrze/woda - monoblok

Oznaczenie typu / znak towarowy

NEXUS M14 PRO  
NEXUS M9 PRO

Metody badań

ČSN EN 14511-2:2019, ČSN EN 14511-3:2019,  
ČSN EN 14511-4:2019, ČSN EN 12102-1 :2018, ČSN EN 12102-1:2018, Przepisy dotyczące badań EHPA - Badanie pomp ciepła powietrze/woda, wersja 2.4a

Podstawa certyfikatu

Raporty z badań:  
39-15771/T z dnia 2022-12-07 r.  
39-15771/H z dnia 2022-12-07 r.  
Dokumentacja techniczna SUNEX S.A.

Zastosowanie temperatury

ŚREDNIA TEMPERATURA  
(Referencyjna temperatura wody 55 °C)

Referencyjny sezon grzewczy  
-10 °C / +2°C)

"A" = średnia / "W" = cieplejsza / "C" =zimniejsza (Referencyjna temperatura projektowa T<sub>designh</sub> =

Specyfikacja warunków

Kontrola prędkości sprężarki	Zmienna	Objętościowe natężenie przepływu wody grzewczej (wewnętrzny wymiennik ciepła)	Zmienne
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	Zmienna	Objętościowe natężenie przepływu cieczy źródłowej (zewnętrzny wymiennik ciepła)	-
Funkcja	Odwracalna		

O-B-01931-22 wersja 1, strona 1 (2)

/pieczęć i stopka z danymi adresowymi/

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WYNIKI

ŚREDNIA TEMPERATURA

(Referencyjna temperatura wody 55 °C)

Nazwa modeli			NEXUS M14 PRO	NEXUS N9 PRO
Warunki temperaturowe *			(Badano)	(Nie badano)
Ogrzewanie przy pełnym obciążeniu	P <sub>designh</sub> [kW]	A	9.49	7.10
		W	9.78	7.42
		C	14.21	10.79
Temperatura biwalentna	T <sub>biwalentna</sub> [°C]	A	-7	-7
		W	2	2
		C	-7	-7

POŚWIADCZONE TŁUMACZENIE Z JĘZYKA ANGIELSKIEGO				
Strona 2 z 2		Nr rep. 851/2024		
Sezonowy współczynnik wydajności	SCOP [-]	A	3.73	3.61
		W	4.39 (nie badano)	4.23
		C	3.07 (nie badano)	2.95
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	$\eta_s$ [%]	A	146.4	141.6
		W	172.6 (nie badano)	166.2
		C	120.0 (nie badano)	114.9

(\*)Komentarz do skróconego oznaczenia: np. A7/W55  
A (powietrze), 7 (powietrze wejściowe - temperatura termometru suchego w °C) / W (woda), 35 (wyjściowa temperatura wody grzewczej)

(Badano) Ta próbka badawcza została przebadana w Laboratorium Badawczym.

(Nie badano) Dane techniczne zostały zadeklarowane przez Producenta zgodnie ze specyfikacją gamy modeli i nie zostały przebadane przez Laboratorium Badawcze.

Engineering Test Institute, Public Enterprise, potwierdza niniejszym certyfikatem, że badania przedmiotowego produktu zostały przeprowadzone i uzyskały wyniki podane powyżej. Engineering Test Institute, Public Enterprise jest akredytowanym Laboratorium Badawczym 1045.1.  
Brno, 2022-12-07  
Milan Homolek, Kierownik Działu Badań Urządzeń Grzewczych i Przyjaznych Środowisku /podpis odręczny/  
/Pieczęć okrągła/

- KONIEC CERTYFIKATU -  
O-B-01931-22 wersja.1, strona 2 (2)

Niniejszym poświadczam zgodność powyższego tłumaczenia z oryginałem dokumentu w języku angielskim. Rafał Wisiński, tłumacz przysięgły języka angielskiego wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod numerem TP/329/05.  
Rep. Nr 851/2024



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# CERTYFIKAT BADAŃ

Nr O-B-01970-21 wersja 1

Klient SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibřrż POLSKA

Produkt Zewnřtrzna pompa ciepła powietrze/woda - monoblok

Oznaczenie typu / znak towarowy NEXUS M14 PRO

Metody badař ČSN EN 14511-2:2019, ČSN EN 14511-3:2019,  
ČSN EN 14511-4:2019, ČSN EN 12102-1 :2018, ČSN EN 12102-  
1:2018, Przepisy dotyczące badař EHPA - Badanie pomp ciepła powietrze/woda,  
wersja 2.4a

Podstawa certyfikatu Raporty z badař:  
39-15771/T z dnia 2022-12-07 r.  
39-15771/H z dnia 2022-12-07 r.  
Dokumentacja techniczna SUNEX S.A.

Zastosowanie temperatury **NISKA TEMPERATURA,**  
(Referencyjna temperatura wody 35 °C)  
**ŚREDNIA TEMPERATURA**  
(Referencyjna temperatura wody 55 °C)

Referencyjny sezon grzewczy **"A" = řredni**  
(Referencyjna temperatura projektowa T<sub>designh</sub> = - 10 °C)

Specyfikacja warunkřw

Kontrola prędkości sprężarki	Zmienna	Objętościowe natężenie przepływu wody grzewczej (wewnřtrzny wymiennik ciepła)	Zmienne
Temperatura wody na wylocie (wewnřtrzny wymiennik ciepła)	Zmienna	Objętościowe natężenie przepływu cieczy źródlowej (zewnřtrzny wymiennik ciepła)	-
Funkcja	Odwracalna		

O-B-01970-21 wersja 1, strona 1 (2)  
/pieczęć i stopka z danymi adresowymi/

Tabela 1. SPEŁNIENIE WYMAGAŃ DOTYCZĄCYCH SEZONOWEJ EFEKTYWNOŚCI ENERGETYCZNEJ OGRZEWANIA POMIESZCZEŃ

Nazwa modeli	Sezonowa efektywność energetyczna ogrzewania pomieszczeń				Spełnienie wymogów
	Niska temperatura (wymóg 125%)		Średnia temperatura (wymóg 110%)		
	Wartość deklarowana/badana [%]	Klasa wydajności	Wartość deklarowana/badana [%]	Klasa wydajności	
NEXUS M14 PRO (Badano)	197.8	A+++	146.4	A++	TAK

Tabela 2. SPEŁNIENIE WYMAGAŃ DOTYCZĄCYCH POZIOMU MOCY AKUSTYCZNEJ

Nazwa modeli	Znamionowa moc cieplna [kW]	Wymagania dotyczące poziomu mocy akustycznej		Deklarowany/badany poziom mocy akustycznej		Spełnienie wymogów
		Jednostka zewnętrzna [dB(A)]	Jednostka wewnętrzna [dB(A)]	Jednostka zewnętrzna [dB(A)]	Jednostka wewnętrzna [dB(A)]	
NEXUS M14 PRO (Badano)	9.49	70	-	57.9	-	TAK

(Badano) Ta próbka badawcza została przebadana w Laboratorium Badawczym.

(Nie badano) Dane techniczne zostały zadeklarowane przez Producenta zgodnie ze specyfikacją gamy modeli i nie zostały przebadane przez Laboratorium Badawcze.

Engineering Test Institute, Public Enterprise, potwierdza niniejszym certyfikatem, że badania przedmiotowego produktu zostały przeprowadzone i uzyskały wyniki podane powyżej. Engineering Test Institute, Public Enterprise jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-12-07

Milan Homolek, Kierownik Działu Badań Urządzeń Grzewczych i Przyjaznych Środowisku /podpis odręczny/



/Pieczęć okrągła/

- KONIEC CERTYFIKATU -

O-B-01970-21 wersja.1, strona 2 (2)

Niniejszym poświadczam zgodność powyższego tłumaczenia z oryginałem dokumentu w języku angielskim. Rafał Wisiński, tłumacz przysięgły języka angielskiego wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod numerem TP/329/05.

Rep. Nr 848/2024



2024-03-25 14:26



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badań technicznych, Przedsiębiorstwo publiczne, Bmo, Republika Czeska/

CERTYFIKAT BADAŃ

Nr

O-B-01738-21 wersja 1

Klient

SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibórz POLSKA

Produkt

Zewnętrzna pompa ciepła powietrze/woda - monoblok

Oznaczenie typu / znak towarowy

NEXUS M14 PRO

Metody badań

ČSN EN 14511-2:2019, ČSN EN 14511-3:2019,  
ČSN EN 14511-4:2019, ČSN EN 12102-1 :2018, ČSN EN 12102-  
1:2018, Przepisy dotyczące badań EHPA - Badanie pomp ciepła powietrze/woda,  
wersja 2.4a

Podstawa certyfikatu

Raporty z badań:  
39-15771/T z dnia 2022-12-07 r.  
39-15771/H z dnia 2022-12-07 r.  
Dokumentacja techniczna SUNEX S.A.

Zastosowanie temperatury

**NISKA TEMPERATURA,**  
(Referencyjna temperatura wody 35 °C)  
**ŚREDNIA TEMPERATURA**  
(Referencyjna temperatura wody 55 °C)

Warunki temperaturowe*	A7/W35	A7/W35	A2/W35	A-7/W35	A7/W55
Skorygowana pojemność cieplna [kW]	13.592	8.624	9.917	8.511	9.540
Efektywna moc elektryczna [kW]	2.896	1.655	2.737	2.802	2.965
Współczynnik wydajności [-]	4.694	5.210	3.623	3.037	3.218
Ustawienia sprężarki [%]	67	42	67	67	50

(\*) Komentarz do skróconego oznaczenia: np. A7/W35  
A (powietrze), 7 (powietrze wejściowe - temperatura termometru suchego w °C) / W (woda), 35 (wyjściowa temperatura wody grzewczej (chłodzącej) w °C).  
O-B-01738-21 wersja 1, strona 1 (2)  
/pieczęć i stopka z danymi adresowymi/

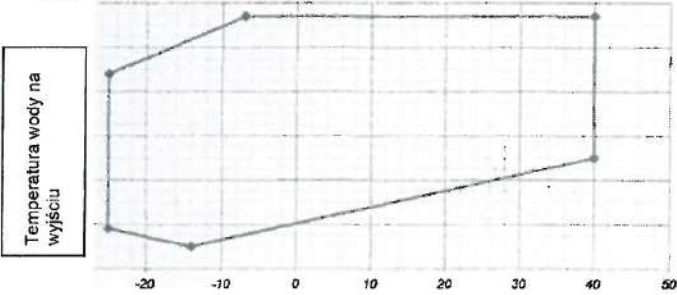


Poziom mocy akustycznej w warunkach temperatury A7/W55" (przy 24%):

Pompa ciepła powietrze/woda - split	NEXUS M14 PRO		
	- jednostka zewnętrzna -	- jednostka wewnętrzna -	
Poziom mocy akustycznej	LwA 57,9 ± 1,5 dB(A)	LwA	- dB(A)
Klasa dokładności	Inżynieria (klasa 2)		
(*) Komentarz do skróconego oznaczenia: np. A7/W55			

A (powietrze), 7 (powietrze wejściowe - temperatura termometru suchego w °C) / W (woda), 55 (wyjściowa temperatura wody grzewczej (chłodzącej) w °C).

Zakres temperatur pracy:  
-+-Zakres temperatur roboczych - tryb grzania



Natężenie przepływu cieczy w:

zewnątrznym wymienniku ciepła		
Minimum	-	m3/h
Maksymalnie	-	m3/h
1 wewnętrznym wymienniku ciepła		
Minimum	0.525	m3/h
Maksimum	2.351	m3/h

Zgodność z ČSN EN 14511-4:2019,  
artykuły: 4.2.1.2, 4.5, 4.6

Specyfikacja warunków:

Kontrola prędkości sprężarki	Zmienna	Objętościowe natężenie przepływu wody grzewczej (wewnętrznym wymienniku ciepła)	Zmienne
Temperatura wody na wylocie (wewnętrznym wymienniku ciepła)	Zmienna	Objętościowe natężenie przepływu cieczy źródłowej (zewnątrznym wymienniku ciepła)	-
Funkcja	Odwracalna		

Engineering Test Institute, Public Enterprise, potwierdza niniejszym certyfikatem, że badania przedmiotowego produktu zostały przeprowadzone i uzyskały wyniki podane powyżej. Engineering Test Institute, Public Enterprise jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-12-07  
Milan Homolek, Kierownik Działu Badań Urządzeń Grzewczych i Przyjaznych Środowisku /podpis odręczny/  
/Pieczęć okrągła/

- KONIEC CERTYFIKATU -  
O-B-01738-21 wersja.1, strona 2 (2)

Niniejszym poświadczam zgodność powyższego tłumaczenia z oryginałem dokumentu w języku angielskim. Rafał Wiśniewski, tłumacz przysięgły języka angielskiego wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod numerem TP/329/05.  
Rep. Nr 842/2024



Logo: Strojfremsky zkušebn ústav, s.p., Bmo, Česká republika Engineering Test Institute, Public Enterprise, Bmo, Czech Republic /Institut badań technicznych, Przedsiębiorstwo publiczne, Bmo, Republika Czeska/

CERTYFIKAT BADAŃ

Nr

O-B-01739-21 wersja 1

Klient

SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibórz POLSKA

Produkt

Zewnętrzna pompa ciepła powietrze/woda - monoblok

Oznaczenie typu / znak towarowy

NEXUS M14 PRO

Metody testowania

ČSN EN 14511-2:2019, ČSN EN 14511-3:2019,  
ČSN EN 14825:2020; ČSN EN 12102-1:2018, Testy EHPA  
Rozporządzenie - Badanie pomp ciepła powietrze/woda, wersja 2.4a

Podstawa certyfikatu

Raporty z badań:  
39-15771/T z dnia 2022-12-07 r.  
39-15771/H z dnia 2022-12-07 r.  
Dokumenty techniczne SUNEX S.A.

Referencyjny sezon grzewczy

"A" = średnia  
(Referencyjna temperatura projektowa  $T_{designh} = -10\text{ }^{\circ}\text{C}$ )

Wyniki:

NISKA TEMPERATURA  
(Referencyjna temperatura wody 35 °C)

ŚREDNIA TEMPERATURA  
(Referencyjna temperatura wody 55 °C)

9.71	P <sub>designh</sub> [kW] ... Ogrzewanie przy pełnym obciążeniu				9.49
5.02	SCOP [-] ... Sezonowy współczynnik wydajności				3.73
Temperatura zewnętrzna  T <sub>j</sub> [°C]	Deklarowana wydajność grzewcza  P <sub>dh</sub> [kW]	Współczynnik wydajności przy deklarowanej wydajności  COP <sub>d</sub> [-]	Temperatura zewnętrzna  T <sub>j</sub> [°C]	Deklarowana wydajność grzewcza  P <sub>dh</sub> [kW]	Współczynnik wydajności przy deklarowanej wydajności  COP <sub>d</sub> [-]
T <sub>j</sub> = -7	8.592	3.112	T <sub>j</sub> = -7	8.399	2.254
T <sub>j</sub> = +2	5.242	5.092	T <sub>j</sub> = +2	5.002	3.758
T <sub>j</sub> = +7	5.165	6.441	T <sub>j</sub> = +7	4.857	4.795
T <sub>j</sub> = +12	5.621	7.529	T <sub>j</sub> = +12	5.391	5.765
T <sub>j</sub> = TOL = -10	7.980	2.839	T <sub>j</sub> = TOL - 10	8.517	2.098
T <sub>j</sub> = T <sub>bivalentna</sub> = -7	8.592	3.112	T <sub>j</sub> = T <sub>bivalentny</sub> = -7	8.399	2.254

O-B-01739-21 wersja 1, strona 1(2)

/Pieczęć okrągła i stopka z danymi adresowymi/





NISKA TEMPERATURA

(Referencyjna temperatura wody 35 °C)

ŚREDNIA TEMPERATURA

(Referencyjna temperatura wody 55 °C)

Zużycie energii w trybach innych niż "tryb aktywny":

16.6
16.7
16.6
0

Tryb wyłączenia	$P_{off}$	[W]
Tryb wyłączenia termostatu	$P_{to}$	[W]
Tryb gotowości	$P_{sb}$	[W]
Tryb grzałki skrzyni korbowej	$P_{ck}$	[W]

16.6
16.7
16.6
0

3997

Roczne zużycie energii elektrycznej na ogrzewanie wg:  
ČSN EN 14825:2020  $Q_{HE}$  [kWh]

Sezonowa efektywność energetyczna ogrzewania pomieszczeń

5252

197.8

ČSN EN 14825: 2020  $\eta_s$  [%]

146.4

Natężenie przepływu cieczy w zewnętrznym wymienniku ciepła:

Płyn źródłowy Min/Max  $[m^3/h]$

Natężenie przepływu cieczy w wewnętrznym wymienniku ciepła:  
Woda grzewcza Min/Max  $[m^3/h]$

Poziom mocy akustycznej w warunkach A7W55\* (przy 24%):

0.525/2.351

0.525/2.351

NEXUS M14 PRO

- jednostka zewnętrzna -

- jednostka wewnętrzna -

$L_{WA}$  57.9 ± 1.5 dB(A)

$L_{WA}$  - dB(A)

Klasa dokładności 2 (inżynierska)

(\*) Komentarz do skróconego oznaczenia: np. A7/W55

"A" powietrze, "T" temperatura na wlocie (temperatura suchego termometru) w °C, "W" woda, "55" wyjściowa temperatura wody w °C.

Specyfikacja warunków:

Kontrola prędkości sprężarki	Zmienna	Objęściowe natężenie przepływu wody grzewczej (wewnętrzny wymiennik ciepła)	Zmienne
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	Zmienna	Objęściowe natężenie przepływu cieczy źródłowej (zewnętrzny wymiennik ciepła)	-
Funkcja	Odwracalna		

Engineering Test Institute, Public Enterprise, potwierdza niniejszym certyfikatem, że badania przedmiotowego produktu zostały przeprowadzone i uzyskały wyniki podane powyżej. Engineering Test Institute, Public Enterprise jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-12-07

Milan Homolek, Kierownik Działu Badań Urządzeń Grzewczych i Przyjaznych Środowisku /podpis odręczny/

/Pieczęć okrągła/

- KONIEC CERTYFIKATU -

O-B-01739-21 wersja 1, strona 2 (2)

Niniejszym poświadczam zgodność powyższego tłumaczenia z oryginałem dokumentu w języku angielskim. Rafał Wiśniński, tłumacz przysięgły języka angielskiego wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod numerem TP/329/05.

Rep. Nr 843/2024



2024-03-25, 14:25

Logo: Strojřrensky zkušebn ěstav, s.p., Bmo, Českř republika Engineering Test Institute, Public Enterprise, Brno, Czech Republic /Institřt badřř technicznřch, Prředsiřbiorstvo publicznř, Brno, Republika Czeskř/

CERTYFIKAT BADAŃ

Nr

O-B-01740-21 wersja 1

Klient

SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibřrż POLSKA

Produkt

Zewnřtrzna pompa ciepłř powiřtrze/woda - monoblok

Oznaczenie typu / znak towarowy

NEXUS M14 PRO

Metody testowania

ČSN EN 14511-2:2019, ČSN EN 14511-3:2019,  
ČSN EN 14825:2020; ČSN EN 12102-1:2018, Testy EHPA  
Rozporządzenie - Badanie pomp ciepłř powiřtrze/woda, wersja 2.4a

Podstawa certyfikatu

Raporty z badaŃ:  
39-15771/T z dnia 2022-12-07 r.  
39-15771/H z dnia 2022-12-07 r.  
Dokumenty techniczne SUNEX S.A.

Referencyjny sezon grzewczy

"W" = cieplejszy  
(Referencyjna temperatura projektowa  $T_{designh} = \pm 2\text{ }^{\circ}\text{C}$ )

Wyniki:

NISKA TEMPERATURA (Referencyjna temperatura wody 35 °C)			ŚREDNIA TEMPERATURA (Referencyjna temperatura wody 55 °C)		
9.92	P <sub>designh</sub> [kW] ... Ogrzewanie przy pełnym obciążeniu				9.78
6.02	SCOP [-] ... Sezonowy współczynnik wydajności				4.39 <sup>(a)</sup>
Temperatura zewnřtrzna  T <sub>j</sub> [°C]	Deklarowana wydajność grzewcza  P <sub>dh</sub> [kW]	Wspřłczynnik wydajności przy deklarowanej wydajności  COP <sub>d</sub> [-]	Temperatura zewnřtrzna  T <sub>j</sub> [°C]	Deklarowana wydajność grzewcza  P <sub>dh</sub> [kW]	Wspřłczynnik wydajności przy deklarowanej wydajności  COP <sub>d</sub> [-]
T <sub>j</sub> = -7	-	-	T <sub>j</sub> = -7	-	-
T <sub>j</sub> = +2	9.915	3.608	T <sub>j</sub> = +2	9.782	2.502
T <sub>j</sub> = +7	6.400	5.800	T <sub>j</sub> = +7 <sup>(a)</sup>	6.100	4.00
T <sub>j</sub> = +12	5.600	6.900	T <sub>j</sub> = +12 <sup>(a)</sup>	5.300	5.300
T <sub>j</sub> = TOL = 2	9.915	3.609	T <sub>j</sub> = TOL = 2	9.782	2.502
T <sub>j</sub> = T <sub>bivalentny</sub> = 2	9.915	3.609	T <sub>j</sub> = T <sub>bivalentny</sub> = 2	9.782	2.502

O-B-01740-21 wersja 1, strona 1(2)

/Pieczęć okrągłř i stopka z danymi adresowymi/



2024-03-25, 14:26



NISKA TEMPERATURA

(Referencyjna temperatura wody 35 °C)

ŚREDNIA TEMPERATURA

(Referencyjna temperatura wody 55 °C)

Zużycie energii w trybach innych niż "tryb aktywny":

16.6	Tryb wyłączenia	P <sub>OFF</sub>	[W]	16.6
16.7	Tryb wyłączenia termostatu	P <sub>TO</sub>	[W]	16.7
16.6	Tryb gotowości	P <sub>SB</sub>	[W]	16.6
0	Tryb grzałki skrzyni korbowej	P <sub>OK</sub>	[W]	0

2200 <sup>(a)</sup>	Roczne zużycie energii elektrycznej na ogrzewanie wg:		2976 <sup>(a)</sup>
	ČSN EN 14825:2020	Q <sub>HE</sub> [kWh]	
	Sezonowa efektywność energetyczna ogrzewania pomieszczeń		
237.8 <sup>(a)</sup>	ČSN EN 14825: 2020	n <sub>s</sub> [%]	172.6 <sup>(a)</sup>

Natężenie przepływu cieczy w zewnętrznym wymienniku ciepła:

- Płyn źródłowy Min/Max [m<sup>3</sup>/h]

0.525/2.351	Natężenie przepływu cieczy w wewnętrznym wymienniku ciepła:	0.525/2.351
	Woda grzewcza Min/Max [m <sup>3</sup> /h]	

Poziom mocy akustycznej w warunkach A7W55\* (przy 24%):

NEXUS M14 PRO	L <sub>WA</sub>	57.9 ± 1.5	dB(A)	Klasa dokładności 2 (inżynierska)
- jednostka zewnętrzna -				
- jednostka wewnętrzna -	L <sub>WA</sub> -		dB(A)	

(\*) Komentarz do skróconego oznaczenia: np. A7W55  
"A" powietrze, "7" temperatura na wlocie (temperatura suchego termometru) w °C, "W" woda, "55" wyjściowa temperatura wody w °C.

Specyfikacja warunków:

Kontrola prędkości sprężarki	Zmienna	Objęściowe natężenie przepływu wody grzewczej (wewnętrzny wymiennik ciepła)	Zmienne
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	Zmienna	Objęściowe natężenie przepływu cieczy źródłowej (zewnętrzny wymiennik ciepła)	-
Funkcja	Odwracalna		

Engineering Test Institute, Public Enterprise, potwierdza niniejszym certyfikatem, że badania przedmiotowego produktu zostały przeprowadzone i uzyskały wyniki podane powyżej. Engineering Test Institute, Public Enterprise jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-12-07  
Milan Homolek, Kierownik Działu Badań Urządzeń Grzewczych i Przyjaznych Środowisku /podpis odręczny/  
/Pieczęć okrągła/

- KONIEC CERTYFIKATU -

O-B-01740-21 wersja 1, strona 2 (2)

Niniejszym poświadczam zgodność powyższego tłumaczenia z oryginałem dokumentu w języku angielskim. Rafał Wisiński, tłumacz przysięgły języka angielskiego wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod numerem TP/329/05.

Rep. Nr 846/2024





Logo: Strojřrensky zkušebn ěstav, s.p., Brno, Českā republika Engineering Test Institute, Public Enterprise, Brno, Czech Republic /Instytut badař technicznych, Przedsiębiorstwo publiczne, Brno, Republika Czeska/

CERTYFIKAT BADAŃ

Nr O-B-01741-21 wersja 1

Klient

SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibřrż POLSKA

Produkt

Zewnętrzna pompa ciepła powietrze/woda - monoblok

Oznaczenie typu / znak towarowy

NEXUS M14 PRO

Metody testowania

ČSN EN 14511-2:2019, ČSN EN 14511-3:2019,  
ČSN EN 14825:2020; ČSN EN 12102-1:2018, Testy EHPA  
Rozporządzenie - Badanie pomp ciepła powietrze/woda, wersja 2.4a

Podstawa certyfikatu

Raporty z badař:  
39-15771/T z dnia 2022-12-07 r.  
39-15771/H z dnia 2022-12-07 r.  
Dokumenty techniczne SUNEX S.A.

Referencyjny sezon grzewczy

"C" = zimniejszy  
(Referencyjna temperatura projektowa  $T_{designh} = -22\text{ }^{\circ}\text{C}$ )

Wyniki:

NISKA TEMPERATURA (Referencyjna temperatura wody 35 °C)			ŚREDNIA TEMPERATURA (Referencyjna temperatura wody 55 °C)		
14.23	P <sub>designh</sub> [kW] ... Ogrzewanie przy pełnym obciążeniu				14.21
3.68	SCOP [-] ... Sezonowy współczynnik wydajności				3.07 <sup>(a)</sup>
Temperatura zewnętrzna  T <sub>j</sub> [°C]	Deklarowana wydajność grzewcza  P <sub>dh</sub> [kW]	Współczynnik wydajności przy deklarowanej wydajności  COP <sub>d</sub> [-]	Temperatura zewnętrzna  T <sub>j</sub> [°C]	Deklarowana wydajność grzewcza  P <sub>dh</sub> [kW]	Współczynnik wydajności przy deklarowanej wydajności  COP <sub>d</sub> [-]
T <sub>j</sub> = -7 <sup>(a)</sup>	8.613	3.351	T <sub>j</sub> = -7 <sup>(a)</sup>	8.598	2.642
T <sub>j</sub> = +2 <sup>(a)</sup>	4.900	4.900	T <sub>j</sub> = +2 <sup>(a)</sup>	5.000	4.100
T <sub>j</sub> = +7 <sup>(a)</sup>	5.200	6.400	T <sub>j</sub> = +7 <sup>(a)</sup>	5.000	5.200
T <sub>j</sub> = +12	5.600	6.800	T <sub>j</sub> = +12	5.500	5.700
T <sub>j</sub> = TOL = -22 <sup>(a)</sup>	5.000	1.700	T <sub>j</sub> = TOL = -22 <sup>(a)</sup>	5.300	1.300
T <sub>j</sub> = T <sub>bivalentny</sub> = -7	8.613	3.351	T <sub>j</sub> = T <sub>bivalentny</sub> = -7	8.598	2.642
T <sub>j</sub> = -15 <sup>(a)</sup>	7.083	2.653	T <sub>j</sub> = -15 <sup>(a)</sup>	6.914	1.955

O-B-01741-21 wersja 1, strona 1(2)

/Pieczęć okrągła i stopka z danymi adresowymi/



2024-03-25, 14:26

NISKA TEMPERATURA

(Referencyjna temperatura wody 35 °C)

ŚREDNIA TEMPERATURA

(Referencyjna temperatura wody 55 °C)

Zużycie energii w trybach innych niż "tryb aktywny":

16.6
16.7
16.6
0

Tryb wyłączenia	$P_{OFF}$	[W]
Tryb wyłączenia termostatu	$P_{TO}$	[W]
Tryb gotowości	$P_{SB}$	[W]
Tryb grzałki skrzyni korbowej	$P_{CK}$	[W]

16.6
16.7
16.6
0

9525 <sup>(a)</sup>	Roczne zużycie energii elektrycznej na ogrzewanie wg: ČSN EN 14825:2020 $Q_{HE}$ [kWh]	11390 <sup>(a)</sup>
Sezonowa efektywność energetyczna ogrzewania pomieszczeń		
144.3 <sup>(a)</sup>	ČSN EN 14825: 2020 $\eta_s$ [%]	120.0 <sup>(a)</sup>

Natężenie przepływu cieczy w zewnętrznym wymienniku ciepła:

Płyn źródłowy                      Min/Max                      [m<sup>3</sup>/h]

0.525/2.351
-------------

Natężenie przepływu cieczy w wewnętrznym wymienniku ciepła:  
Woda grzewcza                      Min/Max                      [m<sup>3</sup>/h]

0.525/2.351
-------------

Poziom mocy akustycznej w warunkach A7W55\* (przy 24%):

NEXUS M14 PRO

- jednostka zewnętrzna -

$L_{WA}$	57.9 ± 1.5	dB(A)
$L_{WA}$ -		dB(A)

Klasa dokładności 2 (inżynierska)

- jednostka wewnętrzna -

(\*) Komentarz do skróconego oznaczenia: np. A7/W55  
"A" powietrze, "7" temperatura na wlocie (temperatura suchego termometru) w °C, "W" woda, "55" wyjściowa temperatura wody w °C.

Specyfikacja warunków:

Kontrola prędkości sprężarki	Zmienna	Objęściowe natężenie przepływu wody grzewczej (wewnętrzny wymiennik ciepła)	Zmienne
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	Zmienna	Objęściowe natężenie przepływu cieczy źródłowej (zewnętrzny wymiennik ciepła)	-
Funkcja	Odwracalna		

Engineering Test Institute, Public Enterprise, potwierdza niniejszym certyfikatem, że badania przedmiotowego produktu zostały przeprowadzone i uzyskały wyniki podane powyżej. Engineering Test Institute, Public Enterprise jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-12-07

Milan Homolek, Kierownik Działu Badań Urządzeń Grzewczych i Przyjaznych Środowisku /podpis odręczny/

/Pieczęć okrągła/

- KONIEC CERTYFIKATU -

O-B-01741-21 wersja 1, strona 2 (2)

Niniejszym poświadczam zgodność powyższego tłumaczenia z oryginałem dokumentu w języku angielskim. Rafał Wiśniński, tłumacz przysięgły języka angielskiego wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod numerem TP/329/05.

Rep. Nr 847/2024



2024-03-25, 14:26



## TEST REPORT 39-15771/T

**Product:** Outdoor Air/Water Heat Pump – monobloc

**Type designation** NEXUS M14 PRO

**Customer:** SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibórz  
POLAND

**Manufacturer:** SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibórz  
POLAND

**Employee responsible:** Ing. Mario Jankola

**Report issue date:** 2022-12-07

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

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The results of tests and verifications only apply to the products tested as received or presented.  
The testing laboratory is not responsible for the data provided by the customer in the report.



The tests were performed based on these documents:

- Order B-73626 of 2021-06-30 (Order reg. no. B-73626 delivered on 2021-07-01)
- Contract B-73626/39
- Amendment to contract B-73626.Z1 of 2021-09-30

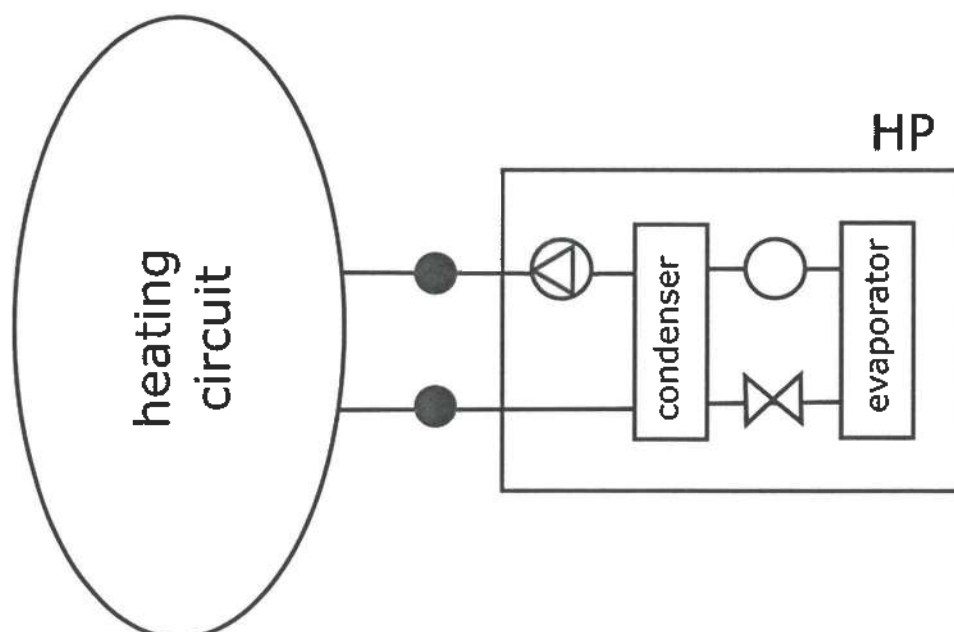
## I. Description of product tested

The Heat pump **NEXUS M14 PRO** supplied by company **SUNEX S.A.** is structurally adapted to operate in air/water system. Device is designed as monobloc unit placed outdoor. Refrigerant R-290 is used with charge 2.8 kg. Power supply is three-phase. Heat pump is able to work in heating and cooling mode. Heat pump is working with variable flow rate.

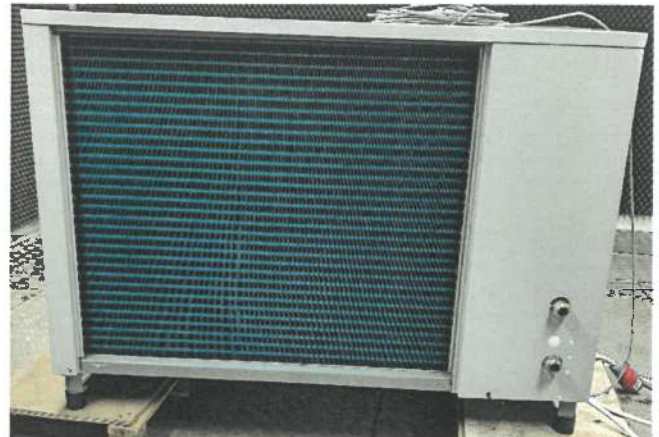
Main components of the outdoor unit **NEXUS M14 PRO**:

- Serial number 214102806
- Cuboid shape with dimensions 1350 × 670 × 988 mm (W × D × H)
- Frame and casing made of varnished steel sheets
- Cuboid evaporator, dimensions, 945 × 120 × 800 mm (W × D × H), spacing 2,5 mm, 5 rows
- Compressor Siam Compressor Industry Co., Ltd., APB52FDAMT
- Refrigerant R-290 (2.8 kg)
- Electric expansion valve CAREL E<sup>2</sup>V
- 4-way reversing valve Sanhua SHF-20D-46-02 X20201 with coil Sanhua
- Filter drier Sanhua DTBG 083s, Vertical liquid receiver GVN VLR.A.33b.04.A1.A1.F4.H20
- Cuboid shape condenser with dimensions 140 × 150 × 550 mm (W × D × H), including insulation
- Circulation pump GrundfosUPM3 Hybrid
- Sight glass
- Axial fan with motor ECblue FN050-ZIQ.0F.V5P4 with diameter Ø 500 mm
- Pressure sensors
- Temperature sensors
- Control panel Carel
- Inverter Carel power+ PS2001840100

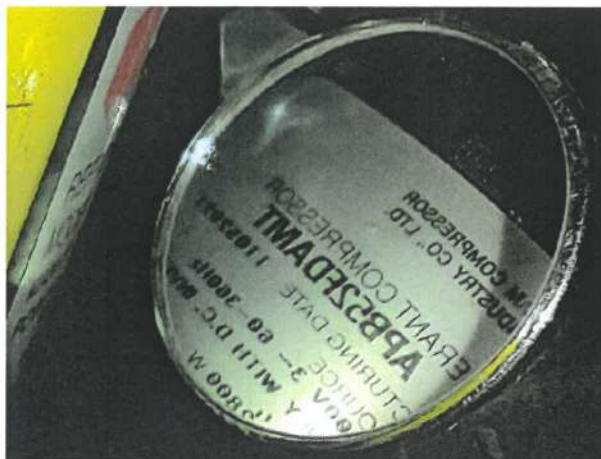
Scheme:





Photos:



Heat pump **NEXUS M14 PRO**  
– Outdoor unit: a) left /back/, b) right /front/ –



Heat pump **NEXUS M14 PRO**  
– Compressor label –

<b>NEXUS</b>  	
<b>Pompa ciepła powietrze/woda typu monoblok inwerter</b> <b>Inverter monoblock air source heat pumps</b>	
Model	<b>NEXUS M14 PRO</b>
Moc grzewcza min./maks. Heating capacity min./max.	2,9/22,8 kW
Moc wejściowa w grzaniu min./maks. Heating input power min./max.	0,81/4,8 kW
Moc chłodnicza min./maks. Cooling capacity min./max.	4,1/19,6 kW
Moc wejściowa w chłodzeniu min./maks. Cooling input power min./max.	1,1/4,4 kW
Zasilanie Power supply	400 V/50 Hz
Znamionowa moc wejściowa Rated input power	2,62 kW
Znamionowy prąd wejściowy Rated input current	9,2 A
Moc grzewcza nominalna (A7/W35) Nominal heating capacity (A7/W35)	13,6 kW
Nominalne COP (A7/W35) Nominal COP (A7/W35)	4,69
Nominalny pobór mocy (A7/W35) Nominal power consumption (A7/W35)	2,9 kW
Czynnik chłodniczy/Ilość Refrigerant/Amount	R290 / 2,8 kg
GWP czynnika Refrigerant GWP	8,4
Waga netto Net weight	170 kg
Data / Nr seryjny Date / NO	10.04.2021 / 214102806
Kraj produkcji Country of origin:	Polska
<b>SUNEX S.A., ul. Piaskowa 7, 47-400 Racibórz, Polska</b>	

Heat pump **NEXUS M14 PRO**  
– Outdoor unit label –

## II. Sample tested

Reg. No. SZÚ	Product	Date of submission
0213.21.35383.001	Heat pump air/water – monobloc	2021-09-27

The visual inspection, tests and verification were carried out by Ing. Dominik Šedivý – Test engineer at the test station of SZÚ.

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

## 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	022370/1	07/2022	082/12/E
2.	Digital watt meter	MaR01/EM01	07/2027	K17071728
3.	Flow meter Krohne Optiflux	022370/5	02/2022	6015-KL-P0077-18
4.	Barometer	022370/7	04/2024	4257/2019
5.	Differential pressure gauge	MaR01_Tl	04/2023	KL-P-0021-21
6.	Temperature-humidity meter HC2-IC305	022370/10	10/2024	6036-KL-V0417-19
7.	Temperature-humidity meter HC2-IC305	022370/11	10/2024	6036-KL-V0416-19
8.	Thermometers	022370/13	01/2022	KL-T-0002-21

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 **NEXUS M14 PRO**

Measuring equipment used: See previous page

Place of testing:	at the Engineering Test Institute <input checked="" type="checkbox"/>	at the Manufacturer's premises <input type="checkbox"/>	at the Customer's premises <input type="checkbox"/>	other: <input type="checkbox"/>
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# Uncertainties of measurement for indicated values

Measured quantity	Unit	Uncertainty of measurement	Evaluation
<b>Liquid</b>			
- temperature difference (dT)	[K]	$\pm 0.15 \text{ K}$	fulfilled
- temperature inlet/outlet	[°C]	$\pm 0.15 \text{ K}$	fulfilled
- volume flow	[m³/s]	$\pm 1 \%$	fulfilled
- static pressure difference	[kPa]	$\pm 1 \text{ kPa } (\Delta p \leq 20 \text{ kPa})$ or $\pm 5 \%$ ( $\Delta p > 20 \text{ kPa}$ )	fulfilled
<b>Air</b>			
- dry bulb temperature	[°C]	$\pm 0.2 \text{ K}$	fulfilled
- wet bulb temperature	[°C]	$\pm 0.4 \text{ K}$	fulfilled
- volume flow	[m³/s]	$\pm 5 \%$	not applied
- static pressure difference	[Pa]	$\pm 5 \text{ Pa } (\Delta p \leq 100 \text{ Pa})$ or $\pm 5 \%$ ( $\Delta p > 100 \text{ Pa}$ )	not applied
<b>Refrigerant</b>			
- pressure at compressor outlet	[kPa]	$\pm 1 \%$	not applied
- temperature	[°C]	$\pm 0.5 \text{ K}$	not applied
<b>Concentration (in volume)</b>			
- heat transfer medium	[%]	$\pm 2$	not related
<b>Electrical quantities</b>			
- electric power	[W]	$\pm 1 \%$	fulfilled
- voltage	[V]	$\pm 0.5 \%$	fulfilled
- current	[A]	$\pm 0.5 \%$	fulfilled
- electric energy	[kWh]	$\pm 1 \%$	not applied
Compressor rotational speed	[min⁻¹]	$\pm 0.5 \%$	not applied
The heating or cooling capacities measured on the liquid side shall be determined within a maximum uncertainty of 5 % independent of the individual uncertainties of measurement including the uncertainties on the properties of fluids.			fulfilled

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 decision rule pursuant to ILAC-G8: 09/2019 Art. 4.2.1 – binary statement for the simple acceptance rule shall be used.

a) **Rating conditions:**

**Measurement results:**

Heat pump NEXUS M14 PRO

Test number		1	2	3
Assessment condition		Rating conditions		
Specification of the assessment condition*		A7/W35	A7/W35	A7/W55
Date of testing		2021-09-27	2021-10-12	2021-10-12
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]	34.99	34.99	55.00
Input heating water – temperature calculation	[°C]	29.97	30.00	46.99
Output heating water temperature	[°C]	34.99	34.99	55.00
Input heating water temperature	[°C]	29.97	30.00	46.99
Air temperature – dry bulb temperature	[°C]	7.01	7.01	7.00
Air temperature – wet bulb temperature	[°C]	6.03	6.03	6.02
Relative humidity	[%]	87.02	87.04	87.06
Barometric pressure	[kPa]	98.637	98.595	98.285
Ambient temperature	[°C]	7.47	7.08	7.08
Secondary circuit pressure difference	[kPa]	10.538	7.752	11.369
Efficiency of the secondary liquid pump	[–]	0.198	0.154	0.155
Volume flow rate of heating water	[m <sup>3</sup> ·h <sup>-1</sup> ]	2.3508	1.5010	1.0442
Density of heating water	[kg·m <sup>-3</sup> ]	994.0	994.0	985.8
Specific heat capacity of heating water	[kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	4.180	4.180	4.180
Voltage	[V]	399.58	399.77	399.35
Total current	[A]	16.86	9.98	16.92
Overall power input	[kW]	2.930	1.676	2.986
Capacity correction of sec. liquid pump	[W]	27.873	17.781	18.025
Power input correction of sec. liquid pump	[W]	34.75	21.01	21.32
Heating capacity – heating water	[kW]	13.619	8.642	9.558
<b>Corrected heating capacity – heating water</b>	<b>[kW]</b>	<b>13.592</b>	<b>8.624</b>	<b>9.540</b>
Uncertainty of corrected heating capacity	[kW]	± 0.231	± 0.149	± 0.107
<b>Effective electric power input</b>	<b>[kW]</b>	<b>2.896</b>	<b>1.655</b>	<b>2.965</b>
<b>COP</b>	<b>[–]</b>	<b>4.694</b>	<b>5.210</b>	<b>3.218</b>
Uncertainty of COP	[–]	± 0.080	± 0.090	± 0.036
<b>Control settings</b>	<b>[%]</b>	<b>67</b>	<b>42</b>	<b>50</b>
Circulation pump settings – heating water	[%]	65	40	35

\* 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)

**Measurement results:**

**Heat pump NEXUS M14 PRO**

Test number		4	5
Assessment condition		Rating conditions	
Specification of the assessment condition*		A-7/W35	A2/W35
Date of testing		2021-10-13	2021-10-13
Transient test procedure	YES / NO	YES	YES
Average defrost time of 1 cycle	[min]	7.3	7.9
Average time of 1 cycle	[min]	128.6	83.4
Calculation time	[min]	128.6	166.9
Output heating water – temperature calculation	[°C]	34.09	34.02
Input heating water – temperature calculation	[°C]	29.62	29.85
Output heating water temperature	[°C]	34.95	34.89
Input heating water temperature	[°C]	29.98	29.98
Air temperature – dry bulb temperature	[°C]	-7.00	2.06
Air temperature – wet bulb temperature	[°C]	-8.00	1.06
Relative humidity	[%]	74.97	83.92
Barometric pressure	[kPa]	98.815	98.943
Ambient temperature	[°C]	-6.81	2.26
Secondary circuit pressure difference	[kPa]	8.804	8.821
Efficiency of the secondary liquid pump	[-]	0.164	0.176
Volume flow rate of heating water	[m <sup>3</sup> ·h <sup>-1</sup> ]	1.6487	2.0515
Density of heating water	[kg·m <sup>-3</sup> ]	994.2	994.2
Specific heat capacity of heating water	[kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	4.180	4.180
Voltage	[V]	399.51	399.37
Total current	[A]	16.18	15.80
Overall power input	[kW]	2.827	2.766
Capacity correction of sec. liquid pump	[W]	20.557	23.470
Power input correction of sec. liquid pump	[W]	24.59	28.49
Heating capacity – heating water	[kW]	8.532	9.940
<b>Corrected heating capacity – heating water</b>	<b>[kW]</b>	<b>8.511</b>	<b>9.917</b>
Uncertainty of corrected heating capacity	[kW]	± 0.163	± 0.202
<b>Effective electric power input</b>	<b>[kW]</b>	<b>2.802</b>	<b>2.737</b>
<b>COP</b>	<b>[-]</b>	<b>3.037</b>	<b>3.623</b>
Uncertainty of COP	[-]	± 0.058	± 0.074
<b>Control settings</b>	<b>[%]</b>	<b>67</b>	<b>67</b>
Circulation pump settings – heating water	[%]	45	55

\*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)



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

<b>„A“ = average</b>	(reference water temperature 35 °C, reference design conditions for heating T <sub>designh</sub> = -10 °C)
<b>„W“ = warmer</b>	(reference water temperature 35 °C, reference design conditions for heating T <sub>designh</sub> = +2 °C)
<b>„C“ = colder</b>	(reference water temperature 35 °C, reference design conditions for heating T <sub>designh</sub> = -22 °C)

Model		Heat pump NEXUS M14 PRO				
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		
	Air flow rate – primary circuit			Variable		
	Water flow rate – secondary circuit			Variable		
Seasonal space heating energy efficiency	Heating	Average	$\eta_s / A$		197.8	%
		Warmer	$\eta_s / W$		237.8	(not tested) %
		Colder	$\eta_s / C$		144.3	(not tested) %
Seasonal efficiency according to ČSN EN 14825:2020	Heating	Average	SCOP / A		5.02	–
		Warmer	SCOP / W		6.02	(not tested) –
		Colder	SCOP / C		3.68	(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 <sub>designc</sub>		–	kW
	Heating	Average	P <sub>designh</sub>		9.71	kW
		Warmer	P <sub>designh</sub>		9.92	kW
		Colder	P <sub>designh</sub>		14.23	kW
Bivalent temperatures	Heating	Average	T <sub>bivalent</sub>		-7	°C
		Warmer	T <sub>bivalent</sub>		2	°C
		Colder	T <sub>bivalent</sub>		-7	°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 <sub>CE</sub>		–	kWh
	Heating	Average	Q <sub>HE/A</sub>		3997	kWh
		Warmer	Q <sub>HE/W</sub>		2200	(not tested) kWh
		Colder	Q <sub>HE/C</sub>		9525	(not tested) kWh
Modes other than „active mode“		Off mode		P <sub>OFF</sub>	16.6	W
		Thermostat off mode		P <sub>TO</sub>	16.7	W
		Standby mode		P <sub>SB</sub>	16.6	W
		Crankcase heater mode		P <sub>CK</sub>	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 <sub>HE</sub>	2066	[h]
H <sub>TO</sub>	178	[h]
H <sub>SB</sub>	0	[h]
H <sub>CK</sub>	178	[h]
H <sub>OFF</sub>	0	[h]

Measured data:

P <sub>TO</sub>	0.0167	[kW]
P <sub>SB</sub>	0.0166	[kW]
P <sub>CK</sub>	0.0000	[kW]
P <sub>OFF</sub>	0.0166	[kW]
P <sub>designh</sub>	9.71	[kW]
SCOP <sub>ON</sub>	5.02	[–]

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<sub>H</sub>)

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

$$Q_H = 9.71 \cdot 2066 = 20066 \quad [\text{kWh}]$$

7.4 Calculation of the annual electricity consumption (Q<sub>HE</sub>)

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

$$Q_{HE} = 20066 / 5.02 + 178 \cdot 0.0167 + 0 \cdot 0.0166 + 178 \cdot 0 + 0 \cdot 0.0166 = 3997 \quad [\text{kWh}]$$

7.2 General formula for calculation of reference SCOP

$$\text{SCOP} = Q_H / Q_{HE} \quad [-]$$

$$\text{SCOP} = 20066 / 3997 = 5.02 \quad [-]$$

7.1 Calculation of the seasonal space heating efficiency  $\eta_s$

$$\Sigma F(i) = F(1) + F(2) \quad [-]$$

$$\Sigma F = 0.03 + 0 = 0.03 \quad [-]$$

$$\eta_s = 1 / \text{CC} \cdot \text{SCOP} - \Sigma F(i) \quad [-]$$

$$\eta_s (A) = (1 / 2.5) \cdot 5.02 - 0.03 = \underline{1.978} \quad [-]$$

Test results for single part load conditions

**Measurement results:**

Heat pump **NEXUS M14 PRO**

Test number		6	7	8
Temperature level		Low temperature application (reference water temperature 35 °C)		
Reference heating season		„A“ = average ( $T_{designh} = -10\text{ °C}$ )		
Assessment condition		A, T <sub>biv</sub> (F)	B	C
Specification of the assessment condition*		A-7/W34	A2/W30	A7/W28.75
Date of testing		2021-10-01	2021-10-01	2021-10-04
Transient test procedure	YES / NO	YES	NO	NO
Average defrost time of 1 cycle	[min]	7.5	–	–
Average time of 1 cycle	[min]	142.3	–	–
Calculation time	[min]	142.3	70.0	70.0
Output heating water – temperature calculation	[°C]	33.35	29.99	28.74
Input heating water – temperature calculation	[°C]	28.86	25.00	23.74
Output heating water temperature	[°C]	33.93	29.99	28.74
Input heating water temperature	[°C]	28.99	25.00	23.74
Air temperature – dry bulb temperature	[°C]	-7.00	2.02	7.00
Air temperature – wet bulb temperature	[°C]	-7.99	1.04	6.02
Relative humidity	[%]	75.02	84.02	87.00
Barometric pressure	[kPa]	99.452	99.159	98.632
Ambient temperature	[°C]	-6.71	2.01	7.06
Secondary circuit pressure difference	[kPa]	8.678	19.342	6.934
Efficiency of the secondary liquid pump	[-]	0.163	0.175	0.134
Volume flow rate of heating water	[m <sup>3</sup> ·h <sup>-1</sup> ]	1.6548	0.9133	0.8962
Density of heating water	[kg·m <sup>-3</sup> ]	994.5	995.5	995.9
Specific heat capacity of heating water	[kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	4.180	4.180	4.180
Voltage	[V]	399.61	399.97	400.04
Total current	[A]	15.86	6.85	5.42
Overall power input	[kW]	2.786	1.058	0.815
Capacity correction of sec. liquid pump	[W]	20.419	23.171	11.113
Power input correction of sec. liquid pump	[W]	24.41	28.08	12.84
Heating capacity – heating water	[kW]	8.613	5.265	5.176
<b>Corrected heating capacity – heating water</b>	<b>[kW]</b>	<b>8.592</b>	<b>5.242</b>	<b>5.165</b>
Uncertainty of corrected heating capacity	[kW]	± 0.164	± 0.092	± 0.090
<b>Effective electric power input</b>	<b>[kW]</b>	<b>2.761</b>	<b>1.029</b>	<b>0.802</b>
<b>COP</b>	<b>[-]</b>	<b>3.112</b>	<b>5.092</b>	<b>6.441</b>
Uncertainty of COP	[-]	± 0.059	± 0.091	± 0.113
<b>Control settings</b>	<b>[%]</b>	<b>67</b>	<b>27</b>	<b>24</b>
Circulation pump settings – heating water	[%]	45	45	25

\* 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 results for single part load conditions

**Measurement results:**

Heat pump NEXUS M14 PRO

Test number		9	10	11
Temperature level		Low temperature application (reference water temperature 35 °C)		
Reference heating season		„A“ = average ( $T_{designh} = -10\text{ °C}$ )		„W“ = warmer ( $T_{designh} = 2\text{ °C}$ )
Assessment condition		D	TOL(E)	B, TOL(E), Tbiv (F)
Specification of the assessment condition*		A12/W27.64	A-10/W35	A2/W35
Date of testing		2021-10-08	2021-10-04	2021-10-05
Transient test procedure	YES / NO	NO	YES	YES
Average defrost time of 1 cycle	[min]	–	7.0	7.9
Average time of 1 cycle	[min]	–	146.3	82.1
Calculation time	[min]	70.0	146.3	164.3
Output heating water – temperature calculation	[°C]	27.66	34.55	34.03
Input heating water – temperature calculation	[°C]	22.66	29.93	29.84
Output heating water temperature	[°C]	27.66	35.05	34.92
Input heating water temperature	[°C]	22.66	30.00	30.00
Air temperature – dry bulb temperature	[°C]	12.00	-10.00	1.94
Air temperature – wet bulb temperature	[°C]	11.01	-10.99	0.95
Relative humidity	[%]	88.99	70.08	83.96
Barometric pressure	[kPa]	99.686	98.604	98.065
Ambient temperature	[°C]	12.04	-9.70	2.22
Secondary circuit pressure difference	[kPa]	8.771	11.455	4.677
Efficiency of the secondary liquid pump	[-]	0.143	0.173	0.147
Volume flow rate of heating water	[m <sup>3</sup> ·h <sup>-1</sup> ]	0.9742	1.4915	2.0534
Density of heating water	[kg·m <sup>-3</sup> ]	996.2	994.1	994.2
Specific heat capacity of heating water	[kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	4.180	4.180	4.180
Voltage	[V]	400.03	399.29	399.41
Total current	[A]	5.18	16.15	15.93
Overall power input	[kW]	0.763	2.838	2.766
Capacity correction of sec. liquid pump	[W]	14.247	22.711	15.526
Power input correction of sec. liquid pump	[W]	16.62	27.45	18.19
Heating capacity – heating water	[kW]	5.635	8.002	9.931
<b>Corrected heating capacity – heating water</b>	<b>[kW]</b>	<b>5.621</b>	<b>7.980</b>	<b>9.915</b>
Uncertainty of corrected heating capacity	[kW]	± 0.098	± 0.148	± 0.202
<b>Effective electric power input</b>	<b>[kW]</b>	<b>0.747</b>	<b>2.810</b>	<b>2.748</b>
<b>COP</b>	<b>[-]</b>	<b>7.529</b>	<b>2.839</b>	<b>3.608</b>
Uncertainty of COP	[-]	± 0.132	± 0.053	± 0.074
<b>Control settings</b>	<b>[%]</b>	<b>24</b>	<b>67</b>	<b>67</b>
Circulation pump settings – heating water	[%]	30	45	50

\* 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 results for single part load conditions

**Measurement results:**

**Heat pump NEXUS M14 PRO**

Test number		12	13
Temperature level		Low temperature application (reference water temperature 35 °C)	
Reference heating season		„C“ = colder ( $T_{designh} = -22\text{ °C}$ )	
Assessment condition		A, T <sub>biv</sub> (F)	G
Specification of the assessment condition*		A-7/W30	A-15/W32
Date of testing		2021-10-07	2021-10-06
Transient test procedure	YES / NO	YES	YES
Average defrost time of 1 cycle	[min]	7.5	6.2
Average time of 1 cycle	[min]	140.9	145.3
Calculation time	[min]	140.9	145.3
Output heating water – temperature calculation	[°C]	29.44	31.56
Input heating water – temperature calculation	[°C]	24.91	26.94
Output heating water temperature	[°C]	29.97	32.02
Input heating water temperature	[°C]	24.99	27.01
Air temperature – dry bulb temperature	[°C]	-7.00	-15.02
Air temperature – wet bulb temperature	[°C]	-7.98	-15.90
Relative humidity	[%]	75.15	61.79
Barometric pressure	[kPa]	99.337	98.965
Ambient temperature	[°C]	-6.68	-14.42
Secondary circuit pressure difference	[kPa]	5.361	10.467
Efficiency of the secondary liquid pump	[-]	0.144	0.162
Volume flow rate of heating water	[m <sup>3</sup> ·h <sup>-1</sup> ]	1.6454	1.3263
Density of heating water	[kg·m <sup>-3</sup> ]	995.7	995.0
Specific heat capacity of heating water	[kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	4.180	4.180
Voltage	[V]	399.43	399.96
Total current	[A]	14.96	15.93
Overall power input	[kW]	2.587	2.693
Capacity correction of sec. liquid pump	[W]	14.577	19.968
Power input correction of sec. liquid pump	[W]	17.03	23.82
Heating capacity – heating water	[kW]	8.628	7.103
<b>Corrected heating capacity – heating water</b>	<b>[kW]</b>	<b>8.613</b>	<b>7.083</b>
Uncertainty of corrected heating capacity	[kW]	± 0.163	± 0.132
<b>Effective electric power input</b>	<b>[kW]</b>	<b>2.570</b>	<b>2.669</b>
<b>COP</b>	<b>[-]</b>	<b>3.351</b>	<b>2.653</b>
Uncertainty of COP	[-]	± 0.063	± 0.049
<b>Control settings</b>	<b>[%]</b>	<b>67</b>	<b>67</b>
Circulation pump settings – heating water	[%]	40	40

\* 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)

Data for SCOP calculation (Heat pump NEXUS M14 PRO)

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

	Outdoor heat exchanger	Indoor heat exchanger	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
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]								
<b>A</b>	-7	34.00	88.46	8.59	8.592	3.112	0.900	1.00	3.112	–
<b>B</b>	2	30.00	53.85	5.23	5.242	5.092	0.900	1.00	5.092	–
<b>C</b>	7	28.75	34.62	3.36	5.165	6.441	0.979	0.65	6.370	0.0167
<b>D</b>	12	27.67	15.38	1.49	5.621	7.529	0.978	0.27	7.091	0.0167
<b>TOL (E)</b>	-10	35.00	100.00	9.71	7.980	2.839	0.900	1.00	2.839	–
<b>Tbiv (F)</b>	-7	34.00	88.46	8.59	8.592	3.112	0.900	1.00	3.112	–

**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:

$$\begin{aligned}
 t_{\text{outlet, average}} &= t_{\text{inlet, capacity test}} + (t_{\text{outlet, capacity test}} - t_{\text{inlet, capacity test}}) \cdot CR & [^{\circ}\text{C}] \\
 t_{\text{outlet, average}} &= t_{\text{inlet, capacity test}} + (\Delta t) \cdot CR & [^{\circ}\text{C}] \\
 t_{\text{outlet, average}} &= t_{\text{outlet, capacity test}} - \Delta t + \Delta t \cdot CR & [^{\circ}\text{C}] \\
 t_{\text{outlet, capacity test}} &= t_{\text{outlet, average}} + \Delta t - \Delta t \cdot CR & [^{\circ}\text{C}]
 \end{aligned}$$

For variable flow:

$$\Delta t = 5$$

$$CR \cdot \Delta t = \text{Part load} / \text{Declared capacity} \cdot 5$$

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

Measured data:

$t_{\text{outlet, average}}$	24.00	[°C]
Declared capacity	5.621	[kW]
Declared capacity standard rating condition A7/W35	–	[kW]
Part load	1.49	[kW]

Calculation of water temperature

$$t_{\text{outlet, capacity test, variable flow}} = 24 + 5 - 1.49 / 5.621 \cdot 5 = 27.67 \quad [^{\circ}\text{C}]$$



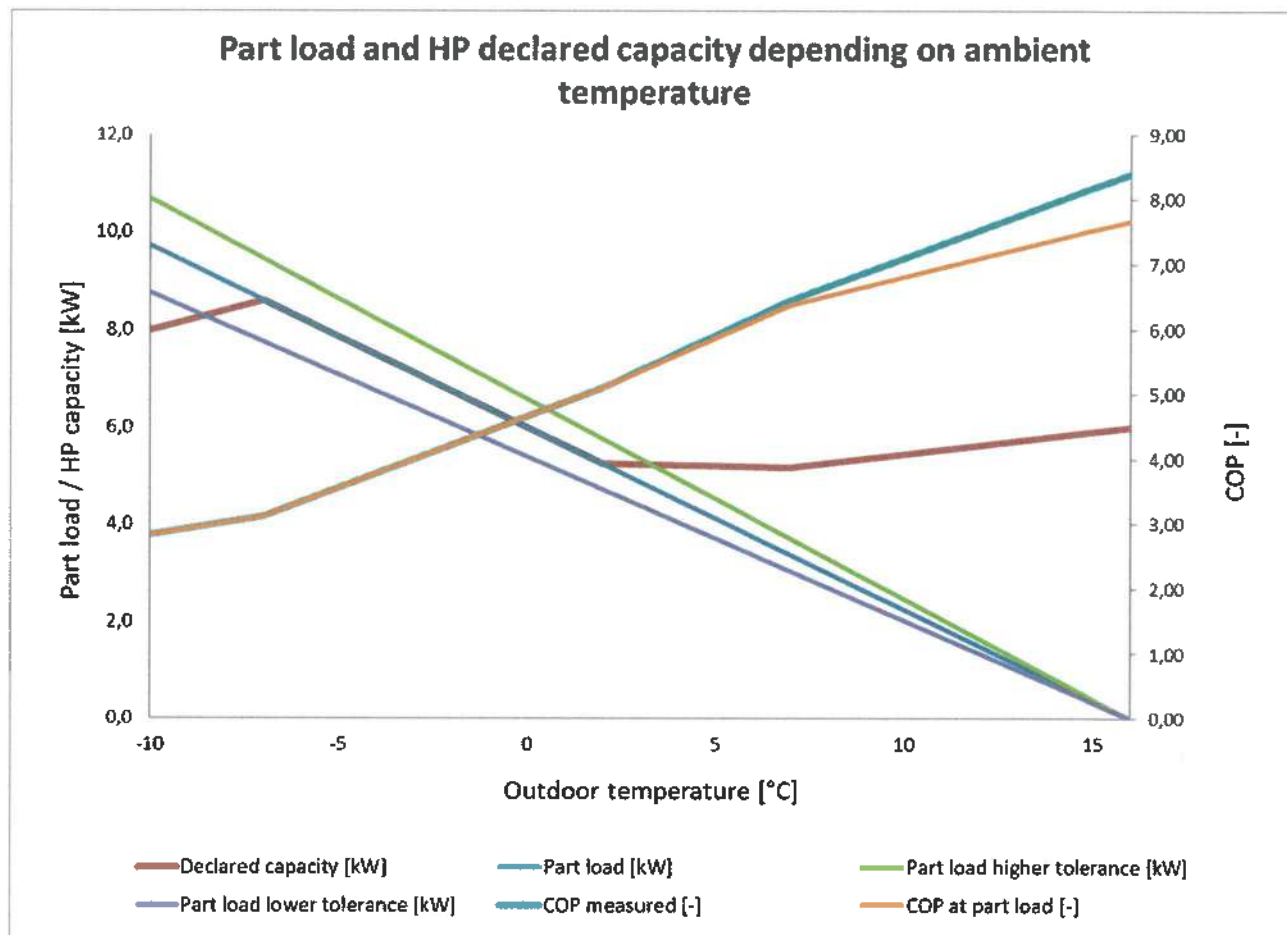
Calculation SCOP, SCOP<sub>on</sub>, SCOP<sub>net</sub> (Heat pump NEXUS M14 PRO)

- 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 Ph(Tj)		hj x (Ph(Tj) + elbu(Tj))		
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]	
	21	-10	1	100.00	9.71	7.98	7.98	1.73	1.73	2.84	10	5	8	3	
	22	-9	25	96.15	9.34	8.18	8.18	1.16	28.88	2.93	233	99	205	70	
	23	-8	23	92.31	8.97	8.39	8.39	0.58	13.28	3.02	206	77	193	64	
A	24	-7	24	88.46	8.59	8.59	8.59	0.00	0.00	3.11	206	66	206	66	
	25	-6	27	84.62	8.22	8.22	8.22	0.00	0.00	3.33	222	67	222	67	
	26	-5	68	80.77	7.84	7.85	7.84	0.00	0.00	3.55	533	150	533	150	
	27	-4	91	76.92	7.47	7.48	7.47	0.00	0.00	3.77	680	180	680	180	
	28	-3	89	73.08	7.10	7.10	7.10	0.00	0.00	3.99	632	158	632	158	
	29	-2	165	69.23	6.72	6.73	6.72	0.00	0.00	4.21	1109	263	1109	263	
	30	-1	173	65.38	6.35	6.36	6.35	0.00	0.00	4.43	1099	248	1099	248	
	31	0	240	61.54	5.98	5.99	5.98	0.00	0.00	4.65	1434	308	1434	308	
	32	1	280	57.69	5.60	5.61	5.60	0.00	0.00	4.87	1569	322	1569	322	
B	33	2	320	53.85	5.23	5.24	5.23	0.00	0.00	5.09	1674	329	1674	329	
	34	3	357	50.00	4.86	5.23	4.86	0.00	0.00	5.35	1734	324	1734	324	
	35	4	356	46.15	4.48	5.21	4.48	0.00	0.00	5.60	1596	285	1596	285	
	36	5	303	42.31	4.11	5.20	4.11	0.00	0.00	5.86	1245	213	1245	213	
	37	6	330	38.46	3.74	5.18	3.74	0.00	0.00	6.11	1233	202	1233	202	
C	38	7	326	34.62	3.36	5.17	3.36	0.00	0.00	6.37	1096	172	1096	172	
	39	8	348	30.77	2.99	5.26	2.99	0.00	0.00	6.51	1040	160	1040	160	
	40	9	335	26.92	2.61	5.35	2.61	0.00	0.00	6.66	876	132	876	132	
	41	10	315	23.08	2.24	5.44	2.24	0.00	0.00	6.80	706	104	706	104	
	42	11	215	19.23	1.87	5.53	1.87	0.00	0.00	6.95	402	58	402	58	
D	43	12	169	15.38	1.49	5.62	1.49	0.00	0.00	7.09	253	36	253	36	
	44	13	151	11.54	1.12	5.71	1.12	0.00	0.00	7.24	169	23	169	23	
	45	14	105	7.69	0.75	5.80	0.75	0.00	0.00	7.38	78	11	78	11	
	46	15	74	3.85	0.37	5.89	0.37	0.00	0.00	7.52	28	4	28	4	
		Σ	4910							Σ	20063	3994	20019	3950	
												SCOPon	5.02	SCOPnet	5.07
														SCOP	5.02

Power diagram (Heat pump NEXUS M14 PRO)

- 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:**

<b>„A“ = average</b>	(reference water temperature 55 °C, reference design conditions for heating T <sub>designh</sub> = -10 °C)
<b>„W“ = warmer</b>	(reference water temperature 55 °C, reference design conditions for heating T <sub>designh</sub> = +2 °C)
<b>„C“ = colder</b>	(reference water temperature 55 °C, reference design conditions for heating T <sub>designh</sub> = -22 °C)

Model			Heat pump NEXUS M14 PRO			
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		
	Air flow rate – primary circuit			Variable		
	Water flow rate – secondary circuit			Variable		
Seasonal space heating energy efficiency	Heating	Average	$\eta_s$ / A		146.4	%
		Warmer	$\eta_s$ / W		172.6	(not tested) %
		Colder	$\eta_s$ / C		120.0	(not tested) %
Seasonal efficiency according to ČSN EN 14825:2020	Heating	Average	SCOP / A		3.73	–
		Warmer	SCOP / W		4.39	(not tested) –
		Colder	SCOP / C		3.07	(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 <sub>designc</sub>		–	kW
	Heating	Average	P <sub>designh</sub>		9.49	kW
		Warmer	P <sub>designh</sub>		9.78	kW
		Colder	P <sub>designh</sub>		14.21	kW
Bivalent temperatures	Heating	Average	T <sub>bivalent</sub>		-7	°C
		Warmer	T <sub>bivalent</sub>		2	°C
		Colder	T <sub>bivalent</sub>		-7	°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 <sub>CE</sub>		–	kWh
	Heating	Average	Q <sub>HE</sub> /A		5252	kWh
		Warmer	Q <sub>HE</sub> /W		2976	(not tested) kWh
		Colder	Q <sub>HE</sub> /C		11390	(not tested) kWh
Modes other than „active mode“		Off mode		P <sub>OFF</sub>	16.6	W
		Thermostat off mode		P <sub>TO</sub>	16.7	W
		Standby mode		P <sub>SB</sub>	16.6	W
		Crankcase heater mode		P <sub>CK</sub>	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 <sub>HE</sub>	2066	[h]
H <sub>TO</sub>	178	[h]
H <sub>SB</sub>	0	[h]
H <sub>CK</sub>	178	[h]
H <sub>OFF</sub>	0	[h]

Measured data:

P <sub>TO</sub>	0.0167	[kW]
P <sub>SB</sub>	0.0166	[kW]
P <sub>CK</sub>	0.0000	[kW]
P <sub>OFF</sub>	0.0166	[kW]
P <sub>designh</sub>	9.49	[kW]
SCOP <sub>ON</sub>	3.74	[-]

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<sub>H</sub>)

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

$$Q_H = 9.49 \cdot 2066 = 19616 \quad [\text{kWh}]$$

7.4 Calculation of the annual electricity consumption (Q<sub>HE</sub>)

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

$$Q_{HE} = 19616 / 3.74 + 178 \cdot 0.0167 + 0 \cdot 0.0166 + 178 \cdot 0 + 0 \cdot 0.0166 = 5252 \quad [\text{kWh}]$$

7.2 General formula for calculation of reference SCOP

$$\text{SCOP} = Q_H / Q_{HE} \quad [-]$$

$$\text{SCOP} = 19616 / 5252 = 3.73 \quad [-]$$

7.1 Calculation of the seasonal space heating efficiency  $\eta_s$

$$\Sigma F(i) = F(1) + F(2) \quad [-]$$

$$\Sigma F = 0.03 + 0 = 0.03 \quad [-]$$

$$\eta_s = 1 / \text{CC} \cdot \text{SCOP} - \Sigma F(i) \quad [-]$$

$$\eta_s (A) = (1 / 2.5) \cdot 3.73 - 0.03 = \underline{\underline{1.464}} \quad [-]$$

Test results for single part load conditions

**Measurement results:**

Heat pump **NEXUS M14 PRO**

Test number		14	15	16
Temperature level		Medium temperature application (reference water temperature 55 °C)		
Reference heating season		„A“ = average ( $T_{designh} = -10\text{ °C}$ )		
Assessment condition		A, T <sub>biv</sub> (F)	B	C
Specification of the assessment condition*		A-7/W52	A2/W42	A7/W38.59
Date of testing		2021-09-29	2021-09-29	2021-09-30
Transient test procedure	YES / NO	YES	NO	NO
Average defrost time of 1 cycle	[min]	6.6	–	–
Average time of 1 cycle	[min]	106.3	–	–
Calculation time	[min]	106.3	70.0	70.0
Output heating water – temperature calculation	[°C]	51.13	42.00	38.58
Input heating water – temperature calculation	[°C]	43.91	34.01	30.58
Output heating water temperature	[°C]	52.10	42.00	38.58
Input heating water temperature	[°C]	44.02	34.01	30.58
Air temperature – dry bulb temperature	[°C]	-7.01	2.01	7.06
Air temperature – wet bulb temperature	[°C]	-8.01	1.02	6.07
Relative humidity	[%]	75.01	84.02	87.00
Barometric pressure	[kPa]	98.850	98.846	99.622
Ambient temperature	[°C]	-6.75	2.31	7.28
Secondary circuit pressure difference	[kPa]	3.408	7.468	7.549
Efficiency of the secondary liquid pump	[-]	0.124	0.127	0.126
Volume flow rate of heating water	[m <sup>3</sup> ·h <sup>-1</sup> ]	1.0068	0.5449	0.5282
Density of heating water	[kg·m <sup>-3</sup> ]	987.5	991.4	992.7
Specific heat capacity of heating water	[kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	4.180	4.170	4.180
Voltage	[V]	399.27	399.87	400.07
Total current	[A]	20.52	8.15	6.41
Overall power input	[kW]	3.734	1.340	1.022
Capacity correction of sec. liquid pump	[W]	6.695	7.787	7.653
Power input correction of sec. liquid pump	[W]	7.65	8.92	8.76
Heating capacity – heating water	[kW]	8.405	5.010	4.865
<b>Corrected heating capacity – heating water</b>	<b>[kW]</b>	<b>8.399</b>	<b>5.002</b>	<b>4.857</b>
Uncertainty of corrected heating capacity	[kW]	± 0.103	± 0.058	± 0.057
<b>Effective electric power input</b>	<b>[kW]</b>	<b>3.727</b>	<b>1.331</b>	<b>1.013</b>
<b>COP</b>	<b>[-]</b>	<b>2.254</b>	<b>3.758</b>	<b>4.795</b>
Uncertainty of COP	[-]	± 0.028	± 0.044	± 0.056
<b>Control settings</b>	<b>[%]</b>	<b>67</b>	<b>27</b>	<b>24</b>
Circulation pump settings – heating water	[%]	20	20	20

\* 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 results for single part load conditions

**Measurement results:**

Heat pump NEXUS M14 PRO

Test number		17	18	19
Temperature level		Medium temperature application (reference water temperature 55 °C)		
Reference heating season		„A“ = average ( $T_{designh} = -10\text{ °C}$ )		„W“ = warmer ( $T_{designh} = 2\text{ °C}$ )
Assessment condition		D	TOL(E)	B, TOL(E), Tbiv (F)
Specification of the assessment condition*		A12/W35.83	A-10/W55	A2/W55
Date of testing		2021-10-01	2021-09-30	2021-10-05
Transient test procedure	YES / NO	NO	NO	YES
Average defrost time of 1 cycle	[min]	–	–	5.9
Average time of 1 cycle	[min]	–	–	73.0
Calculation time	[min]	70.0	70.0	146.1
Output heating water – temperature calculation	[°C]	35.79	54.98	53.78
Input heating water – temperature calculation	[°C]	27.80	46.99	46.94
Output heating water temperature	[°C]	35.79	54.98	55.01
Input heating water temperature	[°C]	27.80	46.99	47.02
Air temperature – dry bulb temperature	[°C]	12.00	-10.00	1.91
Air temperature – wet bulb temperature	[°C]	11.01	-10.99	0.92
Relative humidity	[%]	89.02	69.99	83.92
Barometric pressure	[kPa]	99.083	99.583	98.036
Ambient temperature	[°C]	12.02	-9.85	2.28
Secondary circuit pressure difference	[kPa]	7.217	4.208	8.805
Efficiency of the secondary liquid pump	[-]	0.127	0.126	0.151
Volume flow rate of heating water	[m <sup>3</sup> ·h <sup>-1</sup> ]	0.5855	0.9329	1.2451
Density of heating water	[kg·m <sup>-3</sup> ]	993.7	985.8	986.3
Specific heat capacity of heating water	[kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	4.180	4.180	4.180
Voltage	[V]	400.11	399.08	399.30
Total current	[A]	6.40	22.24	22.23
Overall power input	[kW]	0.944	4.068	3.930
Capacity correction of sec. liquid pump	[W]	8.048	7.548	17.060
Power input correction of sec. liquid pump	[W]	9.22	8.64	20.10
Heating capacity – heating water	[kW]	5.399	8.525	9.799
<b>Corrected heating capacity – heating water</b>	<b>[kW]</b>	<b>5.391</b>	<b>8.517</b>	<b>9.782</b>
Uncertainty of corrected heating capacity	[kW]	± 0.063	± 0.096	± 0.125
<b>Effective electric power input</b>	<b>[kW]</b>	<b>0.935</b>	<b>4.059</b>	<b>3.910</b>
<b>COP</b>	<b>[-]</b>	<b>5.765</b>	<b>2.098</b>	<b>2.502</b>
Uncertainty of COP	[-]	± 0.067	± 0.024	± 0.032
<b>Control settings</b>	<b>[%]</b>	<b>24</b>	<b>67</b>	<b>67</b>
Circulation pump settings – heating water	[%]	20	20	35

\* 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 results for single part load conditions

**Measurement results:**

Heat pump **NEXUS M14 PRO**

Test number		20	21
Temperature level		Medium temperature application (reference water temperature 55 °C)	
Reference heating season		„C“ = colder ( $T_{designh} = -22\text{ °C}$ )	
Assessment condition		A, $T_{biv}$ (F)	G
Specification of the assessment condition*		A-7/W44	A-15/W49
Date of testing		2021-10-07	2021-10-06
Transient test procedure	YES / NO	YES	YES
Average defrost time of 1 cycle	[min]	7.3	6.0
Average time of 1 cycle	[min]	129.4	145.1
Calculation time	[min]	129.4	145.1
Output heating water – temperature calculation	[°C]	43.13	48.23
Input heating water – temperature calculation	[°C]	35.90	40.96
Output heating water temperature	[°C]	44.00	48.94
Input heating water temperature	[°C]	36.01	41.02
Air temperature – dry bulb temperature	[°C]	-7.00	-15.04
Air temperature – wet bulb temperature	[°C]	-7.98	-15.82
Relative humidity	[%]	75.13	66.57
Barometric pressure	[kPa]	99.362	98.746
Ambient temperature	[°C]	-6.76	-14.84
Secondary circuit pressure difference	[kPa]	8.219	7.773
Efficiency of the secondary liquid pump	[-]	0.143	0.135
Volume flow rate of heating water	[m <sup>3</sup> ·h <sup>-1</sup> ]	1.0302	0.8227
Density of heating water	[kg·m <sup>-3</sup> ]	990.9	988.8
Specific heat capacity of heating water	[kJ·kg <sup>-1</sup> ·K <sup>-1</sup> ]	4.180	4.180
Voltage	[V]	399.67	399.39
Total current	[A]	18.79	19.87
Overall power input	[kW]	3.271	3.550
Capacity correction of sec. liquid pump	[W]	14.147	11.357
Power input correction of sec. liquid pump	[W]	16.50	13.13
Heating capacity – heating water	[kW]	8.612	6.925
<b>Corrected heating capacity – heating water</b>	<b>[kW]</b>	<b>8.598</b>	<b>6.914</b>
Uncertainty of corrected heating capacity	[kW]	± 0.105	± 0.085
<b>Effective electric power input</b>	<b>[kW]</b>	<b>3.255</b>	<b>3.536</b>
<b>COP</b>	<b>[-]</b>	<b>2.642</b>	<b>1.955</b>
Uncertainty of COP	[-]	± 0.032	± 0.024
<b>Control settings</b>	<b>[%]</b>	<b>67</b>	<b>67</b>
Circulation pump settings – heating water	[%]	30	25

\* 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)

Data for SCOP calculation (Heat pump NEXUS M14 PRO)

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

	Outdoor heat exchanger	Indoor heat exchanger	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
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]								
<b>A</b>	-7	52.00	88.46	8.40	8.399	2.254	0.900	1.00	2.254	–
<b>B</b>	2	42.00	53.85	5.11	5.002	3.758	0.900	1.00	3.758	–
<b>C</b>	7	38.59	34.62	3.29	4.857	4.795	0.984	0.68	4.758	0.0167
<b>D</b>	12	35.83	15.38	1.46	5.391	5.765	0.982	0.27	5.501	0.0167
<b>TOL (E)</b>	-10	55.00	100.00	9.49	8.517	2.098	0.900	1.00	2.098	–
<b>Tbiv (F)</b>	-7	52.00	88.46	8.40	8.399	2.254	0.900	1.00	2.254	–

**Adaption of water temperature – according to ČSN EN 14825:2020, Annex F**

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

General formulas and derivation:

$$\begin{aligned}
 t_{\text{outlet, average}} &= t_{\text{inlet, capacity test}} + (t_{\text{outlet, capacity test}} - t_{\text{inlet, capacity test}}) \cdot CR & [^{\circ}\text{C}] \\
 t_{\text{outlet, average}} &= t_{\text{inlet, capacity test}} + (\Delta t) \cdot CR & [^{\circ}\text{C}] \\
 t_{\text{outlet, average}} &= t_{\text{outlet, capacity test}} - \Delta t + \Delta t \cdot CR & [^{\circ}\text{C}] \\
 t_{\text{outlet, capacity test}} &= t_{\text{outlet, average}} + \Delta t - \Delta t \cdot CR & [^{\circ}\text{C}]
 \end{aligned}$$

For variable flow:

$$\Delta t = 8$$

$$CR \cdot \Delta t = \text{Part load} / \text{Declared capacity} \cdot 8$$

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

Measured data:

$t_{\text{outlet, average}}$	30.00	[°C]
Declared capacity	5.391	[kW]
Declared capacity standard rating condition A7/W35	–	[kW]
Part load	1.46	[kW]

Calculation of water temperature

$$t_{\text{outlet, capacity test, variable flow}} = 30 + 8 - 1.46 / 5.391 \cdot 8 = 35.83 \quad [^{\circ}\text{C}]$$

Calculation SCOP, SCOP<sub>on</sub>, SCOP<sub>net</sub> (Heat pump NEXUS M14 PRO)

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

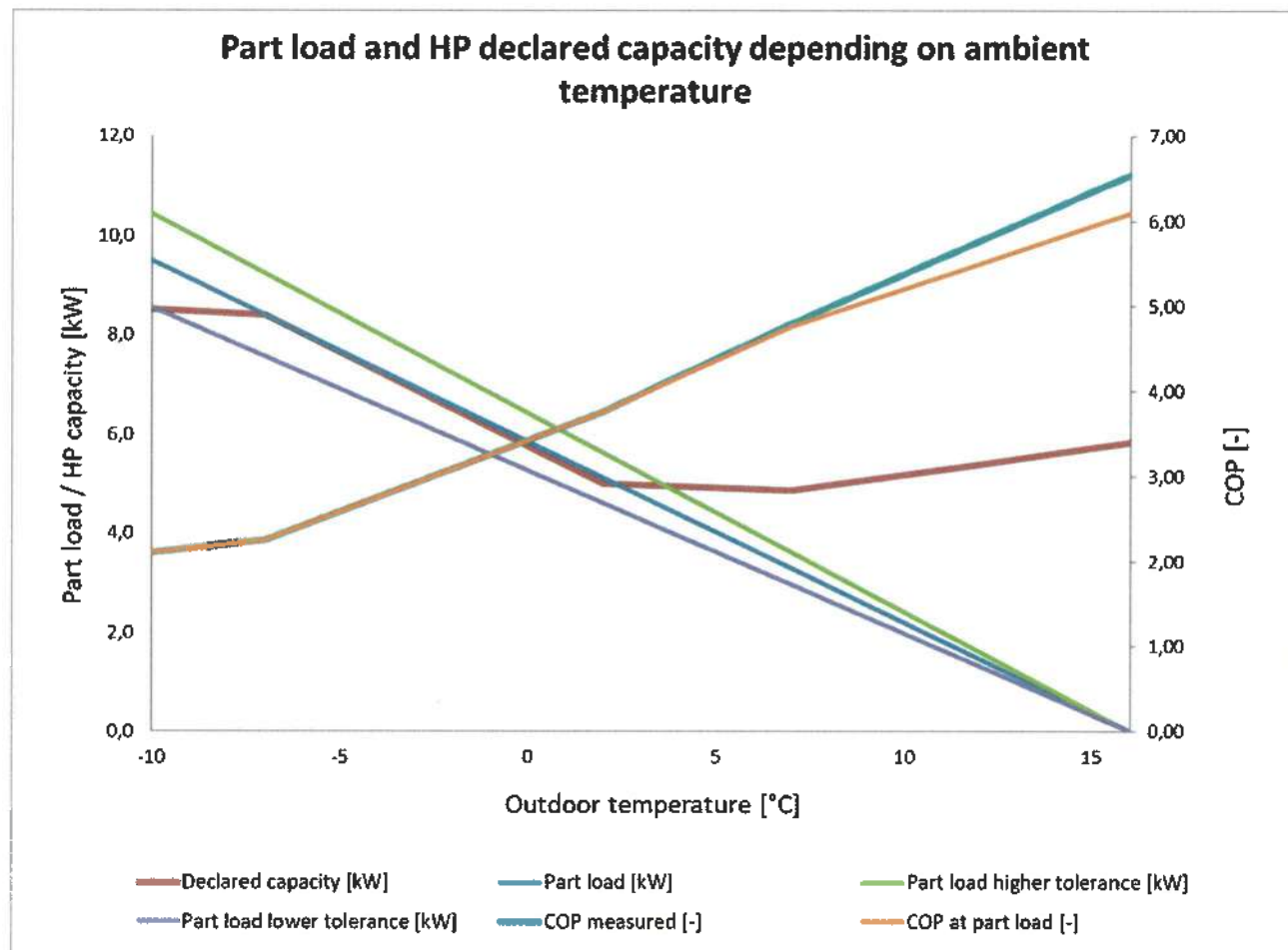
	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	Tj	hj		Ph(Tj)			elbu(Tj)	hj x elbu(Tj)	COPb in (Tj)	hj x Ph(Tj)		hj x (Ph(Tj) + elbu(Tj))	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
	21	-10	1	100,00	9,49	8,52	8,52	0,98	0,98	2,10	9	5	9	4
	22	-9	25	96,15	9,13	8,48	8,48	0,65	16,29	2,15	228	115	212	99
	23	-8	23	92,31	8,76	8,44	8,44	0,33	7,49	2,20	202	96	194	88
A	24	-7	24	88,46	8,40	8,40	8,40	0,00	0,00	2,25	202	89	202	89
	25	-6	27	84,62	8,03	8,02	8,02	0,00	0,00	2,42	217	90	217	90
	26	-5	68	80,77	7,67	7,64	7,64	0,00	0,00	2,59	521	201	521	201
	27	-4	91	76,92	7,30	7,27	7,27	0,00	0,00	2,76	665	241	665	241
	28	-3	89	73,08	6,94	6,89	6,89	0,00	0,00	2,92	618	211	618	211
	29	-2	165	69,23	6,57	6,51	6,51	0,00	0,00	3,09	1085	351	1085	351
	30	-1	173	65,38	6,21	6,13	6,13	0,00	0,00	3,26	1074	330	1074	330
	31	0	240	61,54	5,84	5,76	5,76	0,00	0,00	3,42	1402	410	1402	410
	32	1	280	57,69	5,48	5,38	5,38	0,00	0,00	3,59	1534	427	1534	427
B	33	2	320	53,85	5,11	5,00	5,00	0,00	0,00	3,76	1636	435	1636	435
	34	3	357	50,00	4,75	4,97	4,75	0,00	0,00	3,96	1695	428	1695	428
	35	4	356	46,15	4,38	4,94	4,38	0,00	0,00	4,16	1560	375	1560	375
	36	5	303	42,31	4,02	4,92	4,02	0,00	0,00	4,36	1217	279	1217	279
	37	6	330	38,46	3,65	4,89	3,65	0,00	0,00	4,56	1205	264	1205	264
C	38	7	326	34,62	3,29	4,86	3,29	0,00	0,00	4,76	1071	225	1071	225
	39	8	348	30,77	2,92	4,96	2,92	0,00	0,00	4,91	1017	207	1017	207
	40	9	335	26,92	2,56	5,07	2,56	0,00	0,00	5,05	856	169	856	169
	41	10	315	23,08	2,19	5,18	2,19	0,00	0,00	5,20	690	133	690	133
	42	11	215	19,23	1,83	5,28	1,83	0,00	0,00	5,35	393	73	393	73
D	43	12	169	15,38	1,46	5,39	1,46	0,00	0,00	5,50	247	45	247	45
	44	13	151	11,54	1,10	5,50	1,10	0,00	0,00	5,65	165	29	165	29
	45	14	105	7,69	0,73	5,60	0,73	0,00	0,00	5,80	77	13	77	13
	46	15	74	3,85	0,37	5,71	0,37	0,00	0,00	5,95	27	5	27	5
	Σ		4910							Σ	19612	5248	19587	5223

SCOP <sub>on</sub>	3.74	SCOP <sub>net</sub>	3.75
		<b>SCOP</b>	<b>3.73</b>



Power diagram (Heat pump **NEXUS M14 PRO**)

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



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

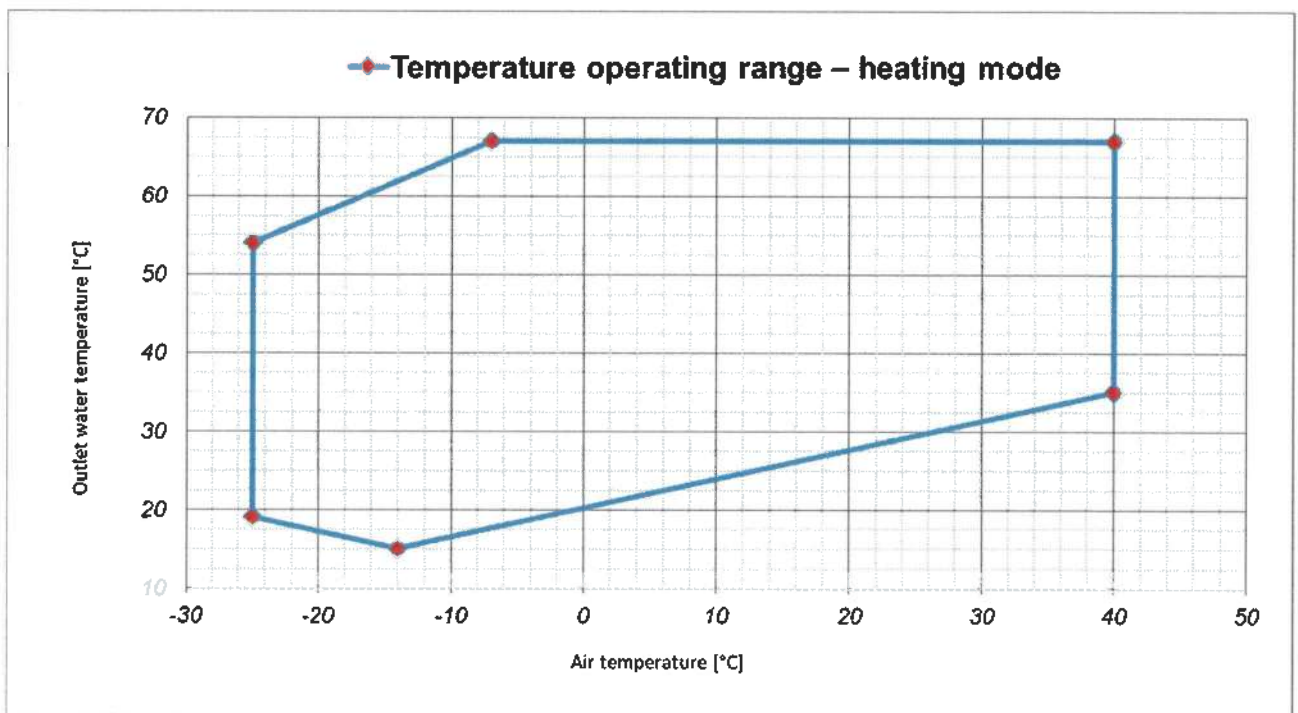
Testing method: **ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14511-4:2019, EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a**

Sample tested: **Heat pump NEXUS M14 PRO**

Measuring equipment used: **See chapter II.**

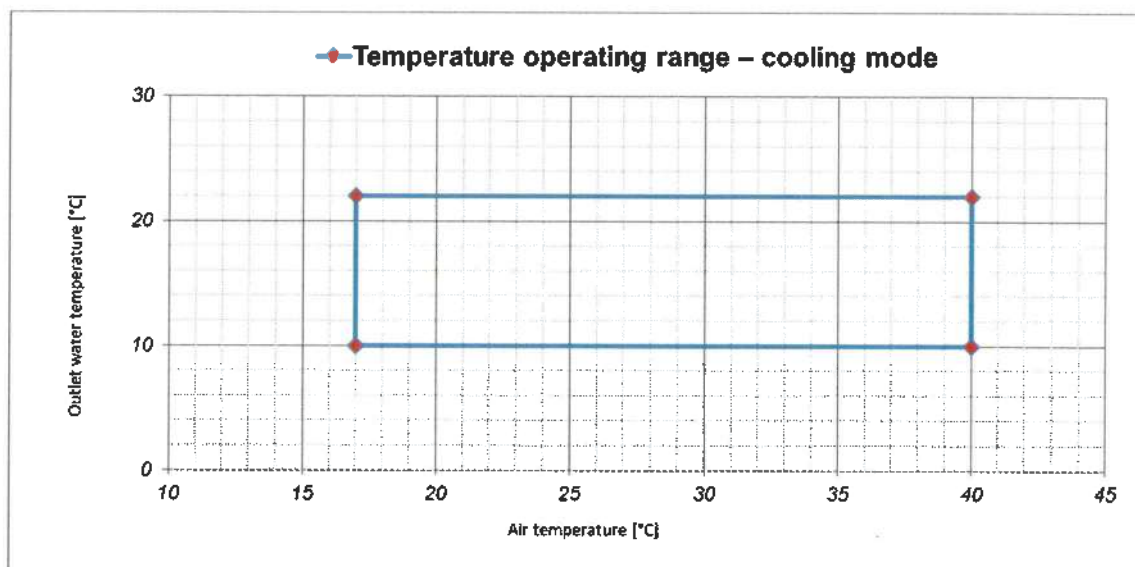
Place of testing:	at the Engineering Test Institute <input checked="" type="checkbox"/>	at the Manufacturer's premises <input type="checkbox"/>	at the Customer's premises <input type="checkbox"/>	other: <input type="checkbox"/>
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### 1) Temperature operating range



Test point	Inlet air dry bulb temperature [°C]		Outlet heating water temperature [°C]		Water flow rate in condenser [m³/h]	Note
1	A	-25	W	19	Minimum	Minimum water flow rate: <b>0.525 m³·h⁻¹</b> Maximum water flow rate: <b>2.351 m³·h⁻¹</b>
2	A	-25	W	54	Minimum	

Heat pump **NEXUS M14 PRO** is fully operational in the 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	17	W	10	Minimum	Minimum water flow rate*: <b>1.1 m³·h⁻¹</b>  Maximum water flow rate*: <b>1.2 m³·h⁻¹</b>
2	A	40	W	22	Maximum	

Heat pump **NEXUS M14 PRO** is fully operational in the temperature operating range.

\*Note: Minimal and maximal flowrates in cooling mode at these points for compressor speed equal to 29 rps.

#### 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	+



2 (starting)	Upper limit of use	Upper limit of use	maximum	Rated voltage	+
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 on working with lower heating capacity
Test for section a) Art. 4.5 ČSN EN 14511-4:2019 – cooling	+	Pressure switch alarm
Test for section b) Art. 4.5 ČSN EN 14511-4:2019 – heating	+	Alarm AL166 (pressure switch)
Test for section b) Art. 4.5 ČSN EN 14511-4:2019 – cooling	+	Alarm 105 (circuit 1 low suction pressure)
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 **NEXUS M14 PRO**

Data for SCOP calculation (Heat pump **NEXUS M14 PRO**)

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

	Outdoor heat exchanger	Indoor heat exchanger	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
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]								
<b>A</b>	–	–	–	–	–	–	–	–	–	–
<b>B</b>	2	35.00	100.00	9.92	9.915	3.608	0.900	1.00	3.608	–
<b>C</b>	7	31.00	64.29	6.37	6.400	5.800	0.900	1.00	5.800	–
<b>D</b>	12	28.47	28.57	2.83	5.600	6.900	0.979	0.51	6.764	0.0167
<b>TOL (E)</b>	2	35.00	100.00	9.92	9.915	3.608	0.900	1.00	3.608	–
<b>Tbiv (F)</b>	2	35.00	100.00	9.92	9.915	3.608	0.900	1.00	3.608	–

Calculation SCOP, SCOP<sub>on</sub>, SCOP<sub>net</sub> (Heat pump **NEXUS M14 PRO**)

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

	B in	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		P <sub>h(Tj)</sub>			elbu <sub>(Tj)</sub>	h <sub>j</sub> x elbu <sub>(Tj)</sub>	COP <sub>b in</sub> (Tj)	h <sub>j</sub> x P <sub>h(Tj)</sub>		h <sub>j</sub> x (P <sub>h(Tj)</sub> - elbu <sub>(Tj)</sub> )	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
B	33	2	3	100.00	9.92	9.92	9.92	0.00	0.00	3.61	30	8	30	8
	34	3	22	92.86	9.21	9.21	9.21	0.00	0.00	4.05	203	50	203	50
	35	4	63	85.71	8.50	8.51	8.50	0.00	0.00	4.48	535	119	535	119

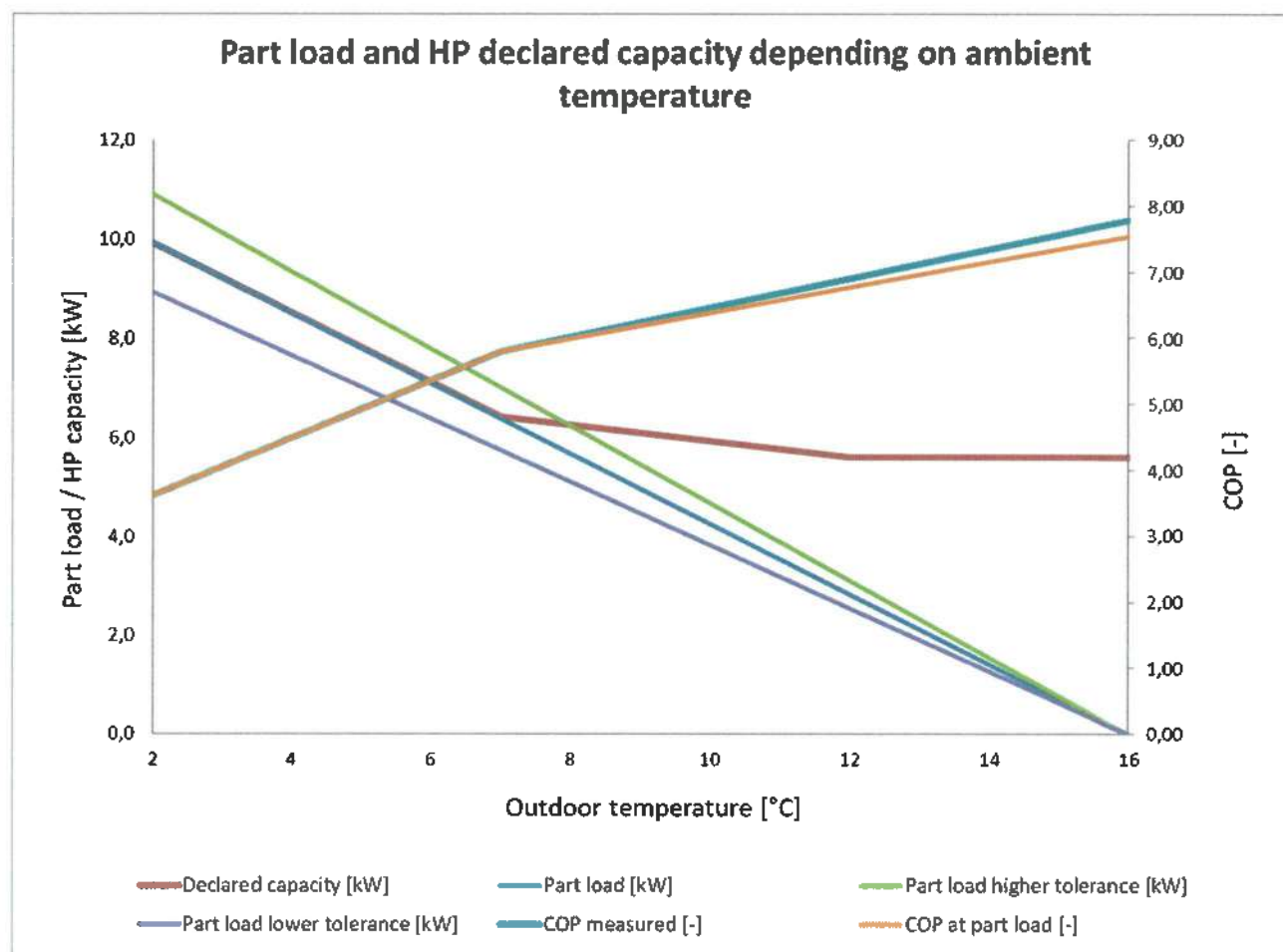


	36	5	63	78.57	7.79	7.81	7.79	0.00	0.00	4.92	491	100	491	100
	37	6	175	71.43	7.08	7.10	7.08	0.00	0.00	5.36	1239	231	1239	231
<b>C</b>	<b>38</b>	<b>7</b>	<b>162</b>	<b>64.29</b>	<b>6.37</b>	<b>6.40</b>	<b>6.37</b>	<b>0.00</b>	<b>0.00</b>	<b>5.80</b>	<b>1033</b>	<b>178</b>	<b>1033</b>	<b>178</b>
	39	8	259	57.14	5.67	6.24	5.67	0.00	0.00	5.99	1467	245	1467	245
	40	9	360	50.00	4.96	6.08	4.96	0.00	0.00	6.19	1785	289	1785	289
	41	10	428	42.86	4.25	5.92	4.25	0.00	0.00	6.38	1819	285	1819	285
	42	11	430	35.71	3.54	5.76	3.54	0.00	0.00	6.57	1523	232	1523	232
<b>D</b>	<b>43</b>	<b>12</b>	<b>503</b>	<b>28.57</b>	<b>2.83</b>	<b>5.60</b>	<b>2.83</b>	<b>0.00</b>	<b>0.00</b>	<b>6.76</b>	<b>1425</b>	<b>211</b>	<b>1425</b>	<b>211</b>
	44	13	444	21.43	2.12	5.44	2.12	0.00	0.00	6.96	943	136	943	136
	45	14	384	14.29	1.42	5.28	1.42	0.00	0.00	7.15	544	76	544	76
	46	15	294	7.14	0.71	5.12	0.71	0.00	0.00	7.34	208	28	208	28
	<b>Σ</b>		<b>3590</b>							<b>Σ</b>	<b>13244</b>	<b>2187</b>	<b>13244</b>	<b>2187</b>

SCOP <sub>on</sub>	6.05	SCOP <sub>net</sub>	6.05
<b>SCOP</b>		<b>6.02</b>	

Power diagram (Heat pump NEXUS M14 PRO)

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



Data for SCOP calculation (Heat pump **NEXUS M14 PRO**)

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

	Outdoor heat exchanger	Indoor heat exchanger	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
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]								
<b>A</b>	-7	30.00	60.53	8.61	8.613	3.351	0.900	1.00	3.351	–
<b>B</b>	2	27.00	36.84	5.24	4.900	4.900	0.900	1.00	4.900	–
<b>C</b>	7	26.76	23.68	3.37	5.200	6.400	0.979	0.65	6.329	0.0167
<b>D</b>	12	27.66	10.53	1.50	5.600	6.800	0.980	0.27	6.442	0.0167
<b>TOL (E)</b>	-22	35.00	100.00	14.23	5.000	1.700	0.900	1.00	1.300	–
<b>Tbiv (F)</b>	-7	30.00	60.53	8.61	8.613	3.351	0.900	1.00	3.351	–
<b>G</b>	-15	32.00	81.58	11.61	7.083	2.653	0.900	1.00	2.653	–

Calculation SCOP, SCOP<sub>on</sub>, SCOP<sub>net</sub> (Heat pump **NEXUS M14 PRO**)

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

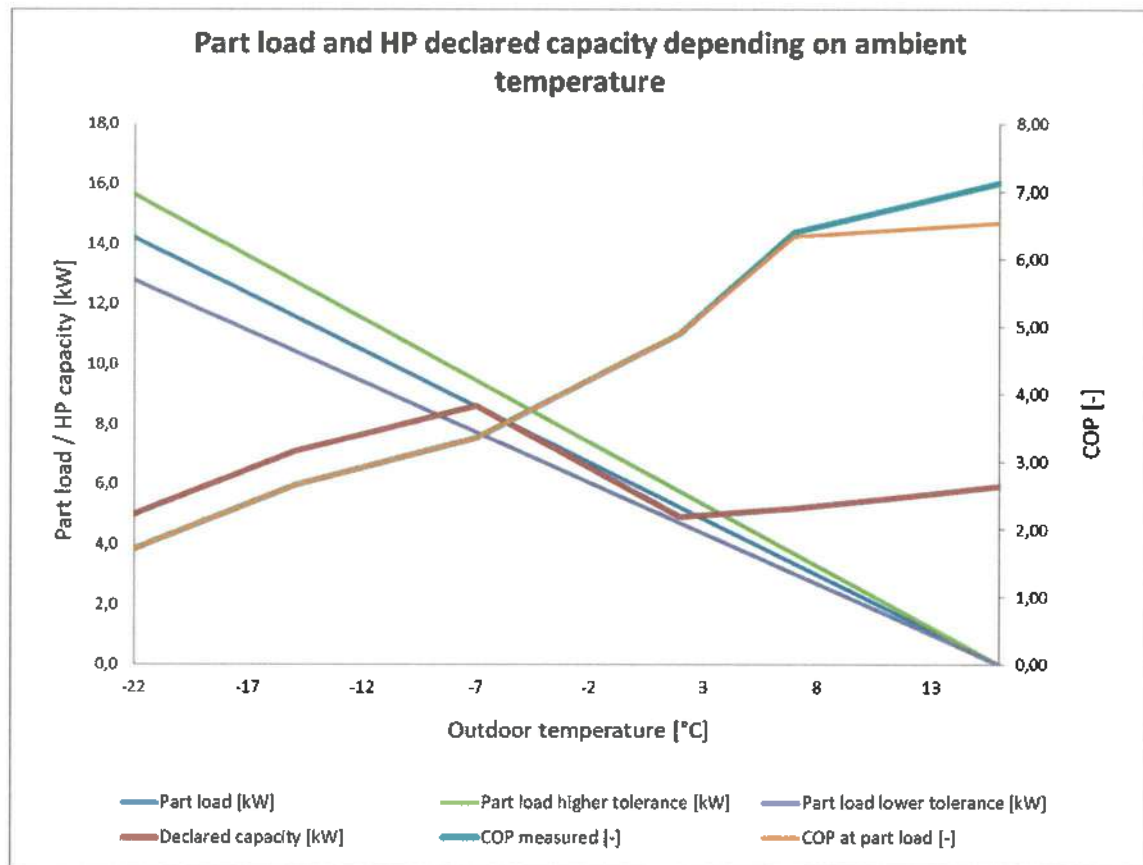
	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	Tj	hj		Ph(Tj)			elbu(Tj)	hj x elbu(Tj)	COP bin (Tj)	hj x Ph(Tj)		hj x (Ph(Tj) - elbu(Tj))	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
	9	-22	1	100.00	14.23	5.00	5.00	9.23	9.23	1.70	14	12	5	3
	10	-21	6	97.37	13.86	5.30	5.30	8.56	51.35	1.84	83	69	32	17
	11	-20	13	94.74	13.48	5.60	5.60	7.89	102.52	1.97	175	139	73	37
	12	-19	17	92.11	13.11	5.89	5.89	7.21	122.64	2.11	223	170	100	48
	13	-18	19	89.47	12.73	6.19	6.19	6.54	124.30	2.24	242	177	118	52
	14	-17	26	86.84	12.36	6.49	6.49	5.87	152.62	2.38	321	223	169	71
	15	-16	39	84.21	11.98	6.79	6.79	5.20	202.72	2.52	467	308	265	105
G	16	-15	41	81.58	11.61	7.08	7.08	4.53	185.56	2.65	476	295	290	109
	17	-14	35	78.95	11.23	7.27	7.27	3.96	138.60	2.74	393	232	255	93
	18	-13	52	76.32	10.86	7.47	7.47	3.39	176.51	2.83	565	314	388	137
	19	-12	37	73.68	10.49	7.66	7.66	2.83	104.66	2.91	388	202	283	97
	20	-11	41	71.05	10.11	7.85	7.85	2.26	92.78	3.00	415	200	322	107
	21	-10	43	68.42	9.74	8.04	8.04	1.70	72.98	3.09	419	185	346	112

	22	-9	54	65.79	9.36	8.23	8.23	1.13	61.10	3.18	506	201	444	140
	23	-8	90	63.16	8.99	8.42	8.42	0.57	50.92	3.26	809	283	758	232
<b>A</b>	<b>24</b>	<b>-7</b>	<b>125</b>	<b>60.53</b>	<b>8.61</b>	<b>8.61</b>	<b>8.61</b>	<b>0.00</b>	<b>0.00</b>	<b>3.35</b>	<b>1077</b>	<b>321</b>	<b>1077</b>	<b>321</b>
	25	-6	169	57.89	8.24	8.20	8.20	0.00	0.00	3.52	1392	395	1392	395
	26	-5	195	55.26	7.86	7.79	7.79	0.00	0.00	3.70	1533	415	1533	415
	27	-4	278	52.63	7.49	7.38	7.38	0.00	0.00	3.87	2082	538	2082	538
	28	-3	306	50.00	7.12	6.96	6.96	0.00	0.00	4.04	2177	539	2177	539
	29	-2	454	47.37	6.74	6.55	6.55	0.00	0.00	4.21	3060	727	3060	727
	30	-1	385	44.74	6.37	6.14	6.14	0.00	0.00	4.38	2451	559	2451	559
	31	0	490	42.11	5.99	5.73	5.73	0.00	0.00	4.56	2936	644	2936	644
	32	1	533	39.47	5.62	5.31	5.31	0.00	0.00	4.73	2994	633	2994	633
<b>B</b>	<b>33</b>	<b>2</b>	<b>380</b>	<b>36.84</b>	<b>5.24</b>	<b>4.90</b>	<b>4.90</b>	<b>0.00</b>	<b>0.00</b>	<b>4.90</b>	<b>1992</b>	<b>407</b>	<b>1992</b>	<b>407</b>
	34	3	228	34.21	4.87	4.96	4.87	0.00	0.00	5.19	1110	214	1110	214
	35	4	261	31.58	4.49	5.02	4.49	0.00	0.00	5.47	1173	214	1173	214
	36	5	279	28.95	4.12	5.08	4.12	0.00	0.00	5.76	1149	200	1149	200
	37	6	229	26.32	3.74	5.14	3.74	0.00	0.00	6.04	858	142	858	142
<b>C</b>	<b>38</b>	<b>7</b>	<b>269</b>	<b>23.68</b>	<b>3.37</b>	<b>5.20</b>	<b>3.37</b>	<b>0.00</b>	<b>0.00</b>	<b>6.33</b>	<b>907</b>	<b>143</b>	<b>907</b>	<b>143</b>
	39	8	233	21.05	3.00	5.28	3.00	0.00	0.00	6.35	698	110	698	110
	40	9	230	18.42	2.62	5.36	2.62	0.00	0.00	6.37	603	95	603	95
	41	10	243	15.79	2.25	5.44	2.25	0.00	0.00	6.40	546	85	546	85
	42	11	191	13.16	1.87	5.52	1.87	0.00	0.00	6.42	358	56	358	56
<b>D</b>	<b>43</b>	<b>12</b>	<b>146</b>	<b>10.53</b>	<b>1.50</b>	<b>5.60</b>	<b>1.50</b>	<b>0.00</b>	<b>0.00</b>	<b>6.44</b>	<b>219</b>	<b>34</b>	<b>219</b>	<b>34</b>
	44	13	150	7.89	1.12	5.68	1.12	0.00	0.00	6.46	169	26	169	26
	45	14	97	5.26	0.75	5.76	0.75	0.00	0.00	6.49	73	11	73	11
	46	15	61	2.63	0.37	5.84	0.37	0.00	0.00	6.51	23	4	23	4
	<b>Σ</b>		<b>6446</b>							<b>Σ</b>	<b>35074</b>	<b>9522</b>	<b>33426</b>	<b>7873</b>

SCOPon	3.68	SCOPnet	4.25
		<b>SCOP</b>	<b>3.68</b>

Power diagram (Heat pump **NEXUS M14 PRO**)

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





Data for SCOP calculation (Heat pump **NEXUS M14 PRO**)

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

	Outdoor heat exchanger	Indoor heat exchanger	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
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]								
<b>A</b>	–	–	–	–	–	–	–	–	–	–
<b>B</b>	2	55.00	100.00	9.78	9.782	2.502	0.900	1.00	2.502	–
<b>C</b>	7	46.00	64.29	6.29	6.100	4.000	0.900	1.00	4.000	–
<b>D</b>	12	37.78	28.57	2.79	5.300	5.300	0.983	0.53	5.222	0.0167
<b>TOL (E)</b>	2	55.00	100.00	9.78	9.782	2.502	0.900	1.00	2.502	–
<b>Tbiv (F)</b>	2	55.00	100.00	9.78	9.782	2.502	0.900	1.00	2.502	–

Calculation SCOP, SCOP<sub>on</sub>, SCOP<sub>net</sub> (Heat pump **NEXUS M14 PRO**)

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

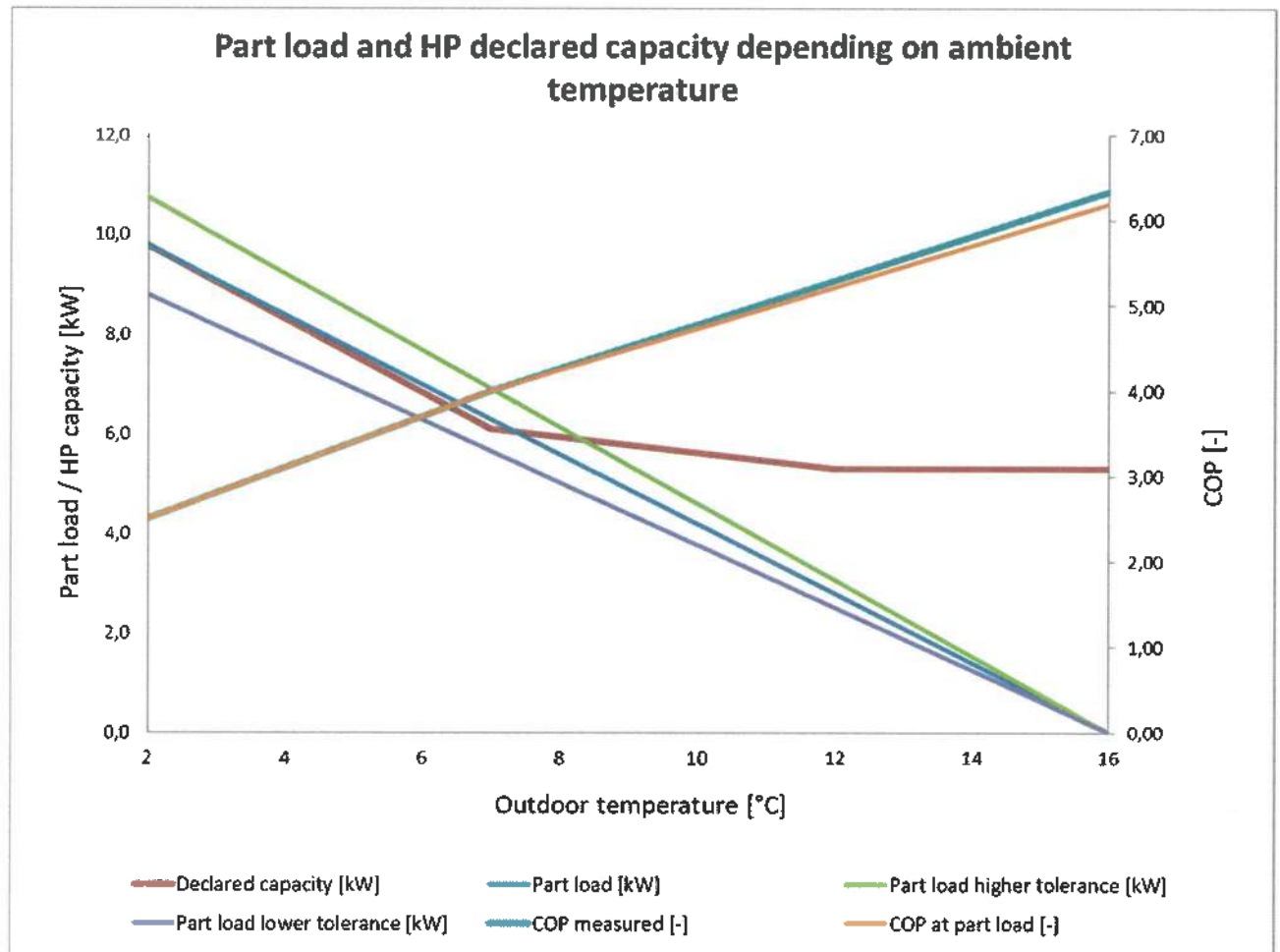
Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
j	Tj	h <sub>j</sub>		P <sub>h(Tj)</sub>			elbu <sub>(Tj)</sub>	h <sub>j</sub> × elbu <sub>(Tj)</sub>	COPb in (Tj)	h <sub>j</sub> × P <sub>h(Tj)</sub>		h <sub>j</sub> × (P <sub>h(Tj)</sub> - elbu <sub>(Tj)</sub> )	
[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
<b>B</b>	33	2	3	100.00	9.78	9.78	9.78	0.00	0.00	2.50	29	12	29
	34	3	22	92.86	9.08	9.05	9.05	0.00	0.00	2.80	200	71	200
	35	4	63	85.71	8.38	8.31	8.31	0.00	0.00	3.10	528	170	528
	36	5	63	78.57	7.69	7.57	7.57	0.00	0.00	3.40	484	142	484
	37	6	175	71.43	6.99	6.84	6.84	0.00	0.00	3.70	1223	330	1223
<b>C</b>	38	7	162	64.29	6.29	6.10	6.10	0.00	0.00	4.00	1019	255	1019
	39	8	259	57.14	5.59	5.94	5.59	0.00	0.00	4.24	1448	341	1448
	40	9	360	50.00	4.89	5.78	4.89	0.00	0.00	4.49	1761	392	1761
	41	10	428	42.86	4.19	5.62	4.19	0.00	0.00	4.73	1794	379	1794
	42	11	430	35.71	3.49	5.46	3.49	0.00	0.00	4.98	1502	302	1502
<b>D</b>	43	12	503	28.57	2.79	5.30	2.79	0.00	0.00	5.22	1406	269	1406
	44	13	444	21.43	2.10	5.14	2.10	0.00	0.00	5.47	931	170	931
	45	14	384	14.29	1.40	4.98	1.40	0.00	0.00	5.71	537	94	537

	46	15	294	7.14	0.70	4.82	0.70	0.00	0.00	5.95	205	34	205	34
		Σ	3590							Σ	13067	2963	13067	2963

SCOPon	4.41	SCOPnet	4.41
<b>SCOP</b>		<b>4.39</b>	

Power diagram (Heat pump NEXUS M14 PRO)

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



Data for SCOP calculation (Heat pump **NEXUS M14 PRO**)

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

	Outdoor heat exchanger	Indoor heat exchanger	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
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]								
<b>A</b>	-7	44.00	60.53	8.60	8.598	2.642	0.900	1.00	2.642	–
<b>B</b>	2	37.00	36.84	5.23	5.000	4.100	0.900	1.00	4.100	–
<b>C</b>	7	34.62	23.68	3.36	5.000	5.200	0.983	0.67	5.156	0.0167
<b>D</b>	12	33.83	10.53	1.50	5.500	5.700	0.983	0.27	5.447	0.0167
<b>TOL (E)</b>	-22	55.00	100.00	14.21	5.300	1.300	0.900	1.00	1.300	–
<b>Tbiv (F)</b>	-7	44.00	60.53	8.60	8.598	2.642	0.900	1.00	2.642	–
<b>G</b>	-15	49.00	81.58	11.59	6.914	1.955	0.900	1.00	1.955	–

Calculation SCOP, SCOP<sub>on</sub>, SCOP<sub>net</sub> (Heat pump **NEXUS M14 PRO**)

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

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)	COP bin (Tj)	hj x Ph(Tj)		hj x (Ph(Tj) - elbu(Tj))	
[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
9	-22	1	100.00	14.21	5.30	5.30	8.91	8.91	1.30	14	13	5	4
10	-21	6	97.37	13.83	5.53	5.53	8.30	49.81	1.39	83	74	33	24
11	-20	13	94.74	13.46	5.76	5.76	7.70	100.06	1.49	175	150	75	50
12	-19	17	92.11	13.08	5.99	5.99	7.09	120.57	1.58	222	185	102	64
13	-18	19	89.47	12.71	6.22	6.22	6.49	123.27	1.67	241	194	118	71
14	-17	26	86.84	12.34	6.45	6.45	5.88	152.97	1.77	321	248	168	95
15	-16	39	84.21	11.96	6.68	6.68	5.28	205.88	1.86	467	346	261	140
<b>G</b>	<b>16</b>	<b>-15</b>	<b>41</b>	<b>81.58</b>	<b>11.59</b>	<b>6.91</b>	<b>6.91</b>	<b>191.66</b>	<b>1.96</b>	<b>475</b>	<b>337</b>	<b>283</b>	<b>145</b>
17	-14	35	78.95	11.21	7.12	7.12	4.09	143.16	2.04	393	265	249	122
18	-13	52	76.32	10.84	7.34	7.34	3.51	182.31	2.13	564	362	381	179
19	-12	37	73.68	10.47	7.55	7.55	2.92	108.10	2.21	387	234	279	126
20	-11	41	71.05	10.09	7.76	7.76	2.34	95.83	2.30	414	234	318	138
21	-10	43	68.42	9.72	7.97	7.97	1.75	75.38	2.38	418	219	343	144

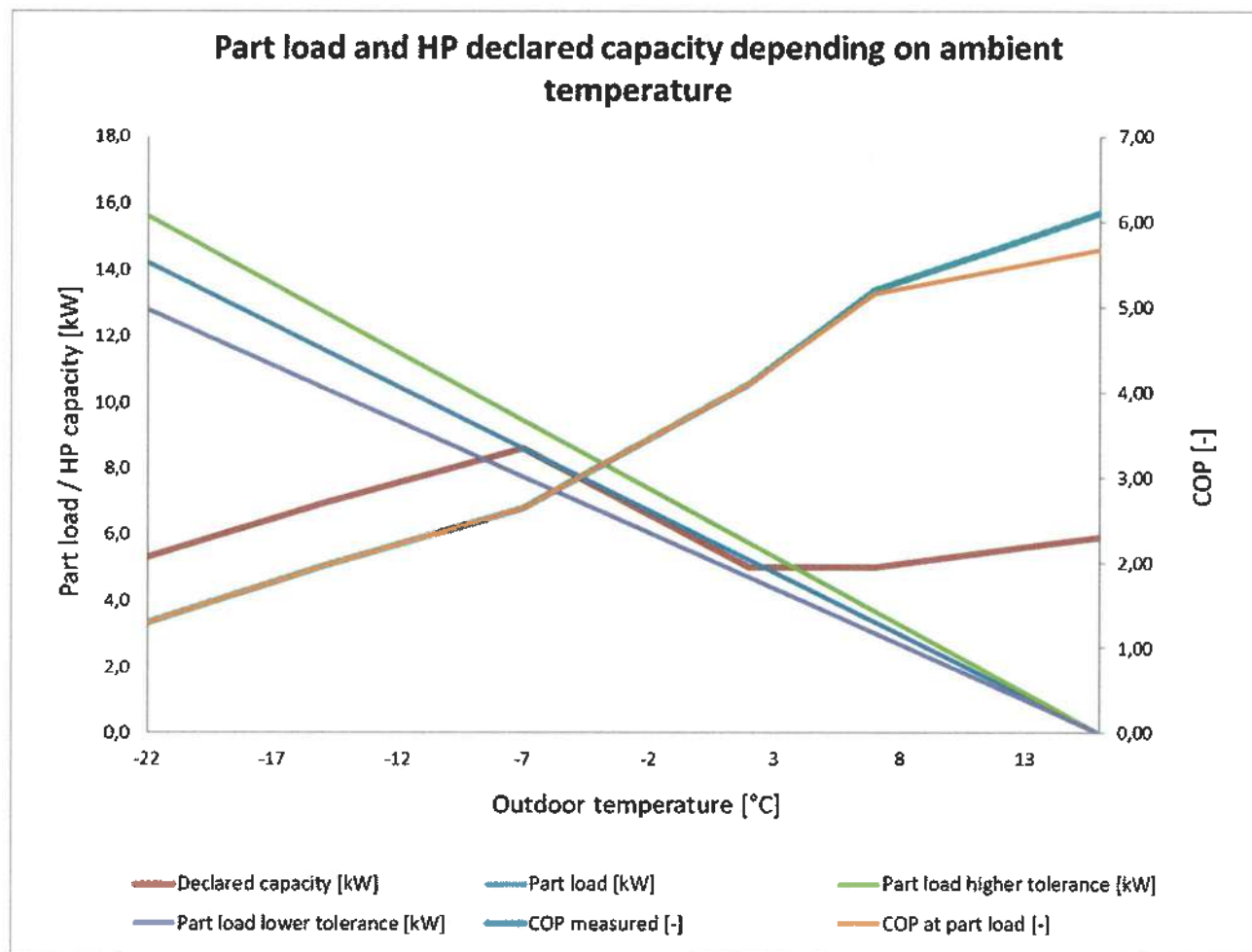
	22	-9	54	65.79	9.35	8.18	8.18	1.17	63.11	2.47	505	242	442	179
	23	-8	90	63.16	8.97	8.39	8.39	0.58	52.59	2.56	807	348	755	295
A	24	-7	125	60.53	8.60	8.60	8.60	0.00	0.00	2.64	1075	407	1075	407
	25	-6	169	57.89	8.22	8.20	8.20	0.00	0.00	2.80	1390	496	1390	496
	26	-5	195	55.26	7.85	7.80	7.80	0.00	0.00	2.97	1531	516	1531	516
	27	-4	278	52.63	7.48	7.40	7.40	0.00	0.00	3.13	2078	664	2078	664
	28	-3	306	50.00	7.10	7.00	7.00	0.00	0.00	3.29	2173	661	2173	661
	29	-2	454	47.37	6.73	6.60	6.60	0.00	0.00	3.45	3055	885	3055	885
	30	-1	385	44.74	6.36	6.20	6.20	0.00	0.00	3.61	2447	677	2447	677
	31	0	490	42.11	5.98	5.80	5.80	0.00	0.00	3.78	2931	776	2931	776
	32	1	533	39.47	5.61	5.40	5.40	0.00	0.00	3.94	2989	759	2989	759
B	33	2	380	36.84	5.23	5.00	5.00	0.00	0.00	4.10	1989	485	1989	485
	34	3	228	34.21	4.86	5.00	4.86	0.00	0.00	4.31	1108	257	1108	257
	35	4	261	31.58	4.49	5.00	4.49	0.00	0.00	4.52	1171	259	1171	259
	36	5	279	28.95	4.11	5.00	4.11	0.00	0.00	4.73	1147	242	1147	242
	37	6	229	26.32	3.74	5.00	3.74	0.00	0.00	4.95	856	173	856	173
C	38	7	269	23.68	3.36	5.00	3.36	0.00	0.00	5.16	905	176	905	176
	39	8	233	21.05	2.99	5.10	2.99	0.00	0.00	5.21	697	134	697	134
	40	9	230	18.42	2.62	5.20	2.62	0.00	0.00	5.27	602	114	602	114
	41	10	243	15.79	2.24	5.30	2.24	0.00	0.00	5.33	545	102	545	102
	42	11	191	13.16	1.87	5.40	1.87	0.00	0.00	5.39	357	66	357	66
D	43	12	146	10.53	1.50	5.50	1.50	0.00	0.00	5.45	218	40	218	40
	44	13	150	7.89	1.12	5.60	1.12	0.00	0.00	5.51	168	31	168	31
	45	14	97	5.26	0.75	5.70	0.75	0.00	0.00	5.56	73	13	73	13
	46	15	61	2.63	0.37	5.80	0.37	0.00	0.00	5.62	23	4	23	4
		Σ	6446							Σ	35013	11387	33339	9714

SCOPon	3.07	SCOPnet	3.43
		<b>SCOP</b>	<b>3.07</b>



Power diagram (Heat pump **NEXUS M14 PRO**)

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



Tested by: Ing. Dominik Šedivý

Date: 2022-12-07

Signed: 

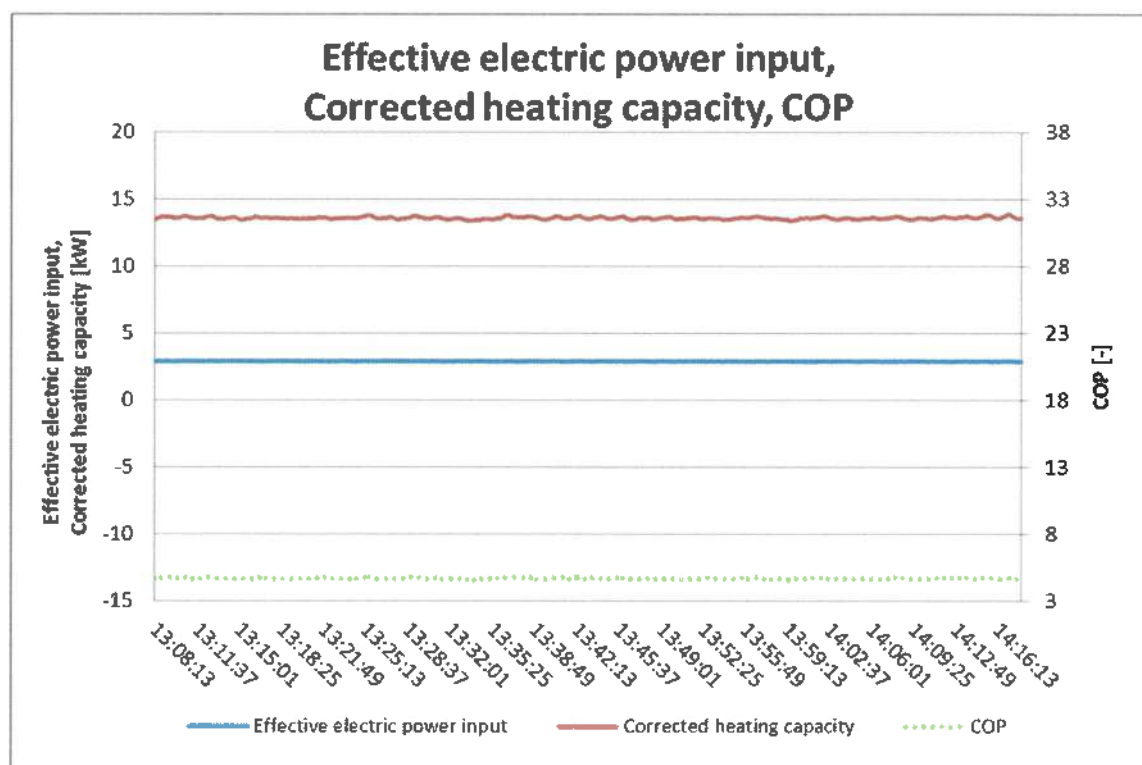
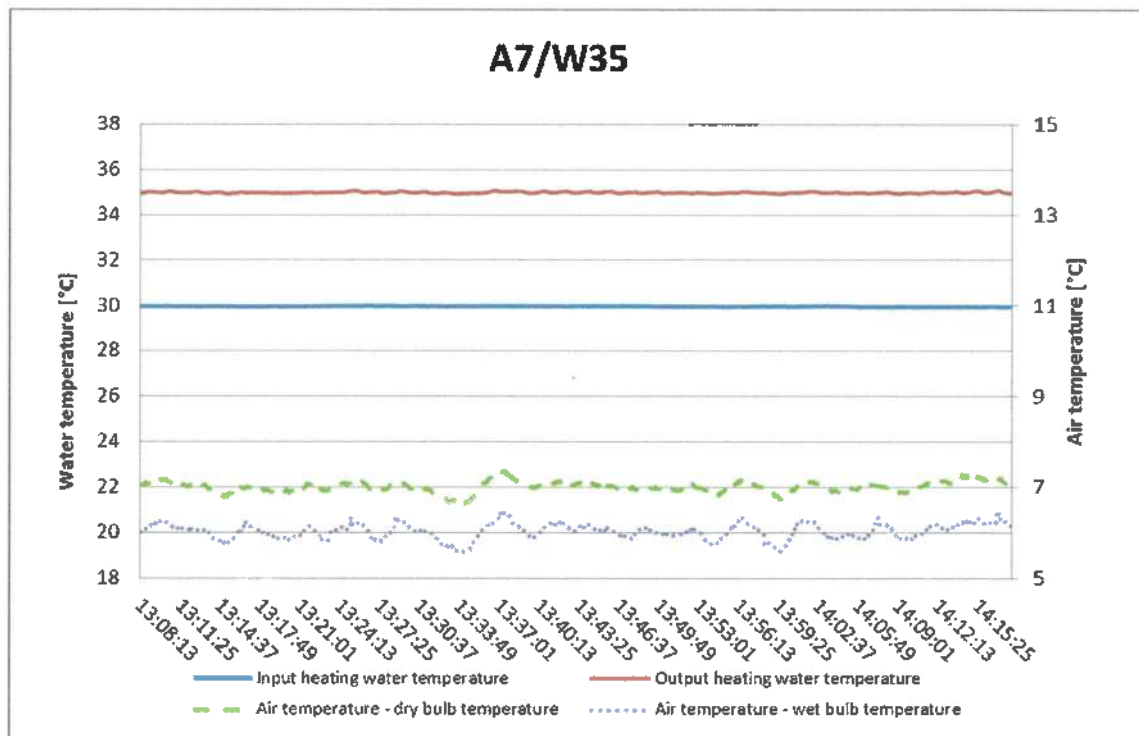
Reviewed by: Ing. Mario Jankola

Date: 2022-12-07

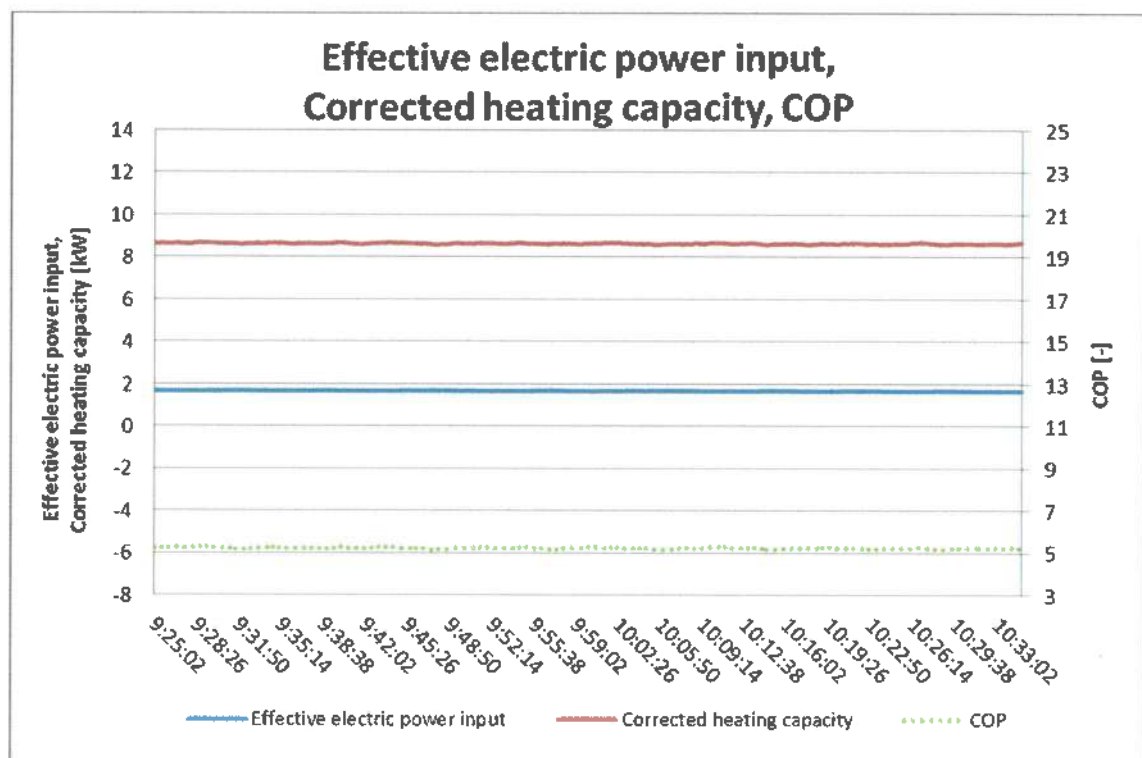
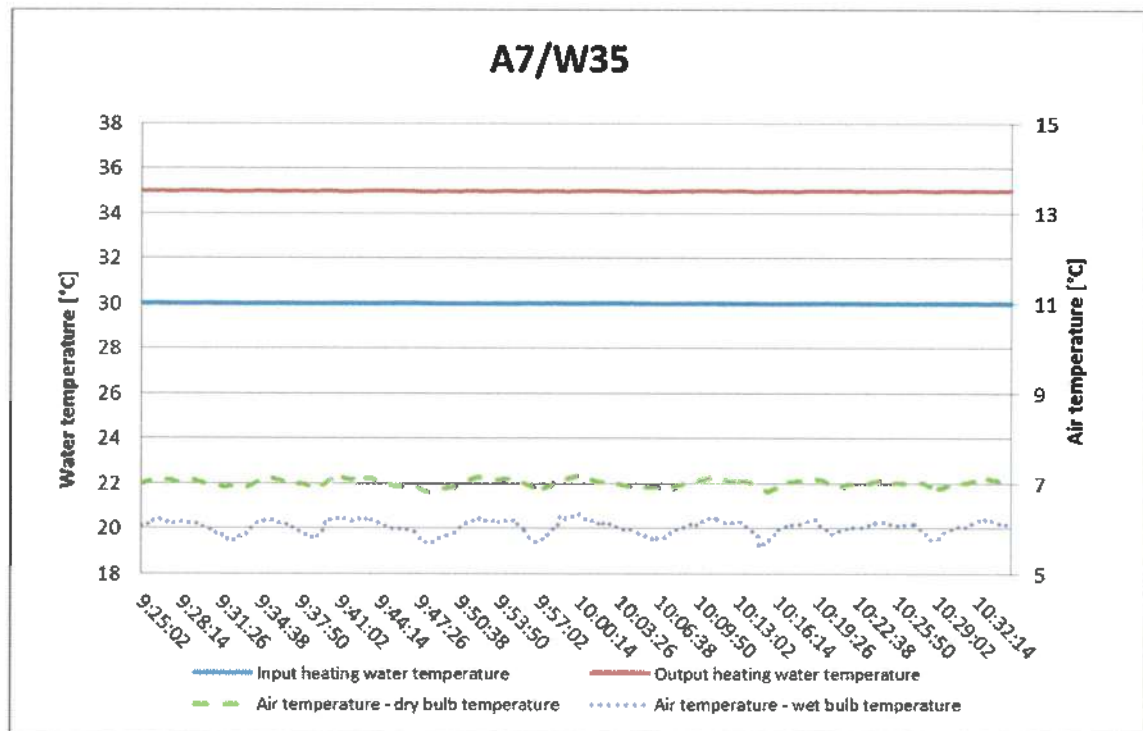
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## V. Graphs

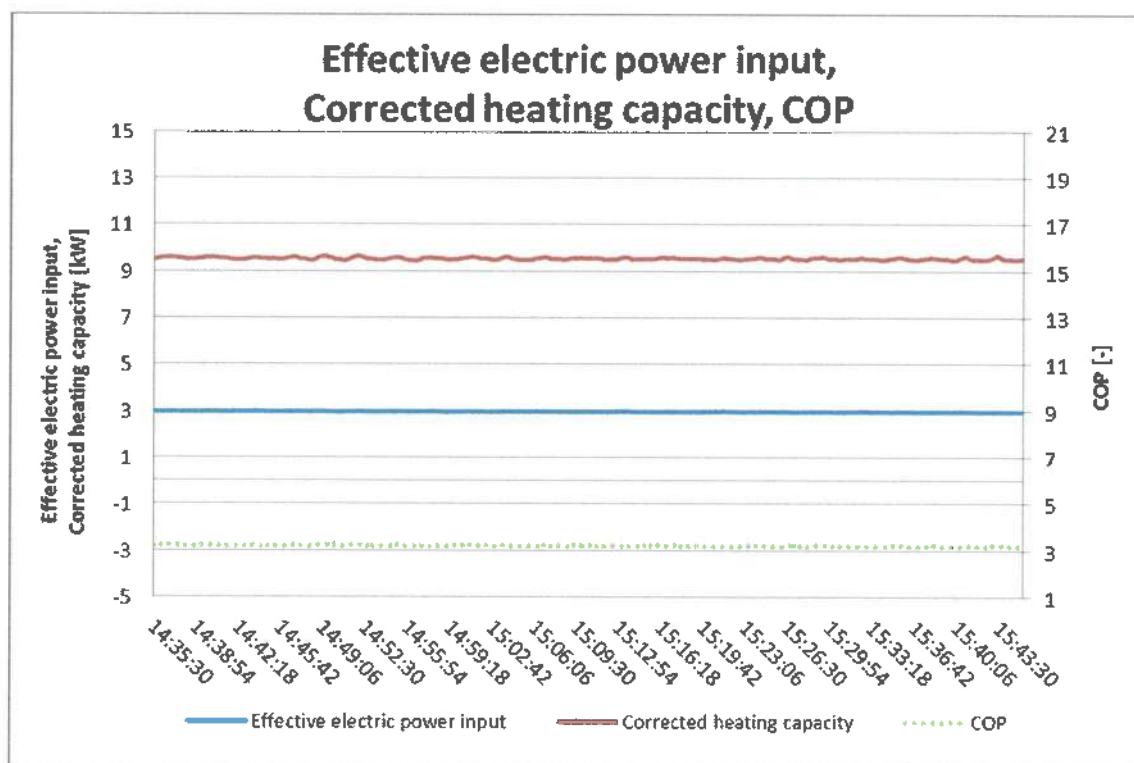
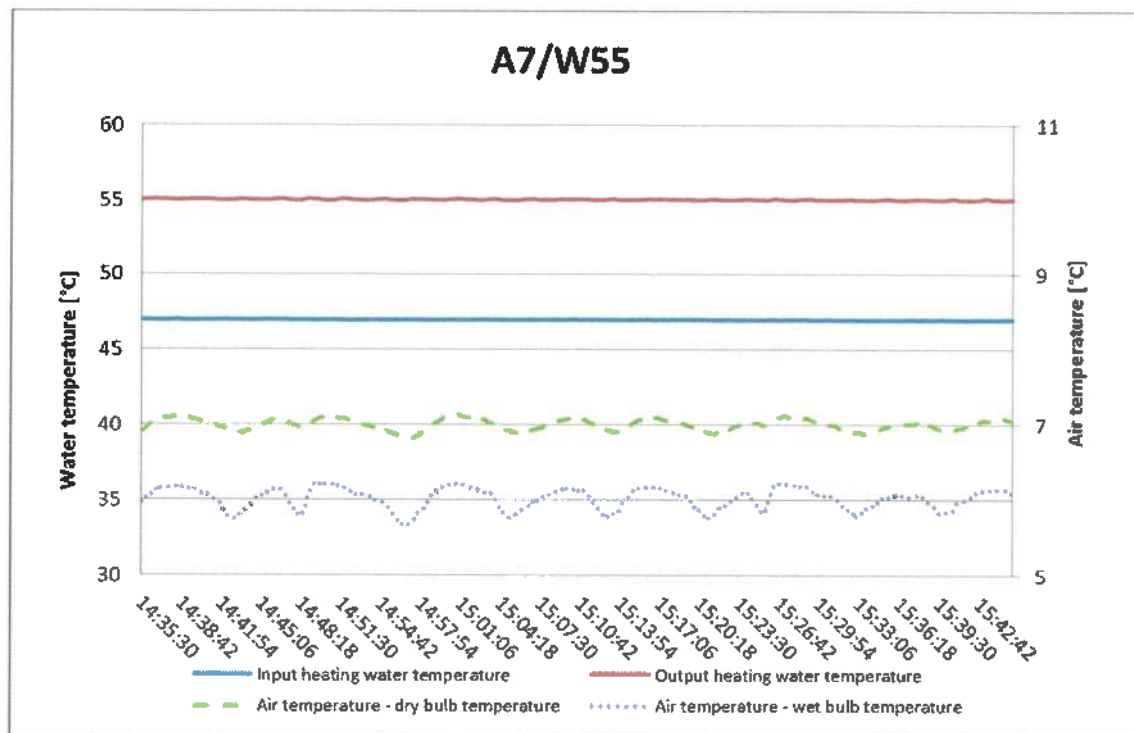
Heat pump NEXUS M14 PRO: A7/W35 (67 %)



Heat pump NEXUS M14 PRO: A7/W35 (42 %)

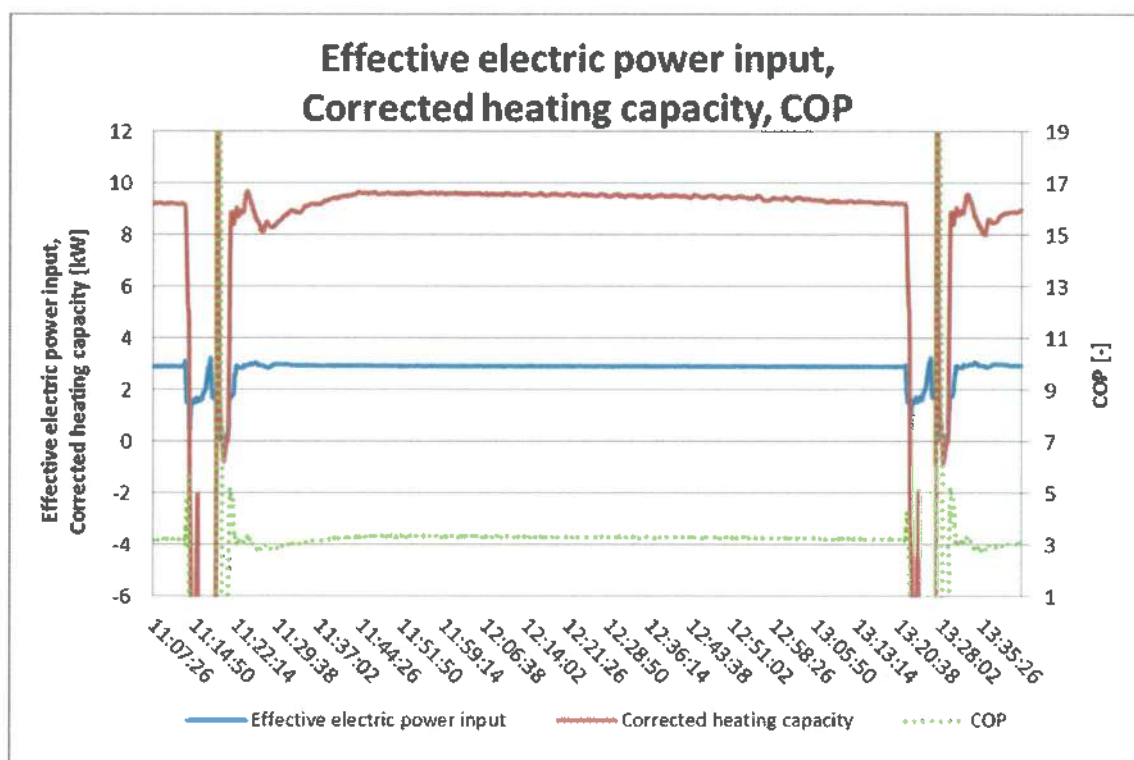
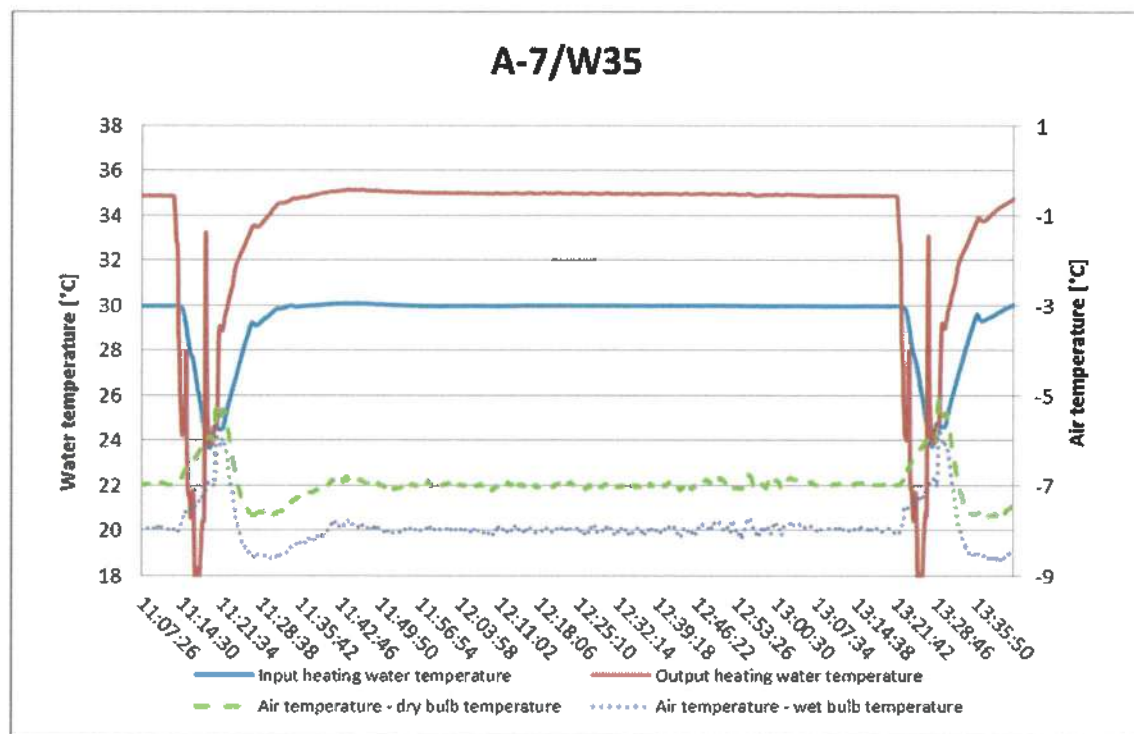


Heat pump NEXUS M14 PRO: A7/W55 (50 %)

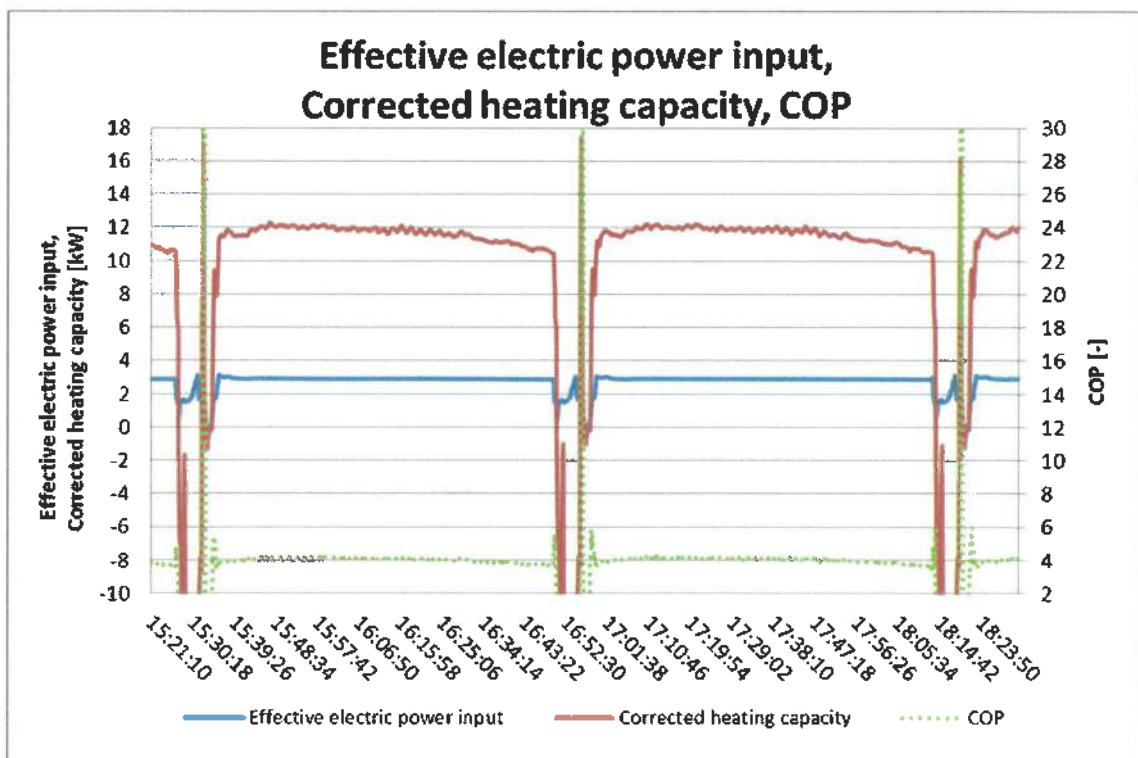
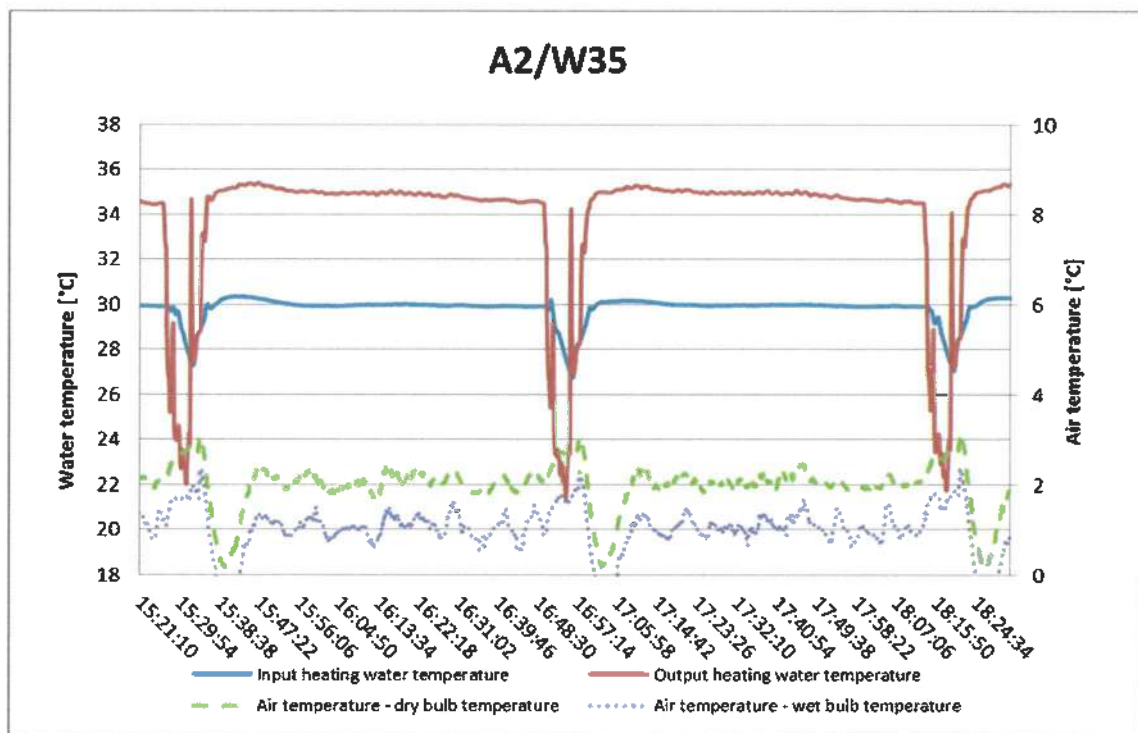




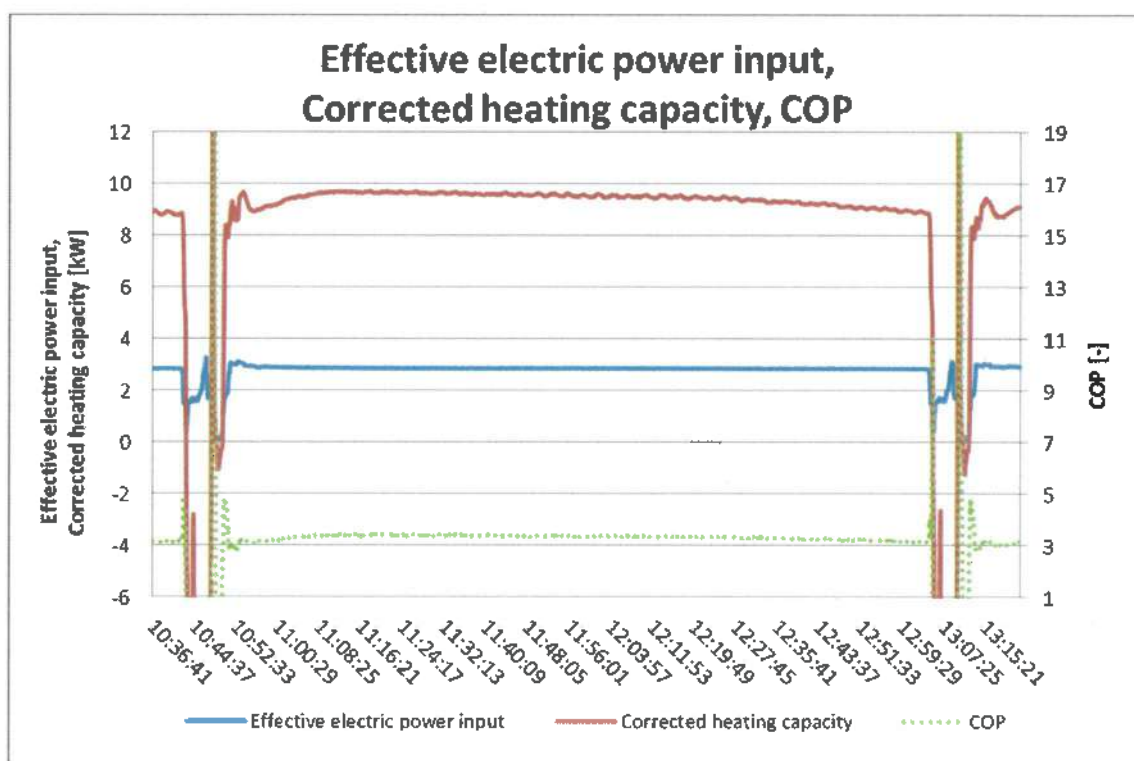
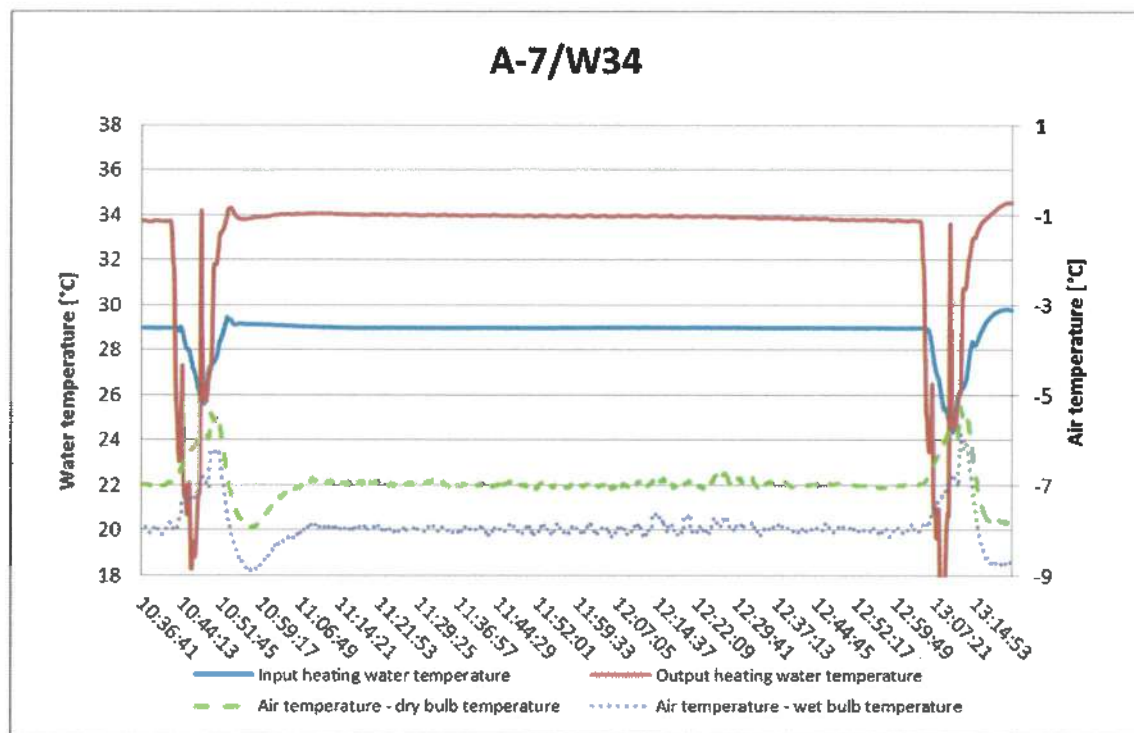
Heat pump NEXUS M14 PRO: A-7/W35 (67 %)



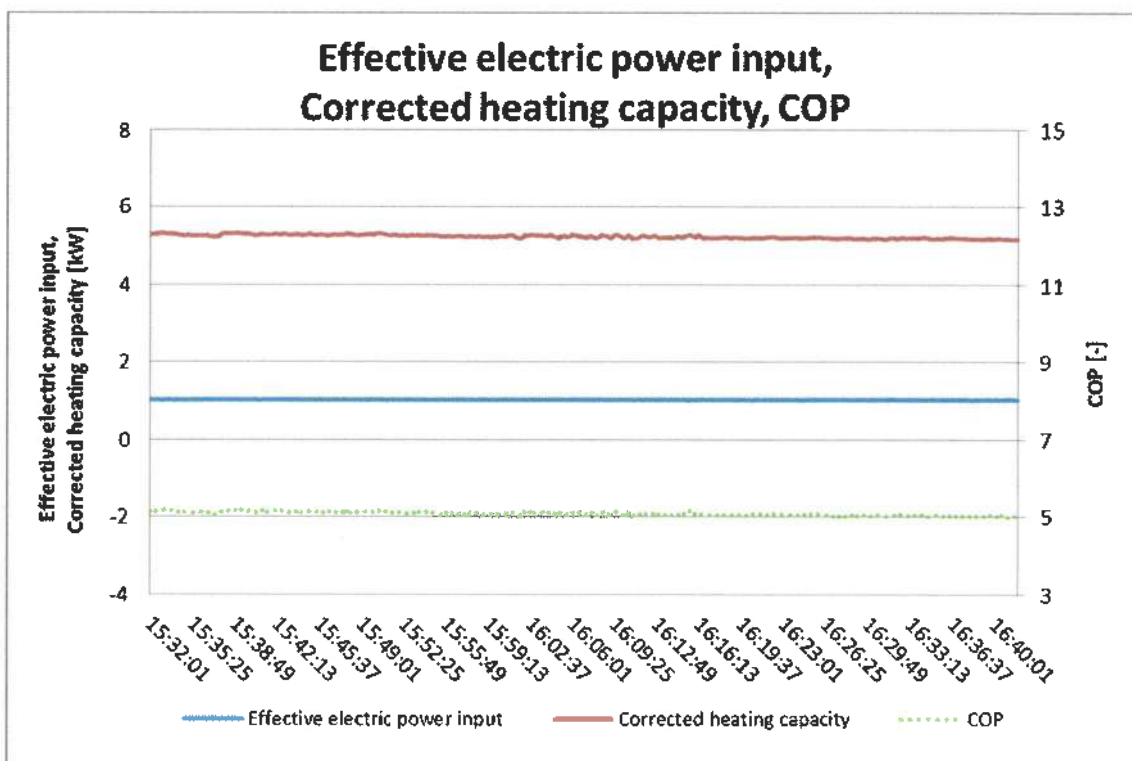
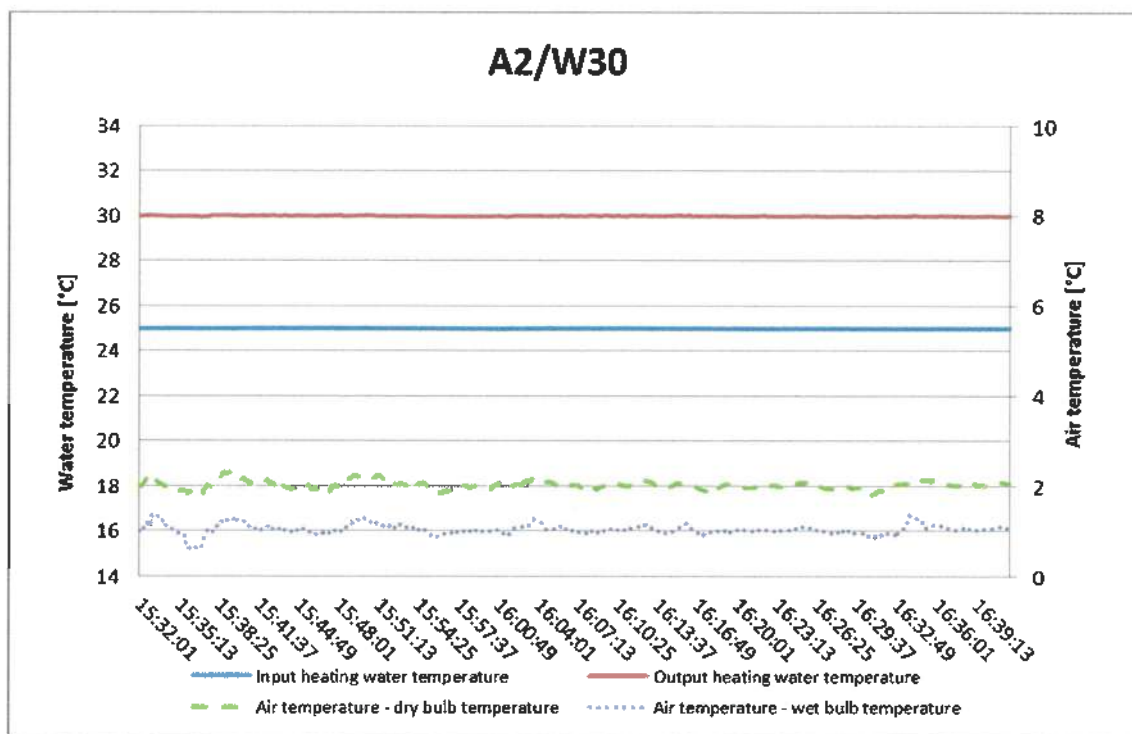
Heat pump NEXUS M14 PRO: A2/W35 (67 %)



Heat pump NEXUS M14 PRO: A-7/W34 (67 %)



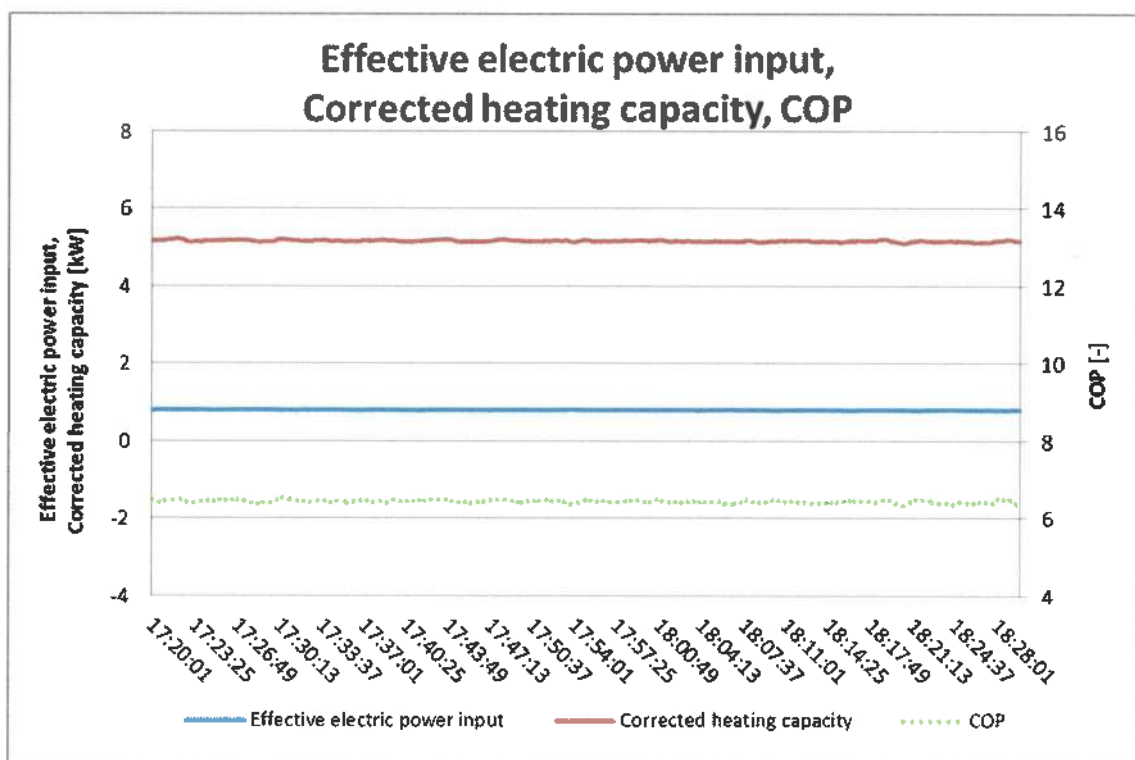
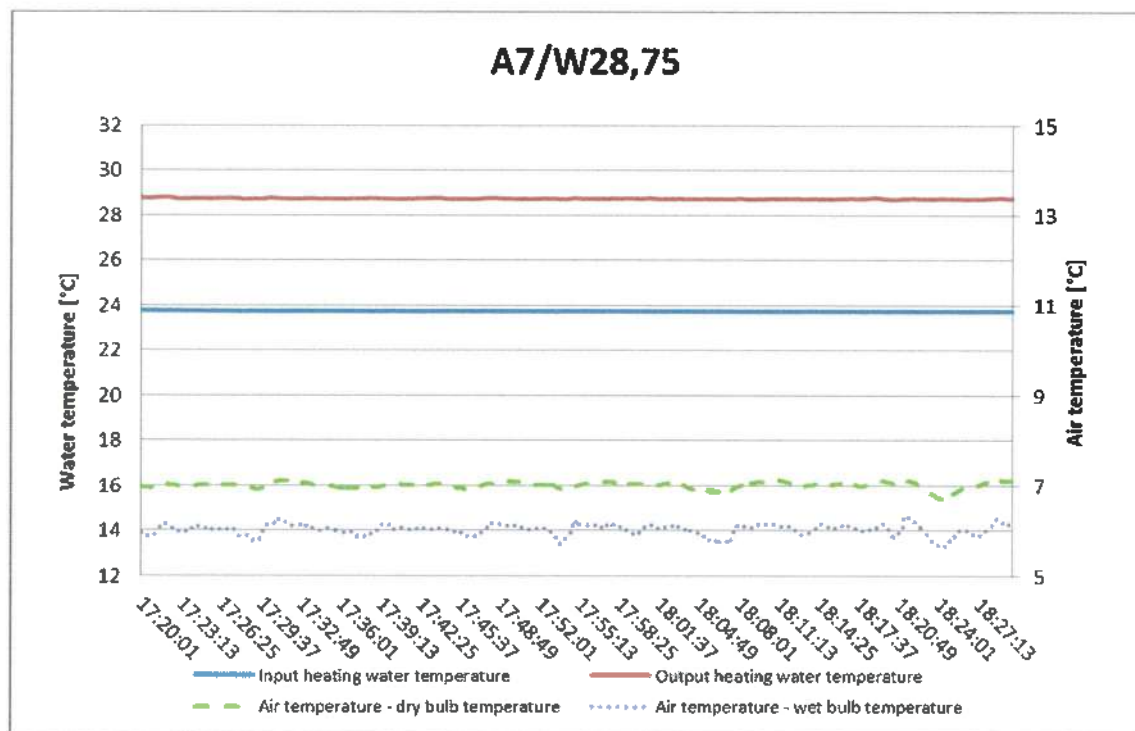
Heat pump NEXUS M14 PRO: A2/W30 (27 %)



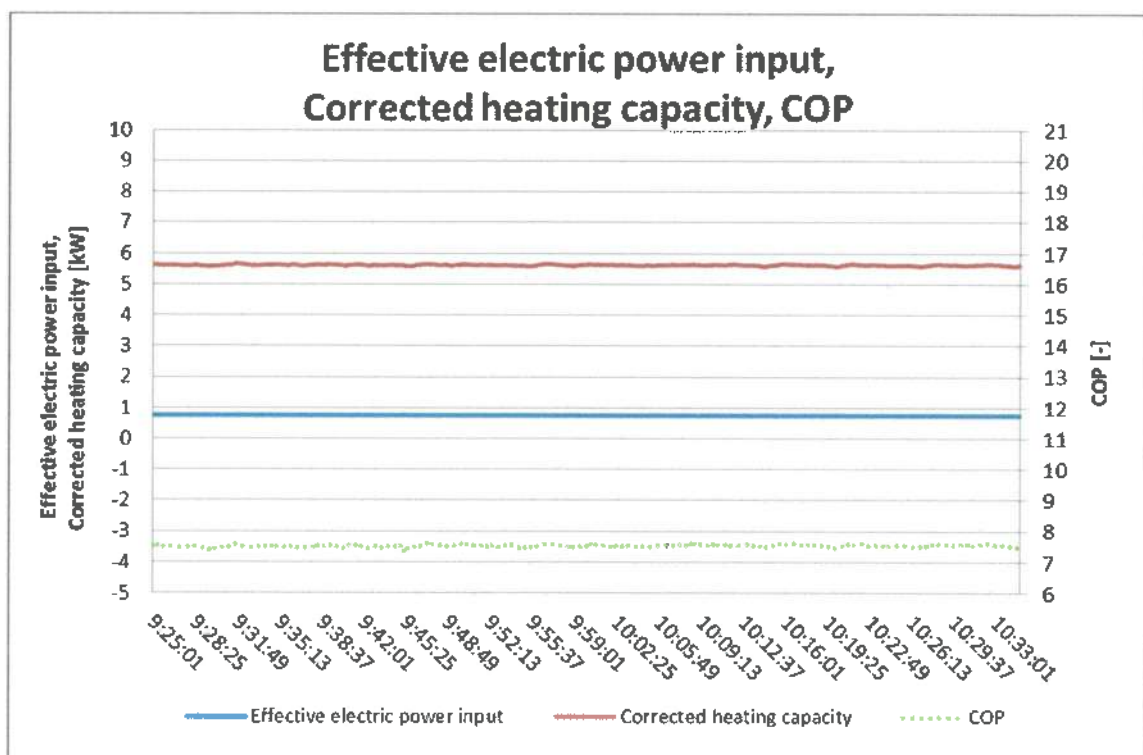
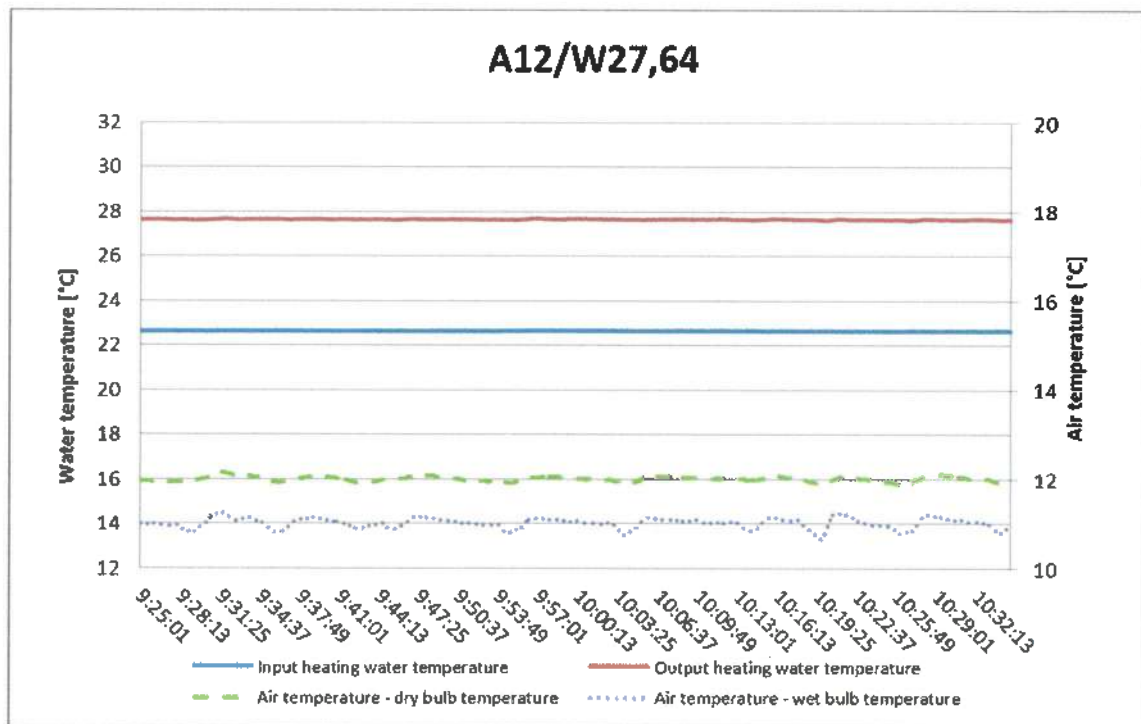


g

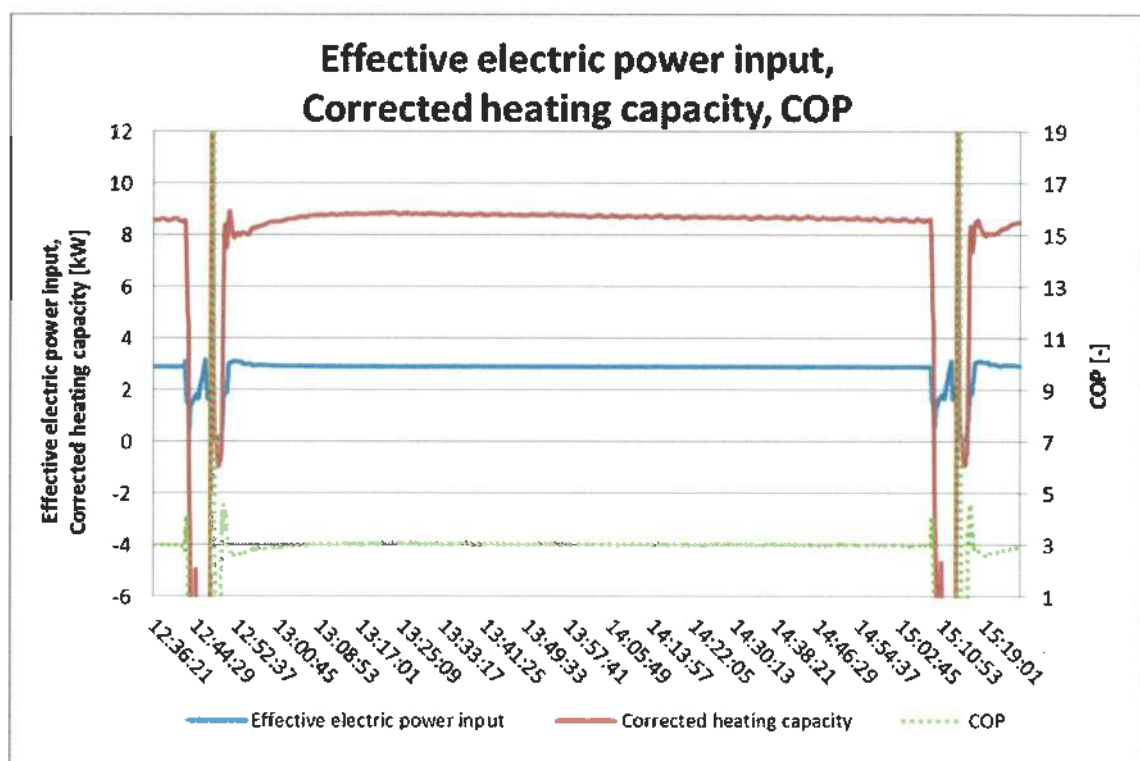
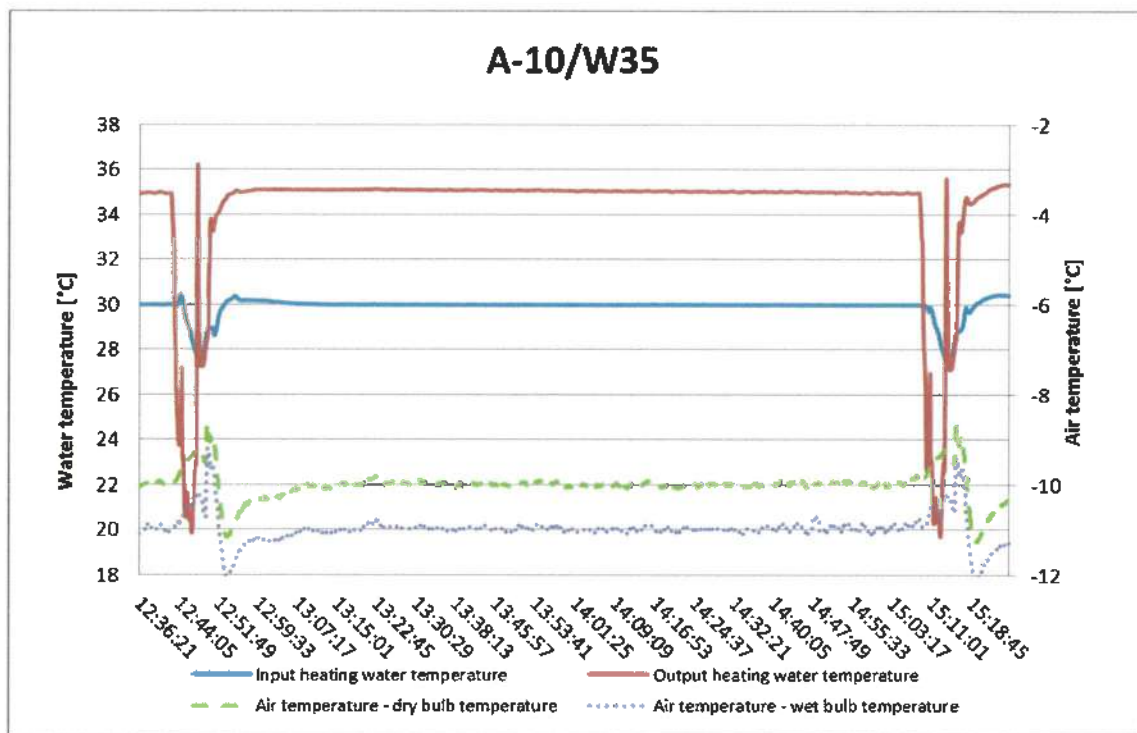
Heat pump NEXUS M14 PRO: A7/W28.75 (24 %)



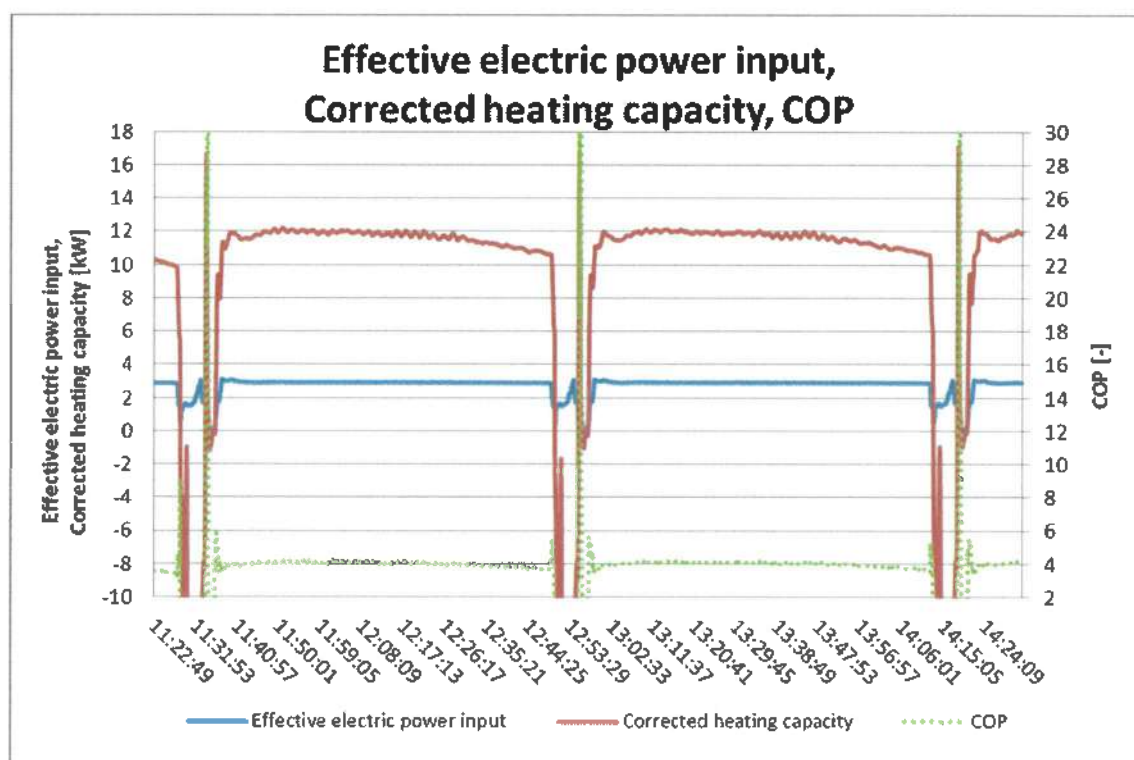
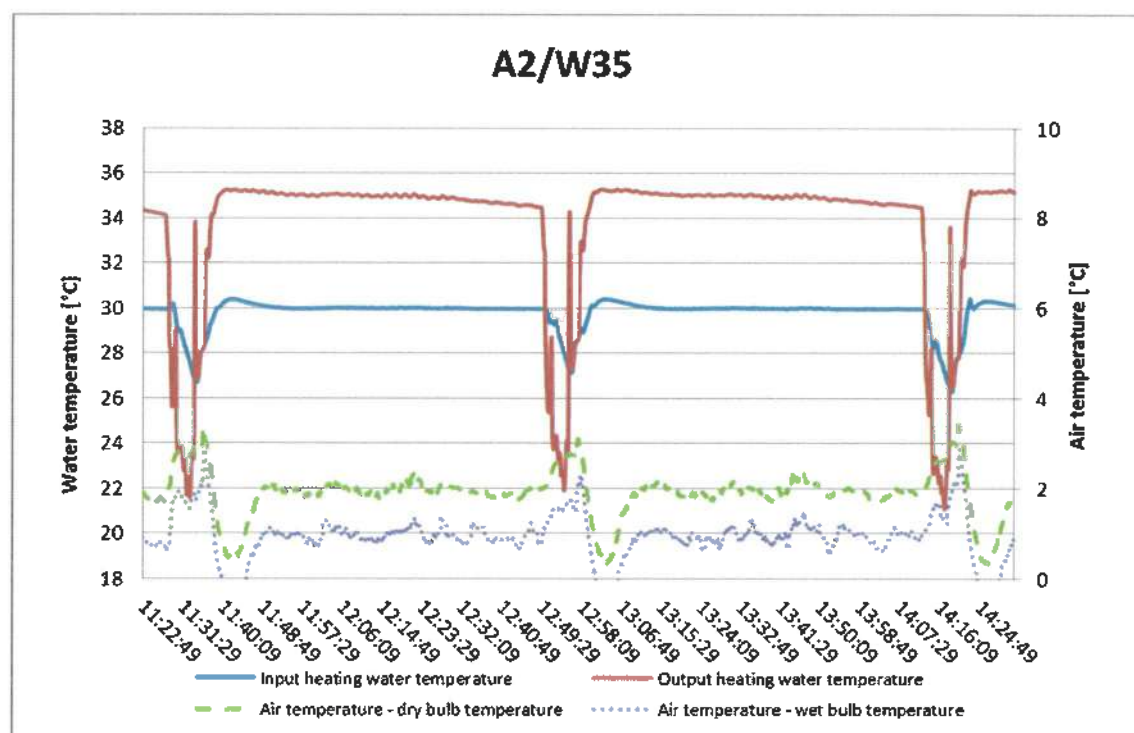
Heat pump NEXUS M14 PRO: A12/W27.64 (24 %)



Heat pump NEXUS M14 PRO: A-10/W35 (67 %)

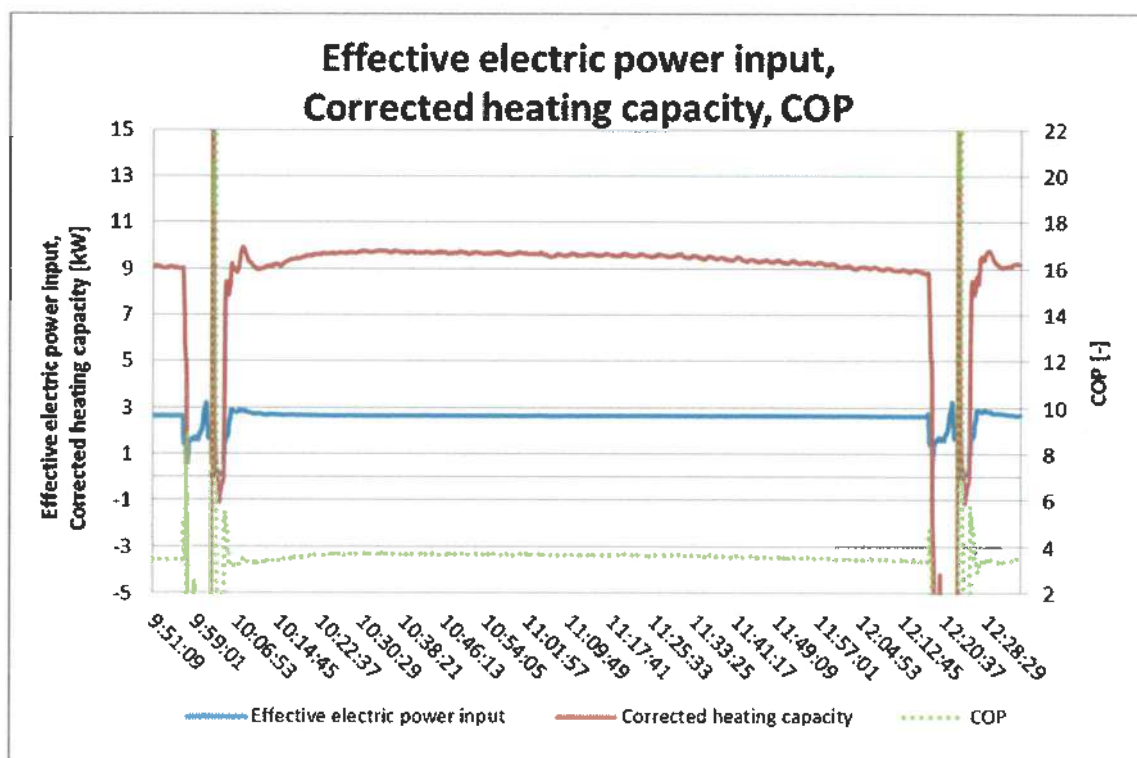
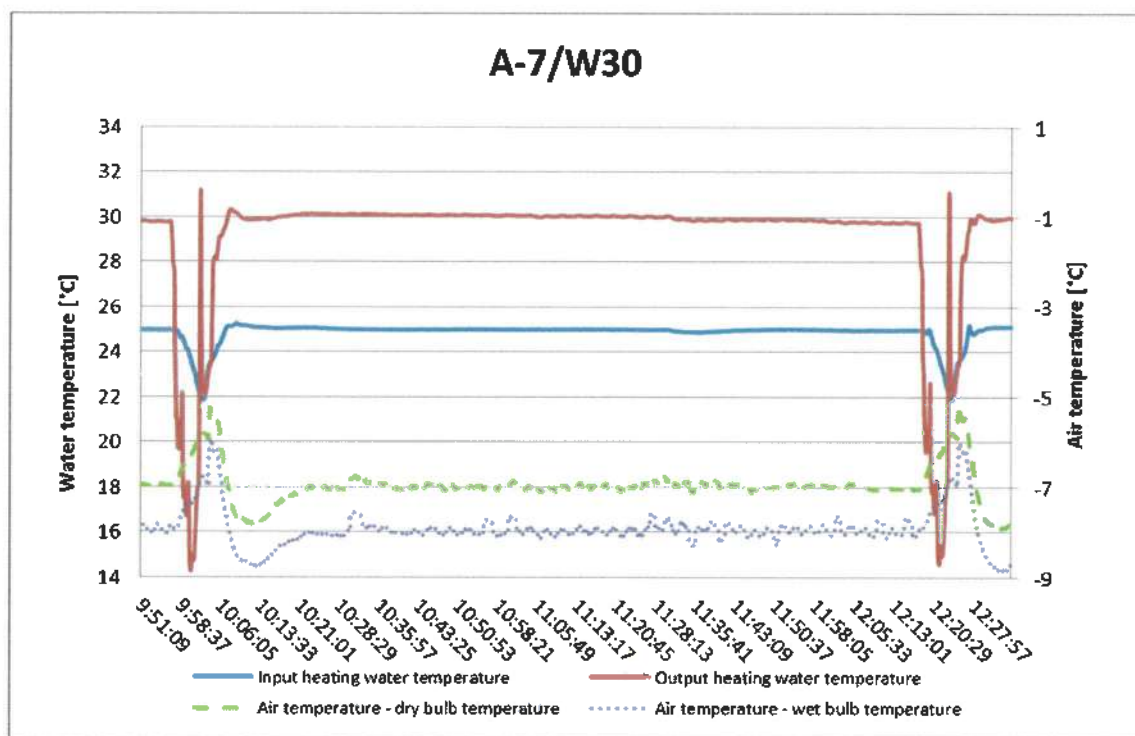


Heat pump NEXUS M14 PRO: A2/W35 (67 %)

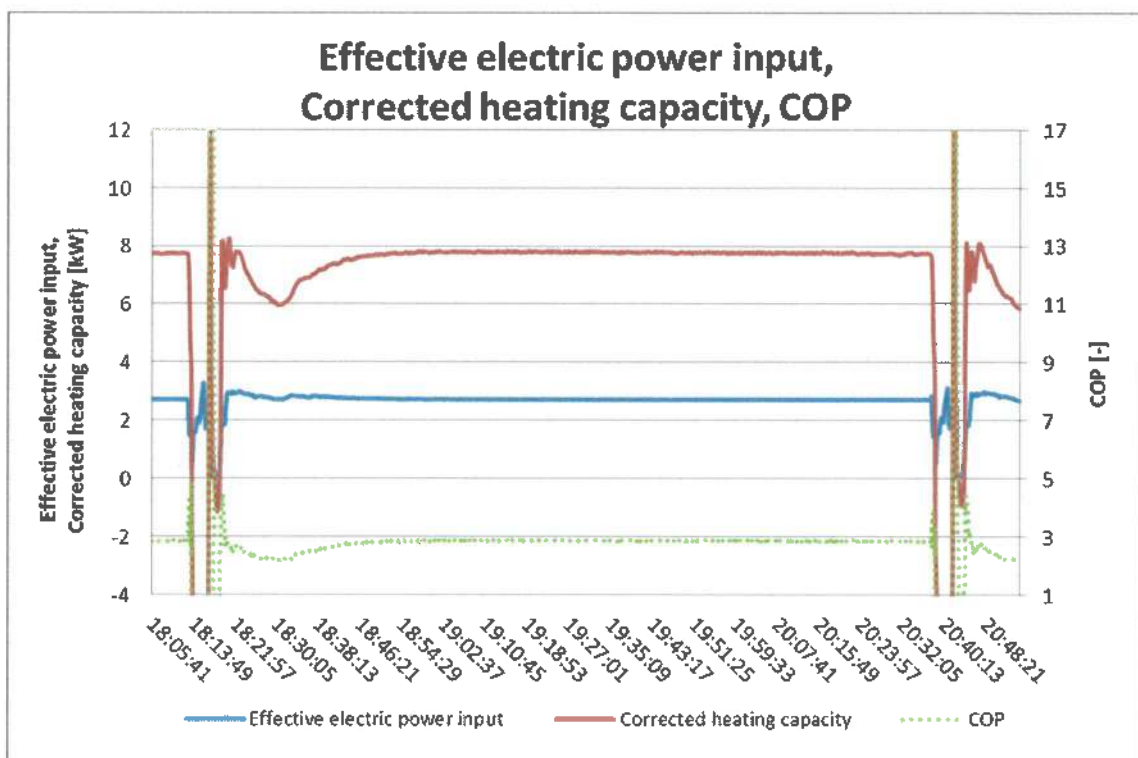
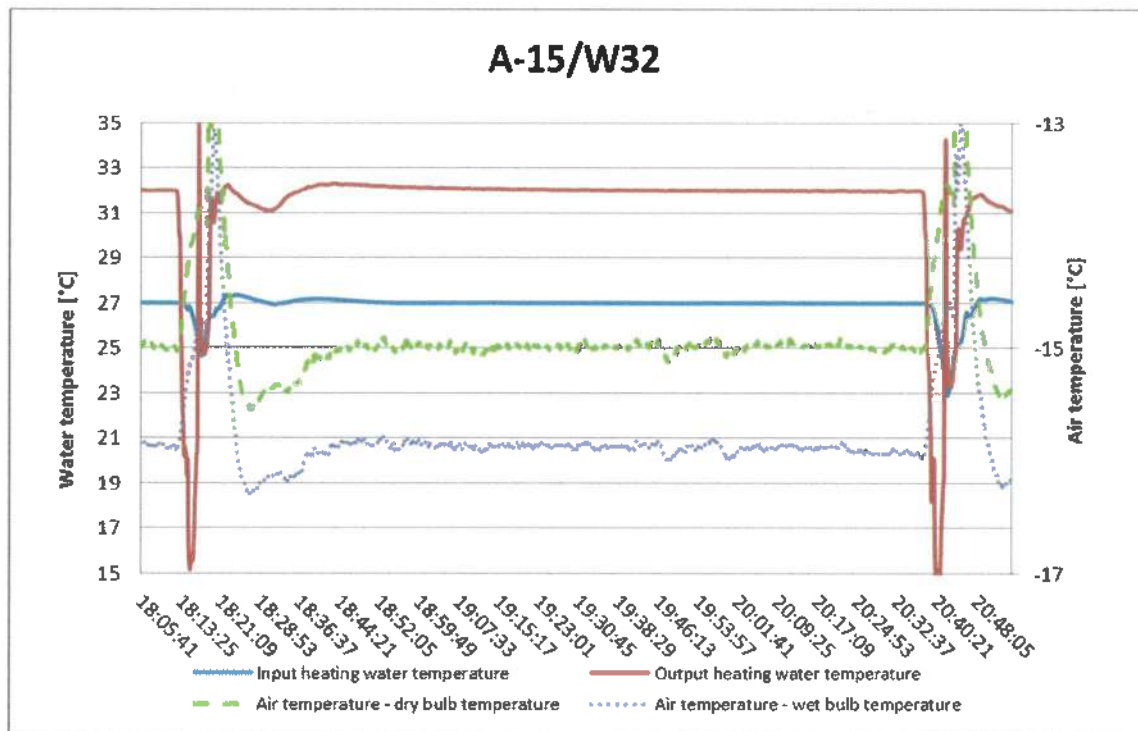




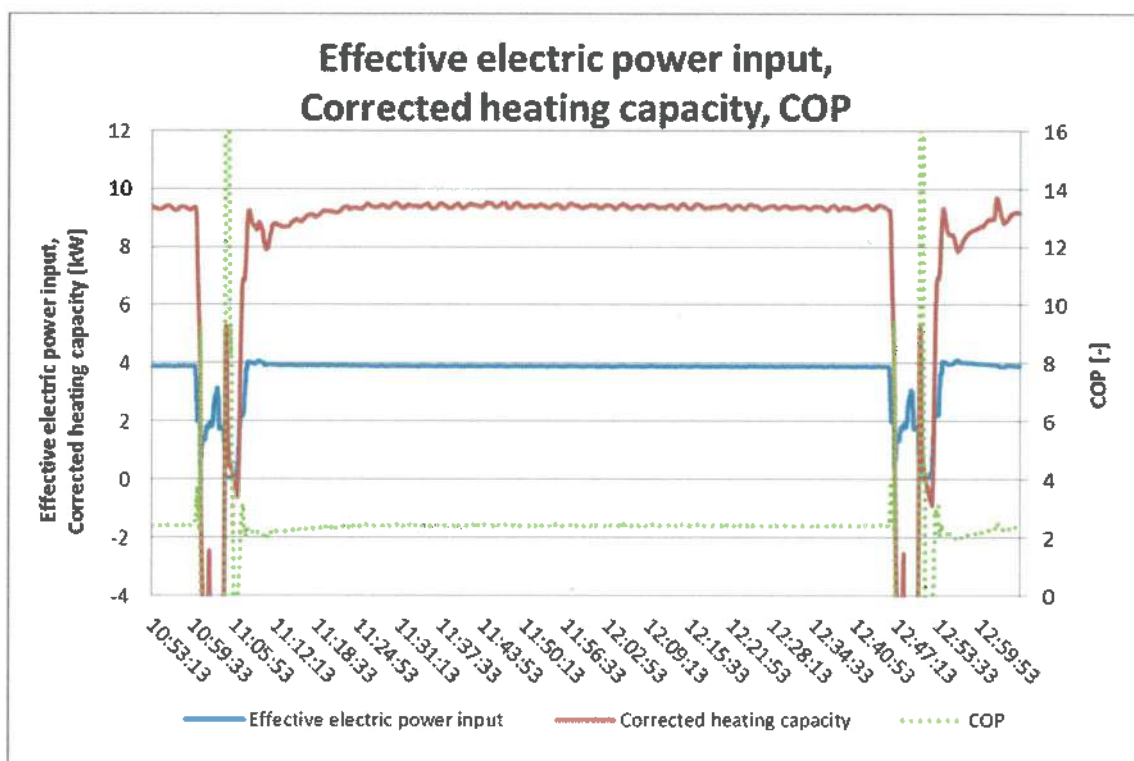
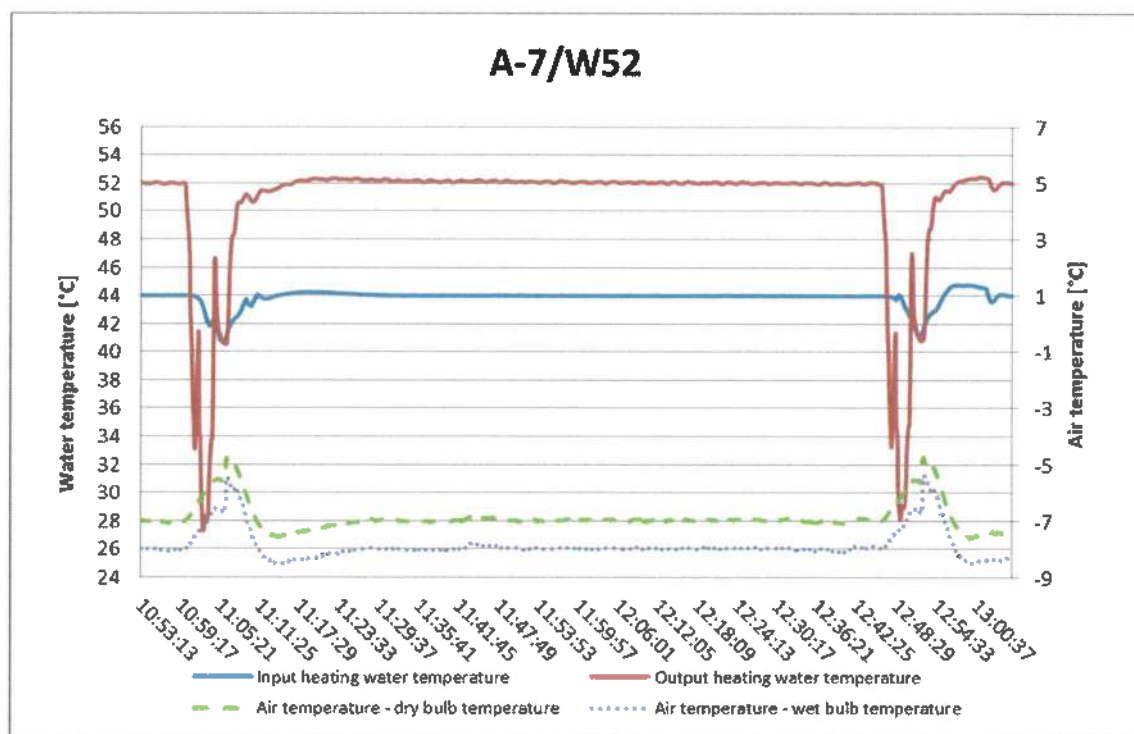
Heat pump NEXUS M14 PRO: A-7/W30 (67 %)



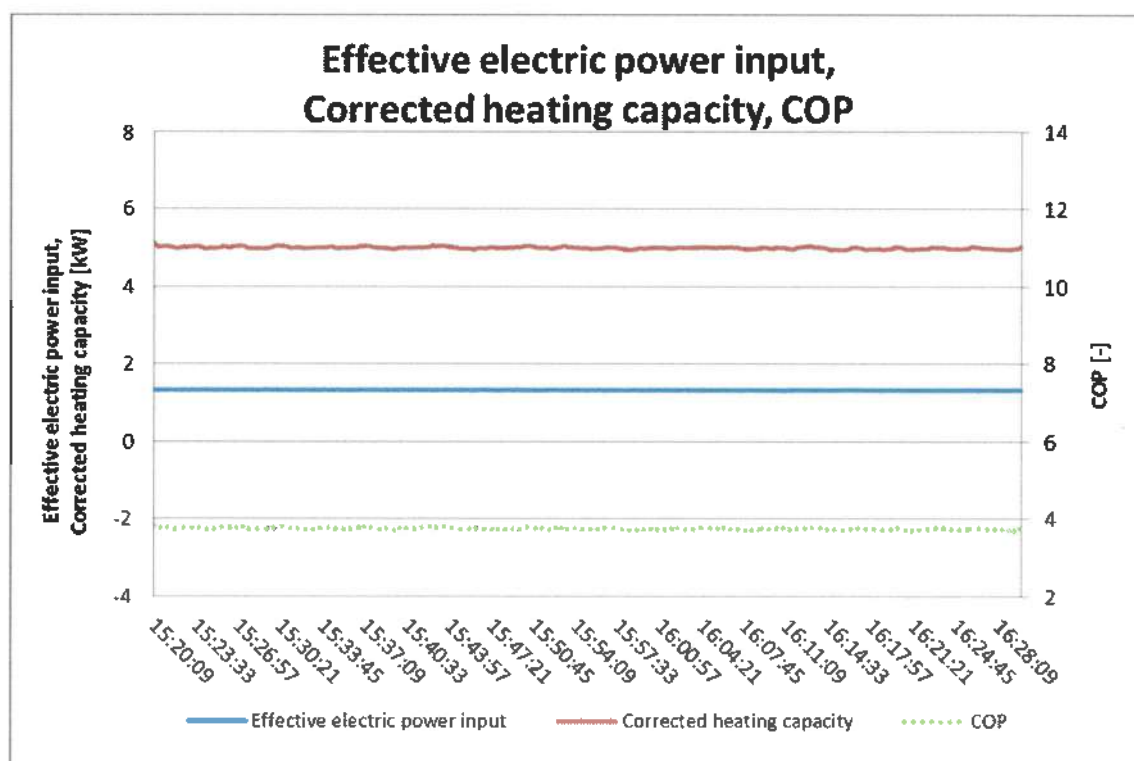
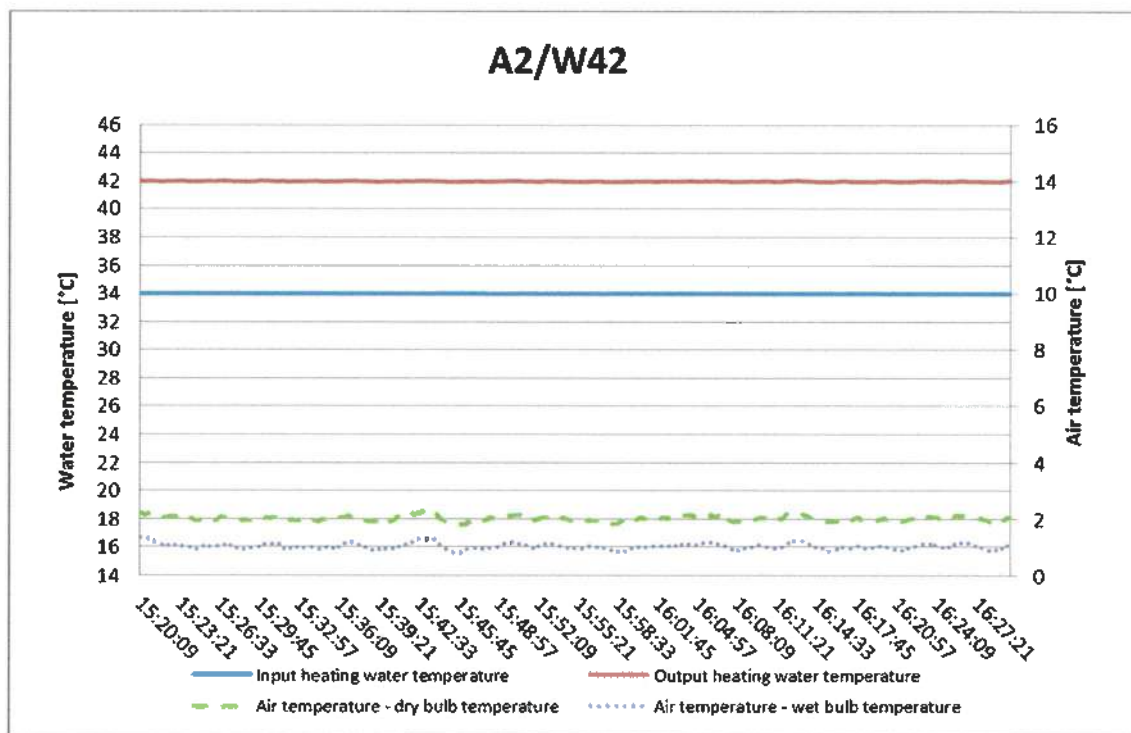
Heat pump NEXUS M14 PRO: A-15/W32 (67 %)



Heat pump NEXUS M14 PRO: A-7/W52 (67 %)

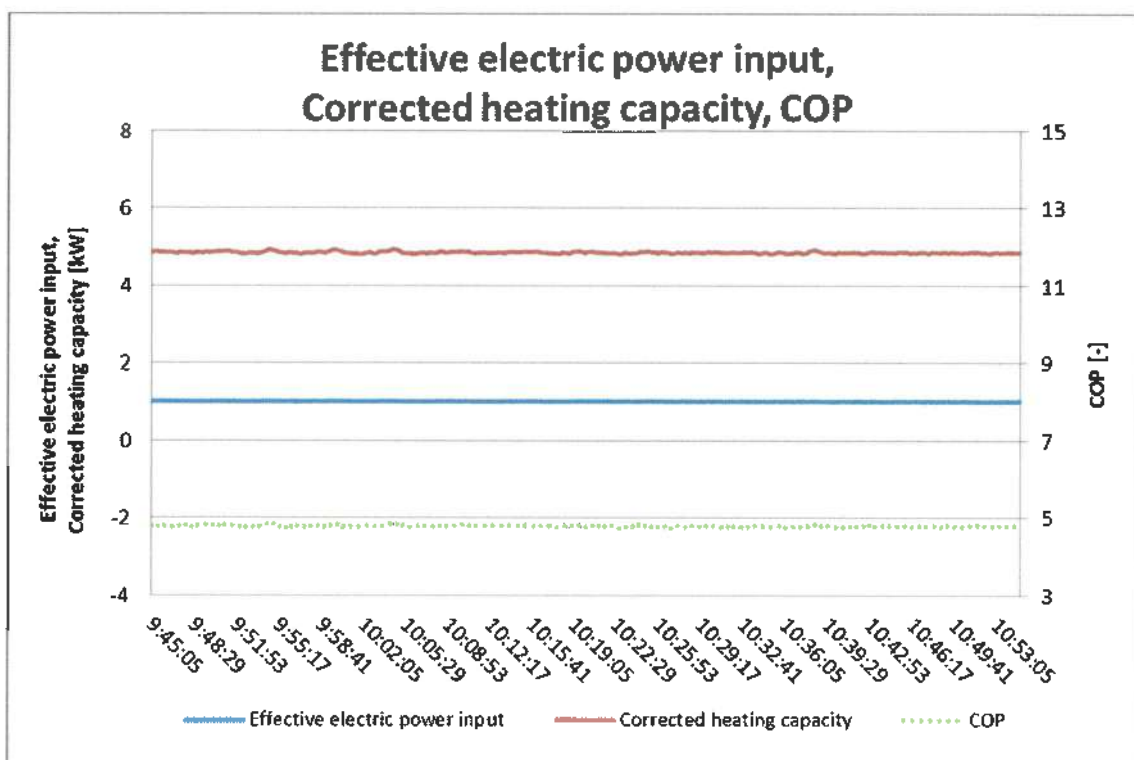
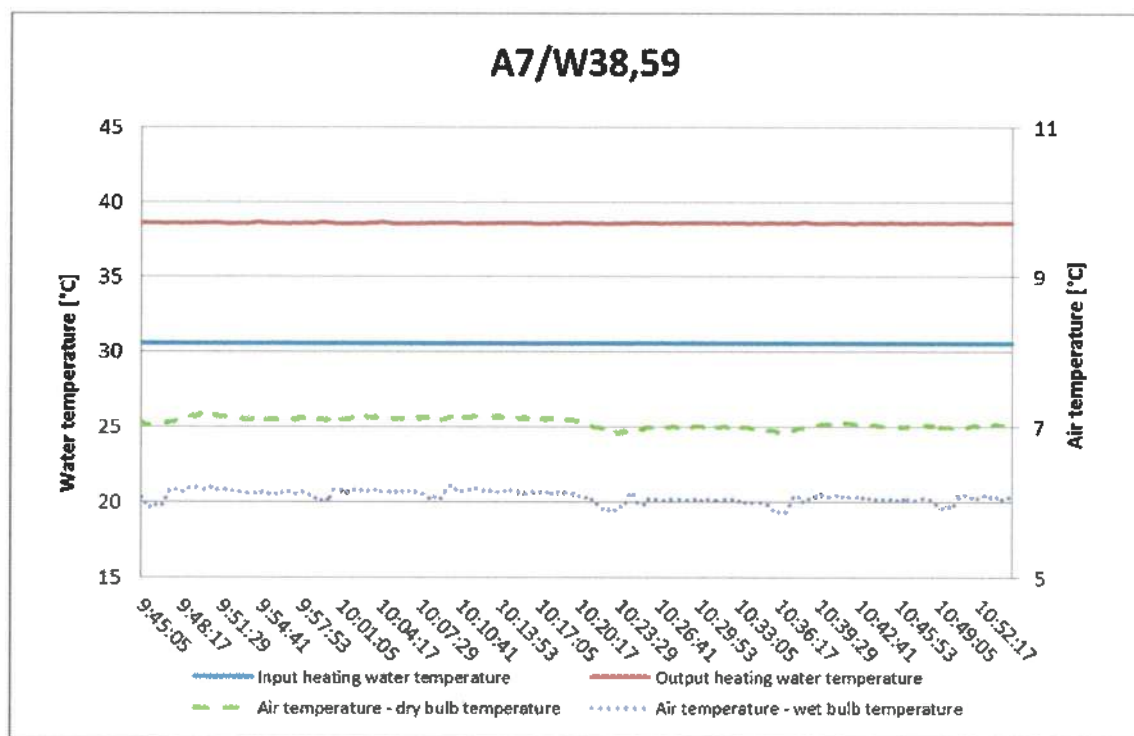


Heat pump NEXUS M14 PRO: A2/W42 (27 %)

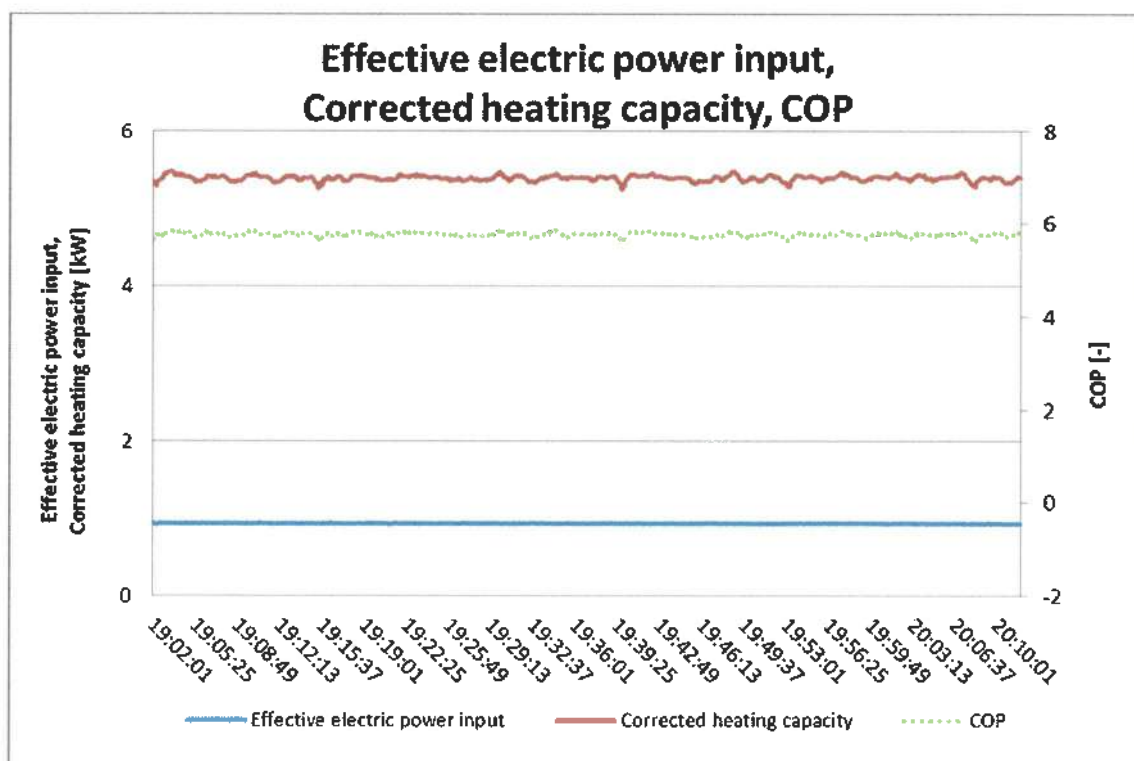
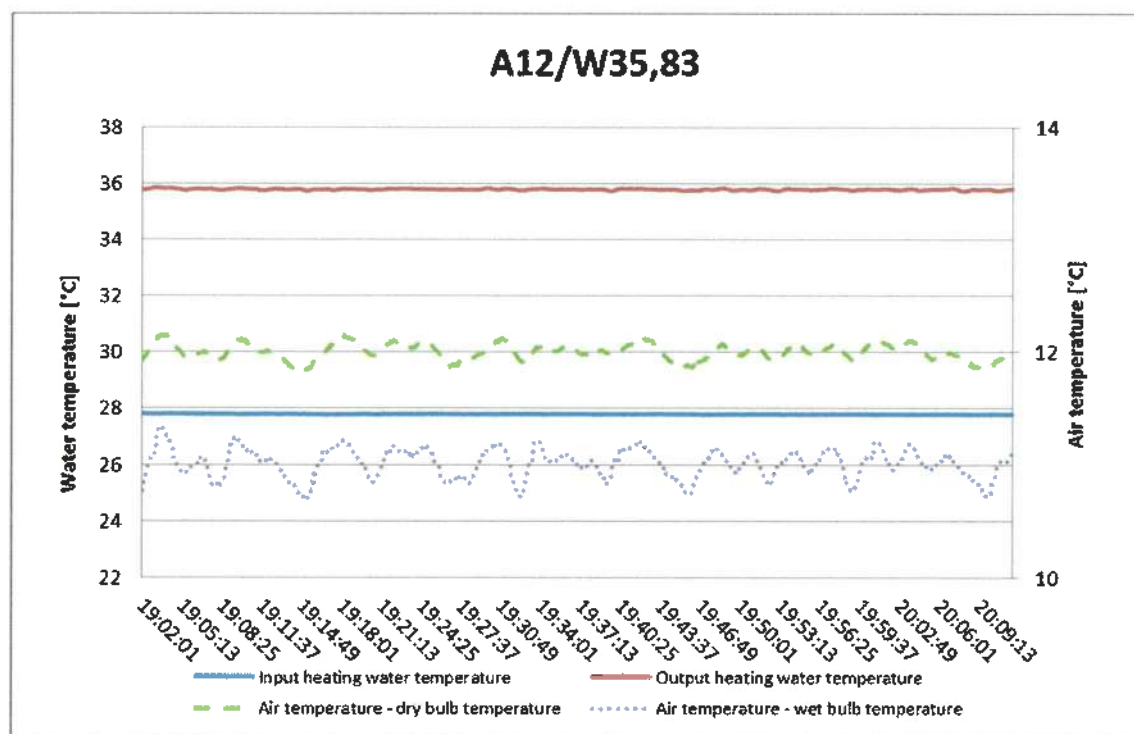




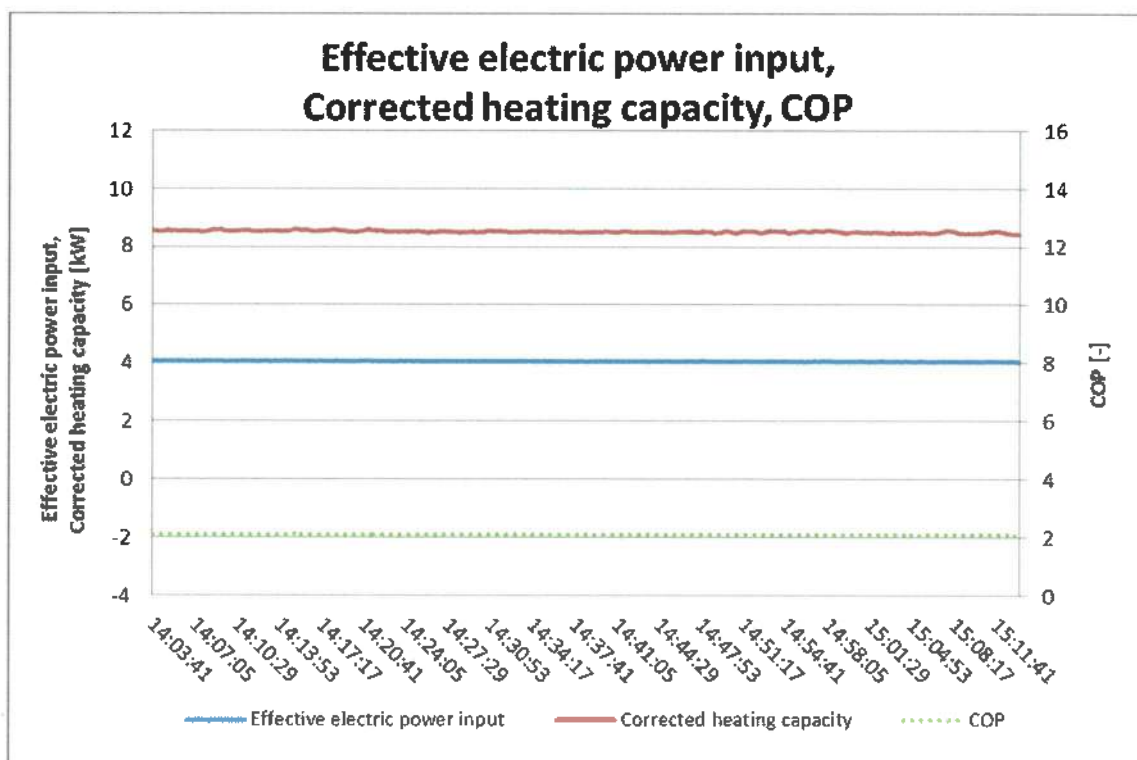
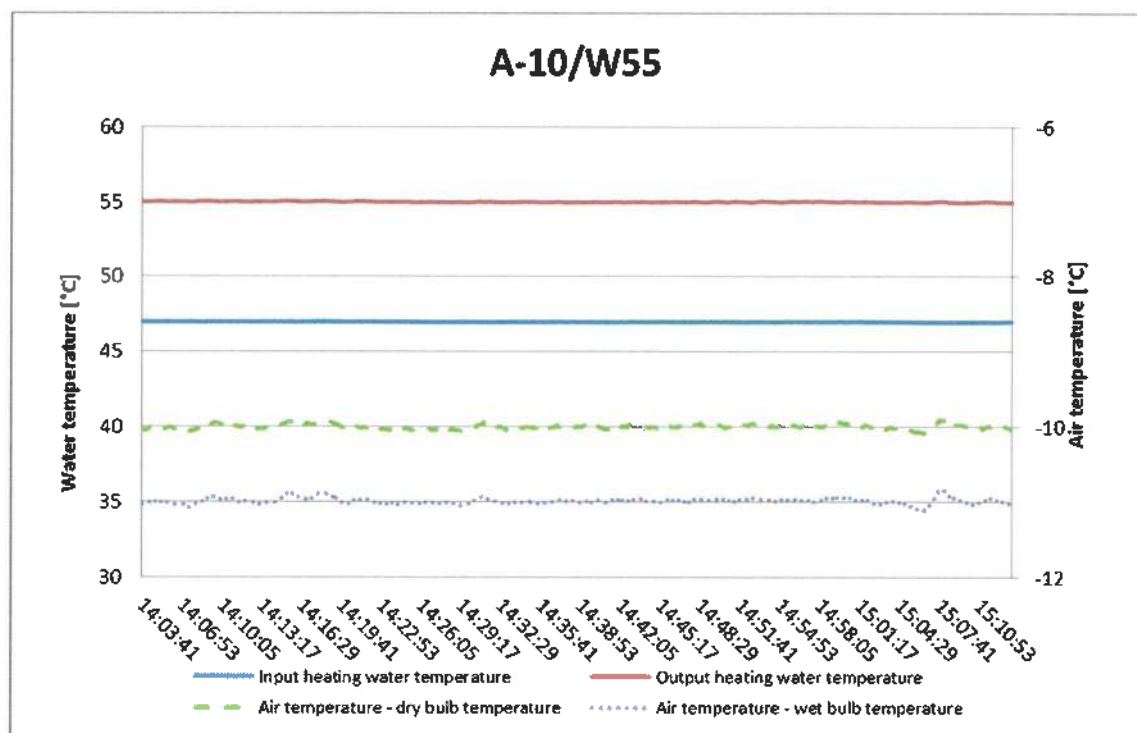
Heat pump NEXUS M14 PRO: A7/W38.59 (24 %)



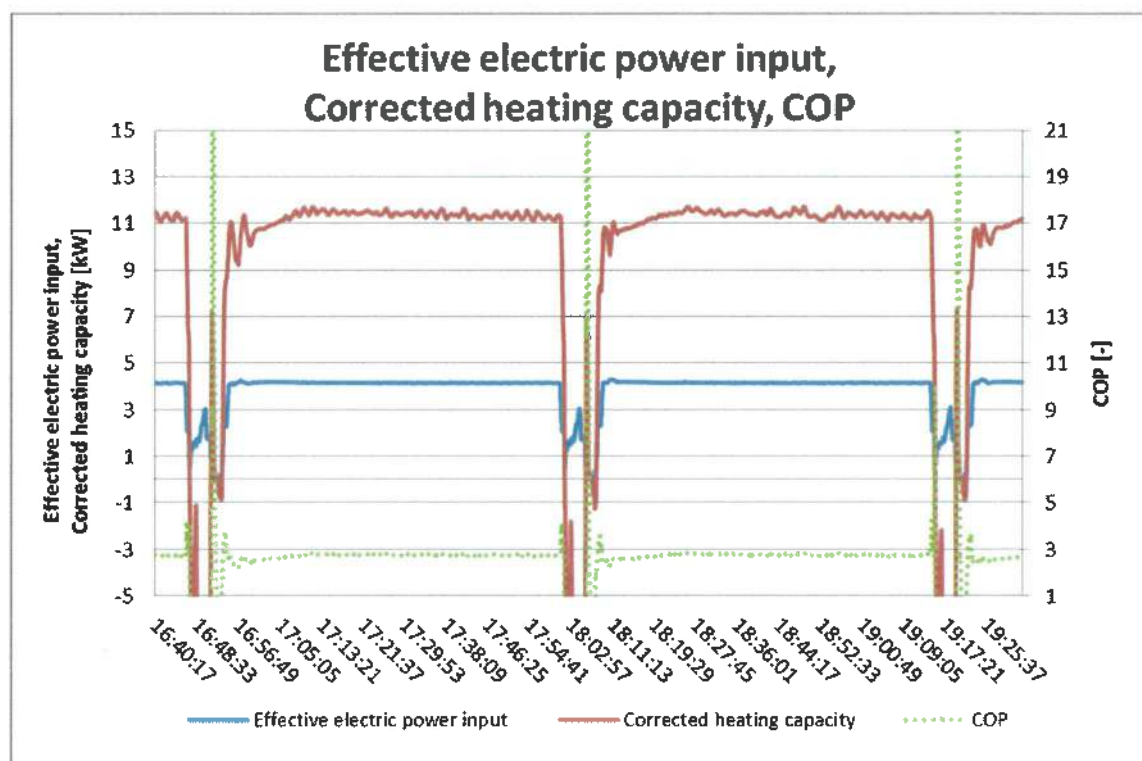
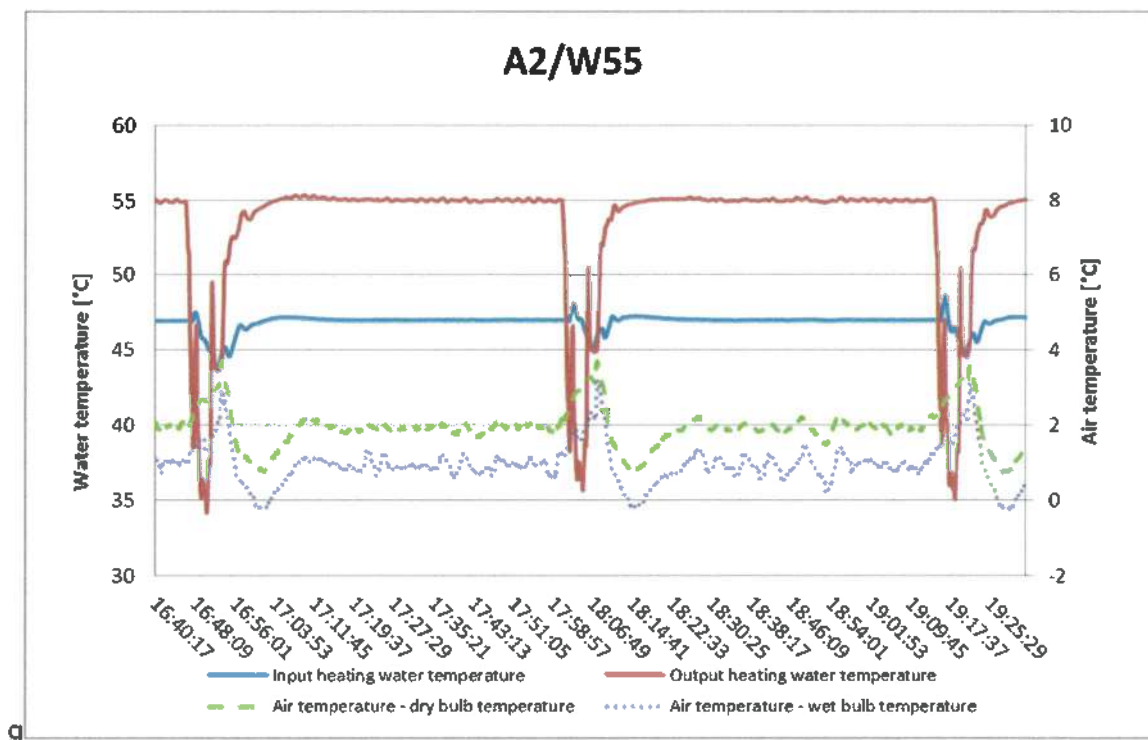
Heat pump NEXUS M14 PRO: A12/W35.83 (24 %)



Heat pump NEXUS M14 PRO: A-10/W55 (67 %)

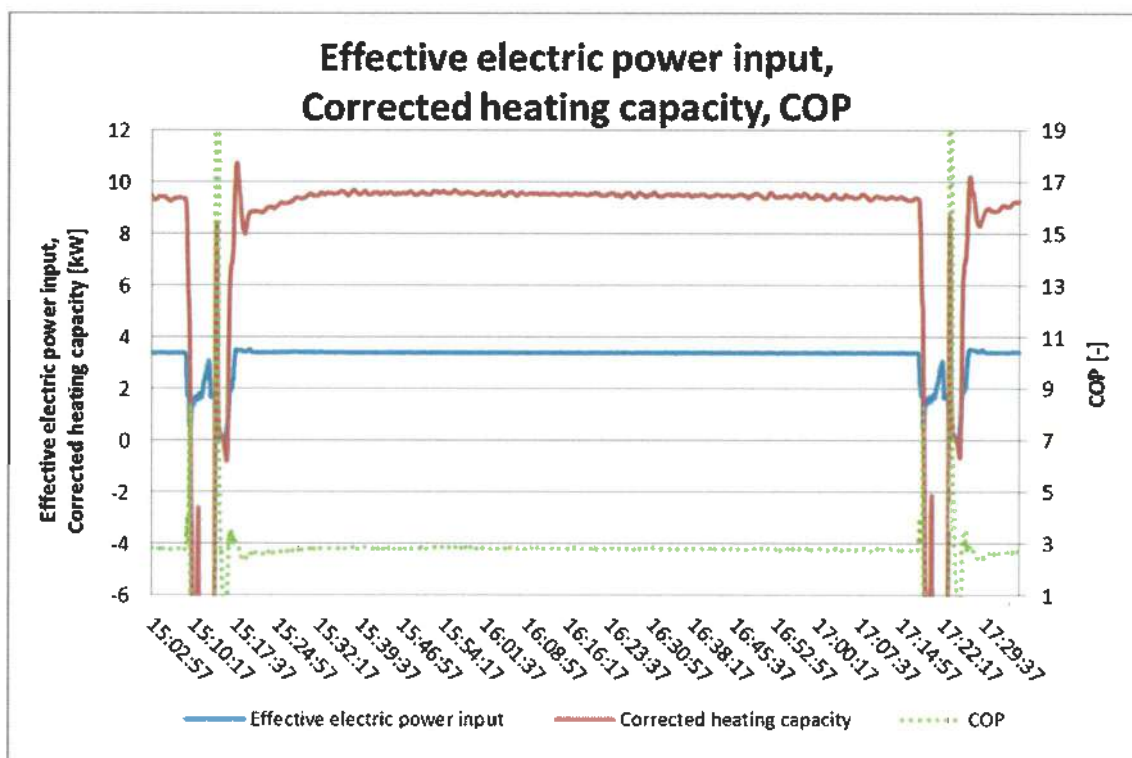
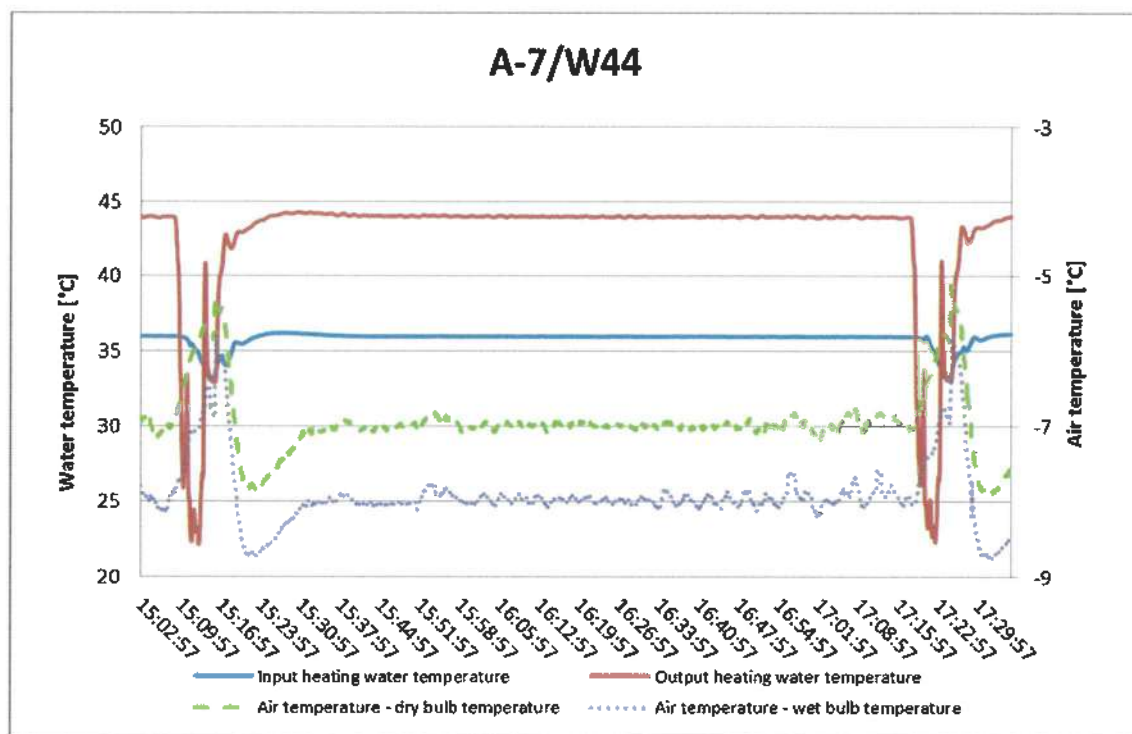


Heat pump NEXUS M14 PRO: A2/W55 (67 %)

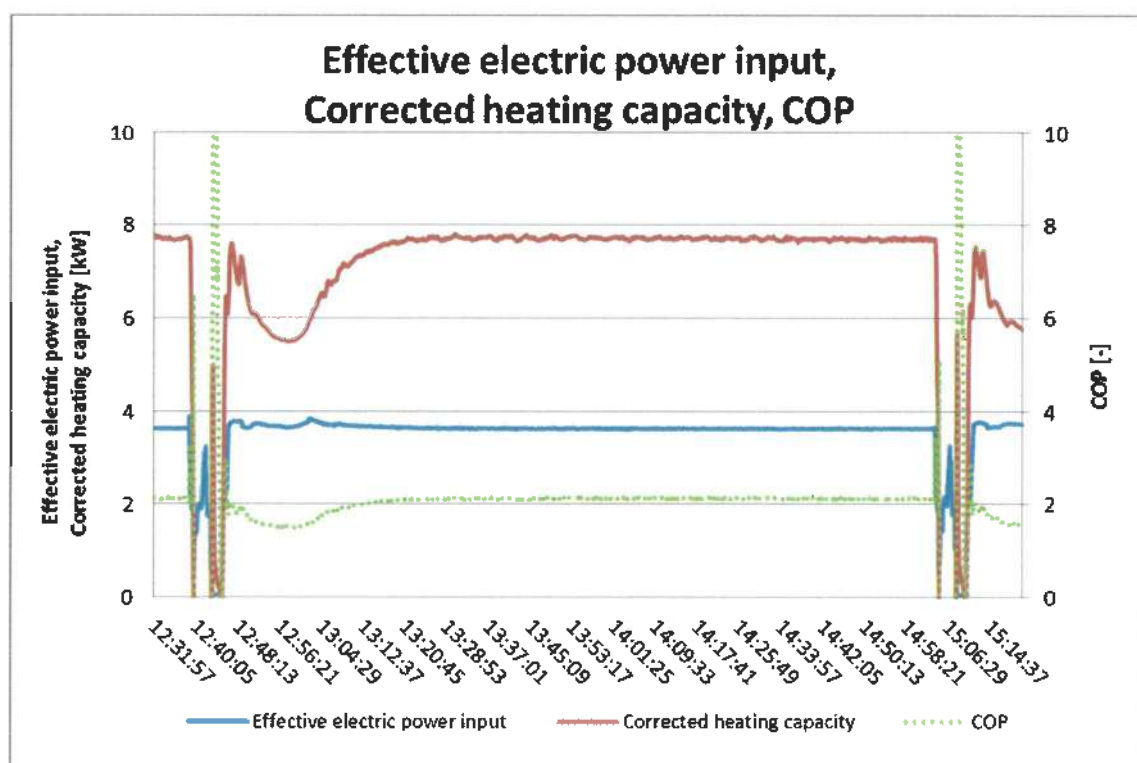
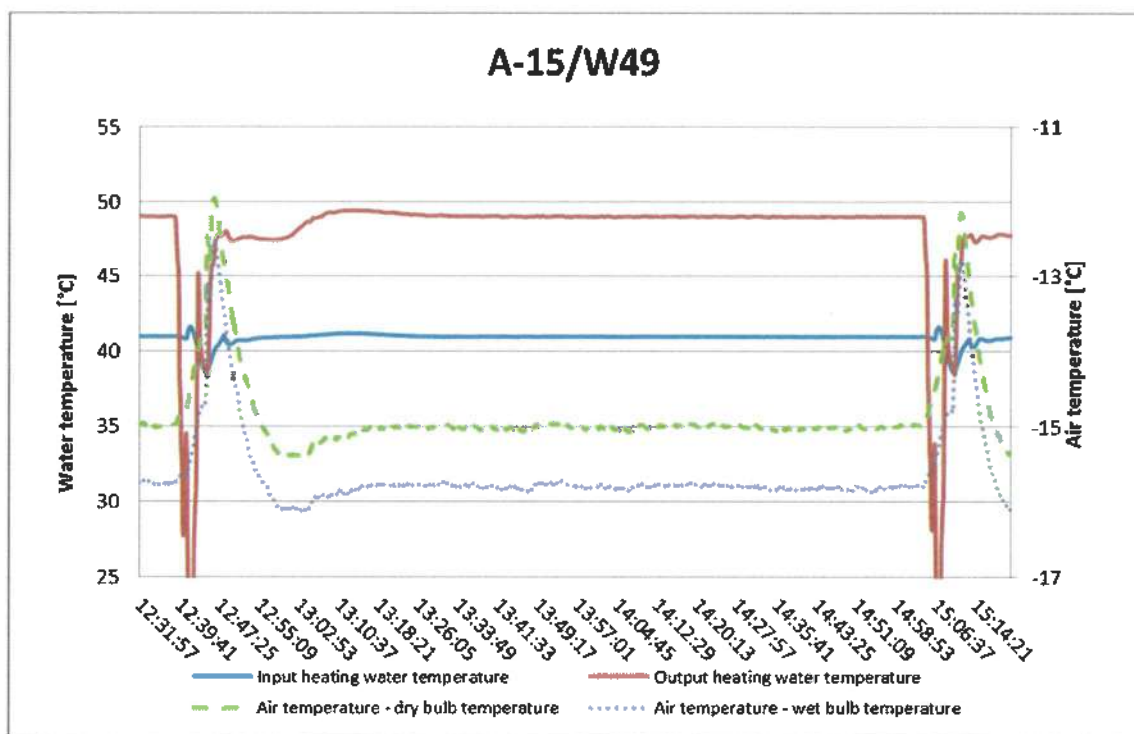




Heat pump NEXUS M14 PRO: A-7/W44 (67 %)



Heat pump NEXUS M14 PRO: A-15/W49 (67 %)



## VI. A list of other referenced documents

- Order B-73626 of 2021-06-30 (Order reg. no. B-73626 delivered on 2021-07-01)
- Contract B-73626/39
- Amendment to contract B-73626.Z1 of 2021-09-30
- 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 – Version 2.4a
- Background 39-15771
- Record measurement file: 39-15771 Sunex (EHPA AW).zip

Test Report compiled by: Ing. Dominik Šedivý – Test engineer

Test Report approved by:

  
**Milan Holomek**

Head of Heat and Environment-Friendly Equipment Test Station



-End of text-



## **TEST REPORT**

### **39-15771/H**

**Product:** Outdoor Air/Water Heat Pump – monobloc

**Type designation** NEXUS M14 PRO

**Customer:** SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibórz  
POLAND

**Manufacturer:** SUNEX S.A.  
ul. Piaskowa 7  
47-400 Racibórz  
POLAND

**Employee responsible:** Ing. Antonín Kolbábek, Ph.D.

**Report issue date:** 2022-12-07

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

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



The tests were performed based on these documents:

- Order B-73626 of 2021-06-30 (Order reg. no. B-73626 delivered on 2021-07-01)
- Contract B-73626/39
- Amendment to contract B-73626.Z1 of 2021-09-30

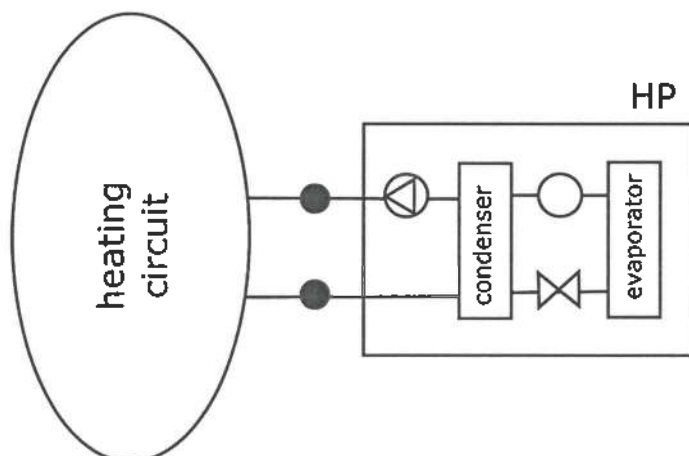
## I. Description of product tested

The heat pump **NEXUS M14 PRO**, supplied by the company **SUNEX S.A.**, is structurally adapted to operate in air/water system. Device is designed as a monobloc unit, placed outdoor on a pedestal. Refrigerant R-290 is used with charge 2.80 kg. Power supply is a three-phase. Heat pump is able to work in heating and cooling mode. Heat pump is working with variable flow rate.

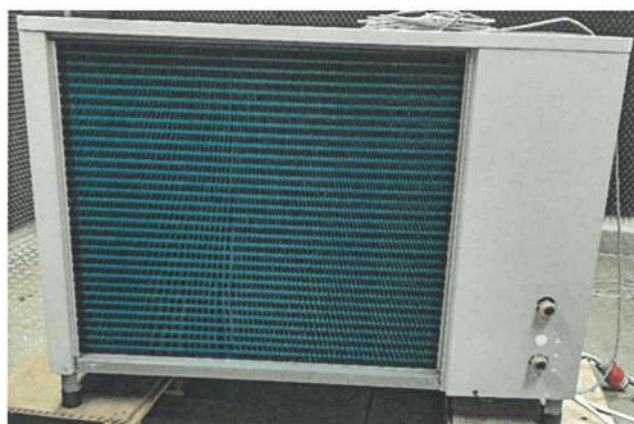
Main components of the outdoor unit **NEXUS M14 PRO**:

- Serial number 214102806
- Cuboid shape with dimensions 1350 × 670 × 988 mm (W × D × H)
- Frame and casing made of varnished steel sheets
- Compressor Siam Compressor Industry Co., Ltd., type: APB52FDAMT
- Refrigerant R-290 (charge: 2.80 kg)
- Cuboid evaporator Fin&Tube, 5-row with dimensions: 945 × 120 × 800 mm (W × D × H); spacing 2.5 mm
- PHE condenser with dimensions 140 × 150 × 550 mm (W × D × H), including insulation
- Electronic expansion valve CAREL E<sup>2</sup>V
- 4-way reversing valve Sanhua SHF-20D-46-02 X20201 with coil Sanhua
- Filter-drier Sanhua DTBG 083s
- Vertical liquid receiver GVN VLR.A.33b.04.A1.A1.F4.H20
- Axial fan with motor ECblue FN050-ZIQ.0F.V5P4, propeller with diameter Ø 500 mm
- Circulation pump GrundfosUPM3 Hybrid
- Sight-glass
- Pressure sensors
- Temperature sensors
- Control panel Carel
- Inverter Carel power+ PS2001840100

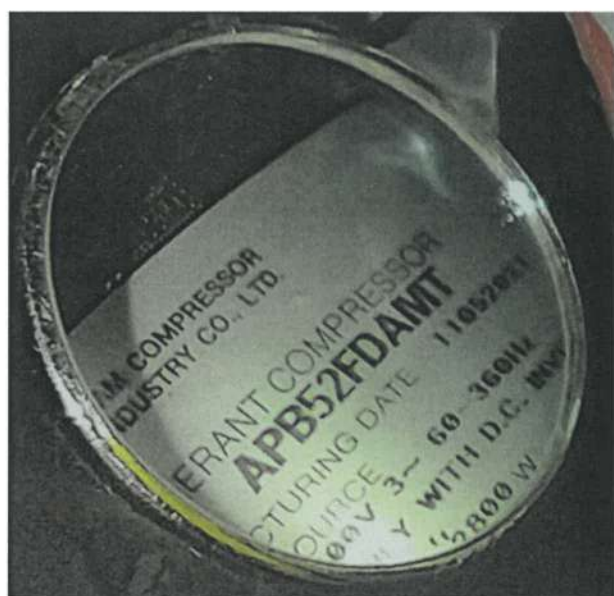
Scheme:





Photos:



Heat pump **NEXUS M14 PRO**  
– Front view /on left/, Back view /on right/ –



Heat pump **NEXUS M14 PRO**  
– Compressor label –

<b>NEXUS</b>  	
<b>Pompa ciepła powietrze/woda typu monoblok inverter</b> <b>Inverter monoblock air source heat pumps</b>	
Model	<b>NEXUS M14 PRO</b>
Moc grzewcza min./maks. Heating capacity min./max.	2,9/22,8 kW
Moc wejściowa w grzaniu min./maks. Heating input power min./max.	0,81/4,8 kW
Moc chłodnicza min./maks. Cooling capacity min./max.	4,1/19,6 kW
Moc wejściowa w chłodzeniu min./maks. Cooling input power min./max.	1,1/4,4 kW
Zasilanie Power supply	400 V/50 Hz
Znamionowa moc wejściowa Rated input power	2,62 kW
Znamionowy prąd wejściowy Rated input current	9,2 A
Moc grzewcza nominalna (A7/W35) Nominal heating capacity (A7/W35)	13,6 kW
Nominalne COP (A7/W35)	4,69
Nominalny pobór mocy (A7/W35) Nominal power consumption (A7/W35)	2,9 kW
Czynnik chłodniczy/ilość Refrigerant/Amount	R290 / 2,8 kg
GWP czynnika Refrigerant GWP	8,4
Waga netto Net weight	170 kg
Data / Nr seryjny Date / NO.	10.04.2021 / 214102806
Kraj produkcji Country of origin:	Polaska
<b>SUNEX S.A., ul. Piaskowa 7, 47-400 Racibórz, Polska</b>	

Heat pump **NEXUS M14 PRO**  
– Outdoor unit label –

## II. Sample tested

Reg. No. SZÚ	Product	Date of submission
0213.21.35383.001	Air/Water Heat Pump NEXUS M14 PRO	2021-09-27

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	022370/1	07/2022	082/12/E
2.	Digital watt meter	MaR01/EM01	07/2027	K17071728
3.	Flow meter Krohne Optiflux	022370/5	02/2022	6015-KL-P0077-18
4.	Barometer	022370/7	04/2024	4257/2019
5.	Differential pressure gauge	MaR01_TI	04/2023	KL-P-0021-21
6.	Temperature-humidity meter HC2-IC305	022370/10	10/2024	6036-KL-V0417-19
7.	Temperature-humidity meter HC2-IC305	022370/11	10/2024	6036-KL-V0416-19
8.	Thermometers	022370/13	01/2022	KL-T-0002-21
9.	Tape measure	ME 475	10/2022	8799/2017
10.	Thermo-hydro meter 608-H1	117043	02/2023	1088F-18
11.	Multi-analyser SINUS SoundBook MK2	000-000-000-875/1	12/2022	6035-OK-Z0084-20
12.	Calibrator G.R.A.S. 42AG	000-000-000-875/3	01/2023	8012-KL-10035-21
13.	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 **NEXUS M14 PRO**

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

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.

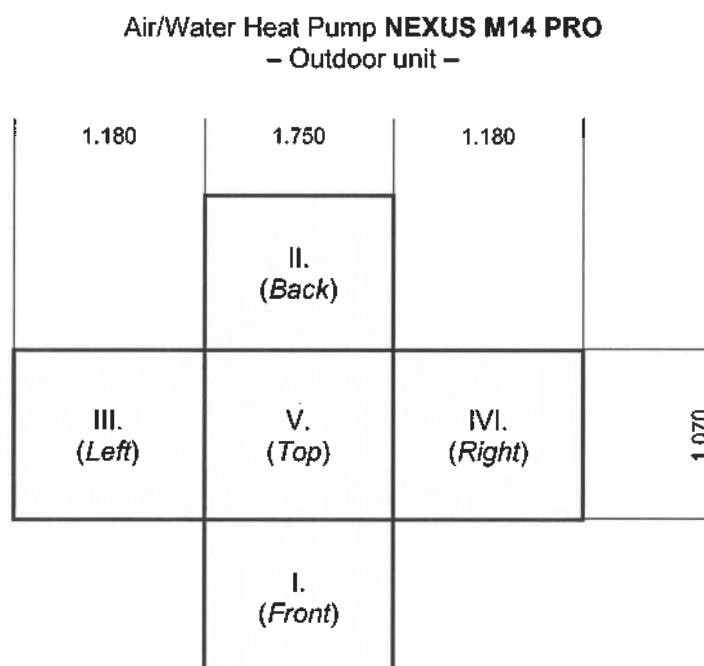
If a statement of conformity is given, the decisions rule pursuant to ILAC-G8: 09/2019 Art. 4.2.1 – binary statement for the simple acceptance rule shall be used.

#### 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	---
Height of measurement surface	$h$	[m]	1.180	---
Width of measurement surface	$w$	[m]	1.750	---
Depth of measurement surface	$l$	[m]	1.070	---
Total measurement surface area	$S$	[m <sup>2</sup> ]	8.4827	---
Minimal measuring time	$t_M$	[s]	5 × 40	---

Sketch of measurement surface (not in scale):



Segment I. (*Front*) was reduced into 2.0200 m<sup>2</sup> because of water pipe connections.



**b) Acoustic environment**

The testing sample was placed inside the climatic-chamber (with dimensions see below); on walls and ceiling of the chamber were mounted sound absorption panels. Sample was placed in the middle of the chamber, at a sufficient distance from the surrounding walls, and was rotated by about  $5 \pm 10^\circ$ .

<b>Climatic-acoustic chamber</b> <i>(corresponds to free-field over a reflecting plane)</i>			<b>For outdoor unit</b>	<b>For indoor unit</b>
Width of testing chamber	$l_1$	[m]	4.000	---
Length of testing chamber	$l_2$	[m]	6.000	---
Height of testing chamber	$l_3$	[m]	2.350	---

**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 <sup>*)</sup>	
Type of HP capacity regulation			Inverter	
Control settings of heat pump / compressor			24 %	
Fan speed settings			AUTO	
Water pump settings – secondary circuit			15 %	
Test sample			Air/Water Heat pump <b>NEXUS M14 PRO</b>	
			– Outdoor unit –	– Indoor unit –
Date of testing			2021-10-12	---
Reference air temperature	$t_{amb}$	[°C]	6.8	---
Relative humidity of air	$RH$	[%]	82.7	---
Ambient pressure	$p_{amb}$	[hPa]	985.14	---
Overall sound power level (linear)	$L_W$	[dB]	63.9 ± 1.5	---
Overall A-weighted sound power level	$L_{WA}$	[dB]	57.9 ± 1.5	---
Accuracy class			Engineering (grade 2)	---

<sup>\*)</sup> 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)

**A) Measurement results – octave bands**

Air/Water Heat Pump <b>NEXUS M14 PRO</b> – Outdoor unit at A7/W55 / Compressor: 24 %, Fan: AUTO, Water pump: 15 % /									Engineering (grade 2)		
$f_m$ [Hz]	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	$L_w$ [dB]	$L_{WA}$ [dB(A)]	U [dB]	Evaluation
	$L_d$	$F_{pl}$	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{w(1)} - L_{w(2)} \leq 5$					
125	21.3	4.2	YES	0.0	YES	YES	YES	62.4	47.5	$\pm 3.0$	passed
250	21.8	5.2	YES	0.0	YES	YES	YES	53.1	44.0	$\pm 2.0$	c
500	22.4	3.8	YES	0.0	YES	YES	YES	49.0	45.4	$\pm 1.5$	passed
1000	23.4	3.5	YES	0.0	YES	YES	YES	43.2	43.1	$\pm 1.5$	c
2000	22.3	2.5	YES	0.0	YES	YES	YES	49.7	50.9	$\pm 1.5$	passed
4000	20.8	2.2	YES	0.0	YES	YES	YES	53.5	54.4	$\pm 1.5$	passed
8000 <sup>*)</sup>	20.6	3.1	YES	0.0	YES	YES	YES	53.9	53.8	$\pm 2.5$	passed
<b>Total</b>								<b>64.1</b>	<b>58.9</b>	<b><math>\pm 1.5</math></b>	

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

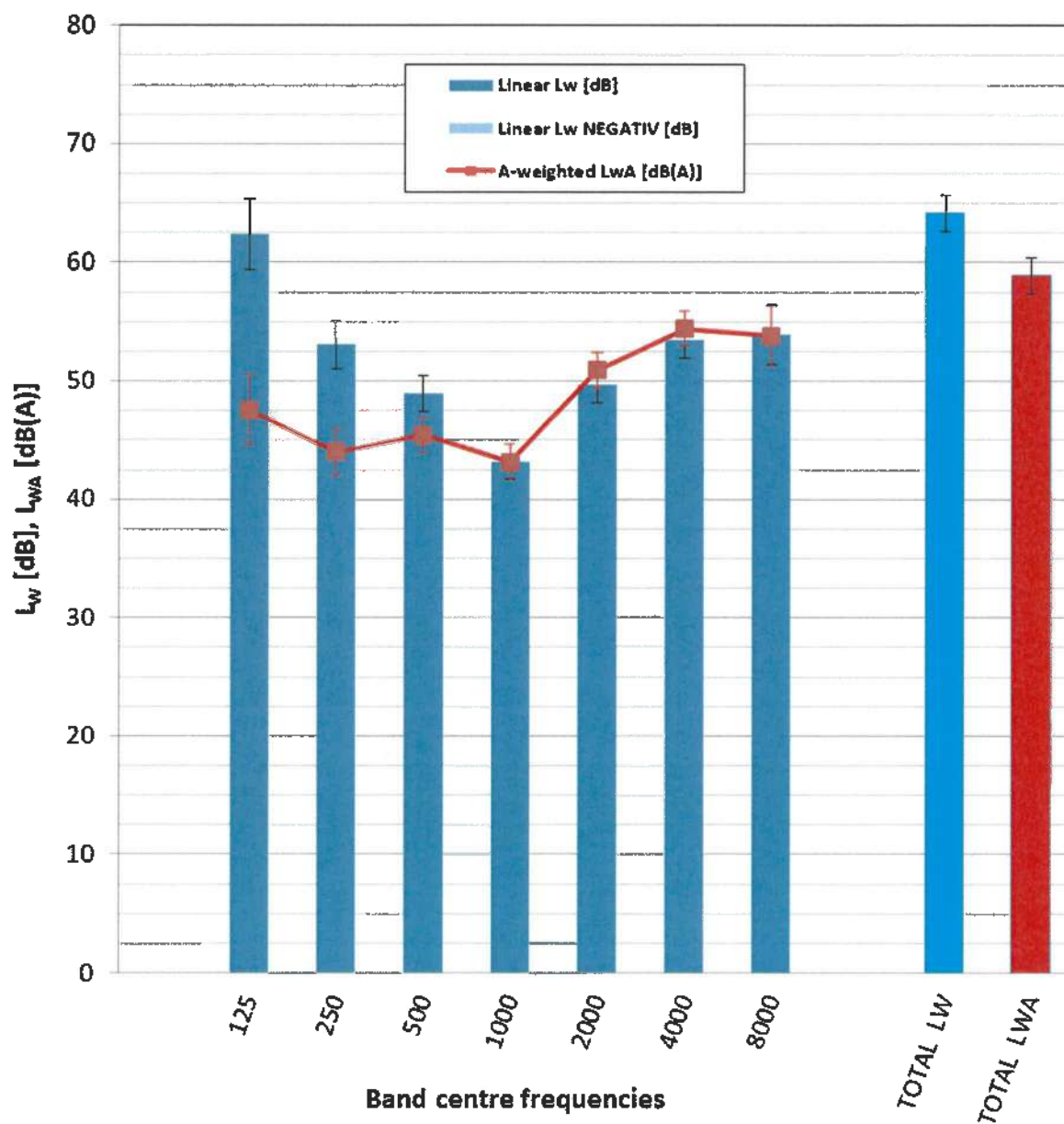
**Legend:**

<i>passed</i>	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.
<i>not passed</i>	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.
<i>c</i>	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 $L_{WA}$ .
<i>nc</i>	Third frequency bands with this description are not significant for calculating of A-weighted total sound power level $L_{WA}$ . These bands aren't evaluated in calculating of $L_{WA}$ .

### Spectrum of Sound power level $L_W$ – octave bands

Air/Water Heat Pump **NEXUS M14 PRO** – Outdoor unit at A7/W55  
/ Compressor: 24 %, Fan: AUTO, Water pump: 15 % /

**Engineering**  
(grade 2)



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

Air/Water Heat Pump <b>NEXUS M14 PRO</b> – Outdoor unit at A7/W55 / Compressor: 24 %, Fan: AUTO, Water pump: 15 % /										Engineering (grade 2)	
$f_m$ [Hz]	Criterion 1			Criterion 2		Criterion 3	All criteria passed?	$L_w$ [dB]	$L_{WA}$ [dB(A)]	$U$ [dB]	Evaluation
	$L_d$	$F_{pl}$	$L_d > F_{pl}$	$F_{+/-}$	$F_{+/-} \leq 3$	$L_{w(1)} - L_{w(2)} \leq s$					
100	21.5	3.1	YES	0.0	YES	YES	YES	57.3	38.2	$\pm 3.0$	c
125	21.3	4.2	YES	0.0	YES	YES	YES	53.5	37.4	$\pm 3.0$	c
160	21.2	4.3	YES	0.0	YES	YES	YES	59.9	46.5	$\pm 3.0$	passed
200	21.5	4.2	YES	0.0	YES	YES	YES	50.2	39.3	$\pm 2.0$	c
250	21.8	5.2	YES	0.0	YES	YES	YES	47.9	39.3	$\pm 2.0$	c
315	22.0	3.6	YES	0.0	YES	YES	YES	45.7	39.1	$\pm 2.0$	c
400	22.3	3.1	YES	0.0	YES	YES	YES	45.3	40.5	$\pm 1.5$	c
500	22.4	3.8	YES	0.0	YES	YES	YES	45.1	41.9	$\pm 1.5$	passed
630	22.2	3.9	YES	0.0	YES	YES	YES	41.0	39.1	$\pm 1.5$	c
800	21.2	3.7	YES	0.0	YES	YES	YES	38.8	38.0	$\pm 1.5$	c
1000	23.4	3.5	YES	0.0	YES	YES	YES	38.0	38.0	$\pm 1.5$	c
1250	22.1	3.3	YES	0.0	YES	YES	YES	38.4	39.0	$\pm 1.5$	c
1600	21.9	2.4	YES	0.0	YES	YES	YES	43.7	44.7	$\pm 1.5$	passed
2000	22.3	2.5	YES	0.0	YES	YES	YES	42.8	44.0	$\pm 1.5$	passed
2500	21.3	2.2	YES	0.0	YES	YES	YES	47.0	48.3	$\pm 1.5$	passed
3150	21.0	2.2	YES	0.0	YES	YES	YES	48.5	49.7	$\pm 1.5$	passed
4000	20.8	2.2	YES	0.0	YES	YES	YES	49.7	50.7	$\pm 1.5$	passed
5000	20.4	2.8	YES	0.0	YES	YES	YES	47.7	48.2	$\pm 1.5$	passed
6300	20.6	3.1	YES	0.0	YES	YES	YES	49.2	49.1	$\pm 2.5$	passed
Total								63.9	57.9	$\pm 1.5$	

**Legend:**

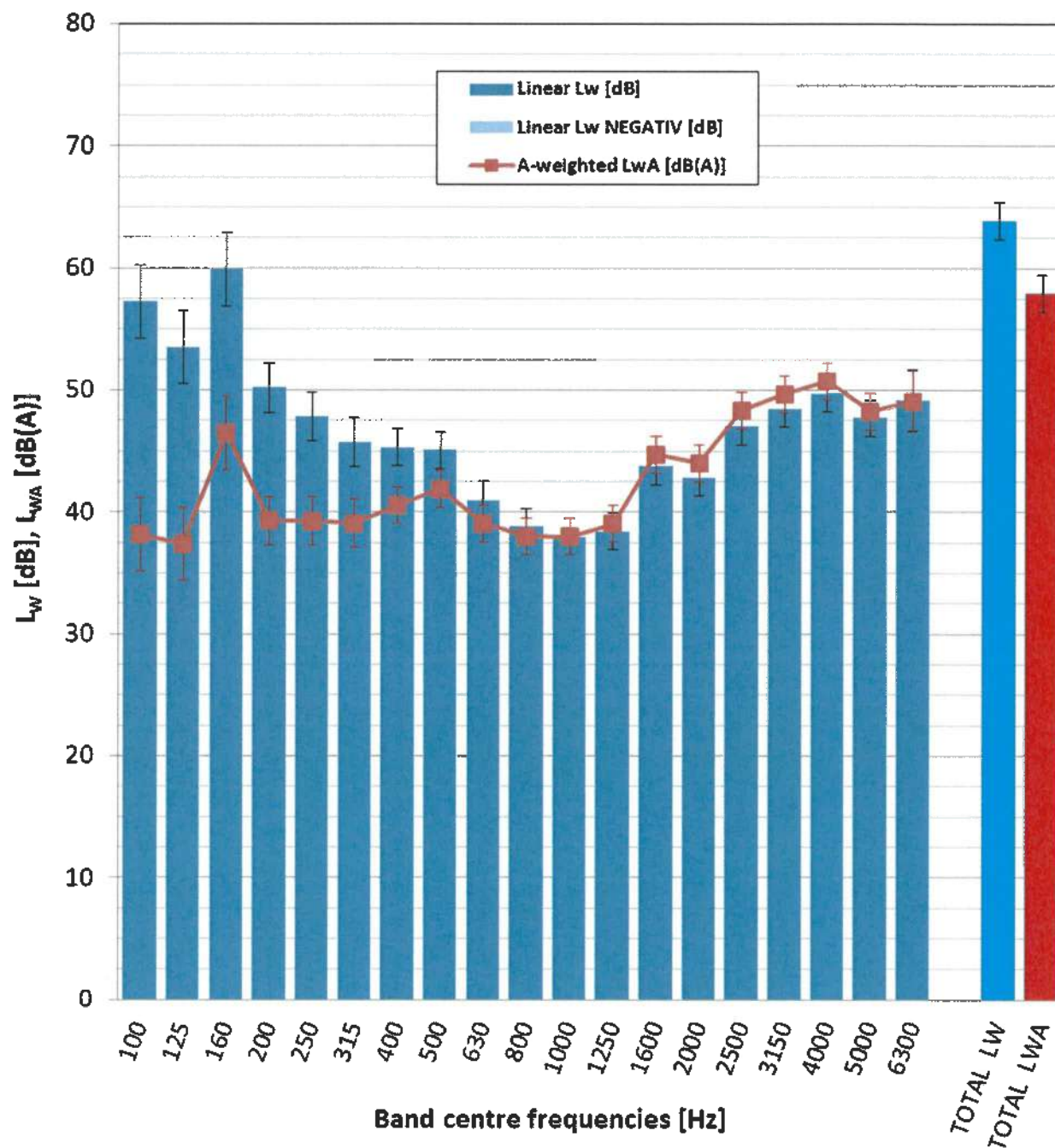
- passed* Third frequency bands with this description are significant for calculation of A-weighted total sound power level  $L_{WA}$ . Required accuracy class is fulfilled in this band.
- not passed* Third frequency bands with this description are significant for calculation of A-weighted total sound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



# Spectrum of Sound power level $L_w$ – one-third octave bands

Air/Water Heat Pump **NEXUS M14 PRO** – Outdoor unit at A7/W55  
/ Compressor: 24 %, Fan: AUTO, Water pump: 15 % /

Engineering  
(grade 2)



Tested and  
reviewed by:

Ing. Antonín  
Kolbábek, Ph.D.

Date: 2022-12-07

Signed:

## V. A list of other referenced documents

- Order B-73626 of 2021-06-30 (Order reg. no. B-73626 delivered on 2021-07-01)
- Contract B-73626/39
- Amendment to contract B-73626.Z1 of 2021-09-30
- 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. 39-15771
- Record measurement file: 39-15771 Sunex (EHPA AW).zip

Test Report compiled by:

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

Test Report approved by:

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



-End of text-