Testing Laboratory 1045.1
accredited by the Czech Accreditation Institute pursuant to ČSN EN ISO/IEC 17025:2018
Strojírenský zkušební ústav, s.p. Zkušební laboratoř
(Engineering Test Institute, Public Enterprise, Testing Laboratory)
Hudcova 424/56b, Medlánky, 621 00 Brno

L 1045.1

TEST REPORT
31-10718/T

Product: Outdoor Air/Water Heat Pump – monobloc

Type designation: **Airmax^3 7GT**

Customer:
"Galmet Sp. z o.o." Sp. K.
ul. Raciborska 36
48-100 Głubczyce
POLAND

Manufacturer:
"Galmet Sp. z o.o." Sp. K.
ul. Raciborska 36
48-100 Głubczyce
POLAND

Responsible employee: Ing. Mario Jankola

Report issue date: 2022-01-31

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

The tests were performed based on these documents:
- Order of 2021-09-14 (Order reg. no. B-74280, received on 2021-09-17)
- Contract B-74280/31
- Amendments to Contract B-74280.D1 of 2021-11-29, B-74280.D2 of 2022-01-25, B-74280.D3 of 2022-01-27

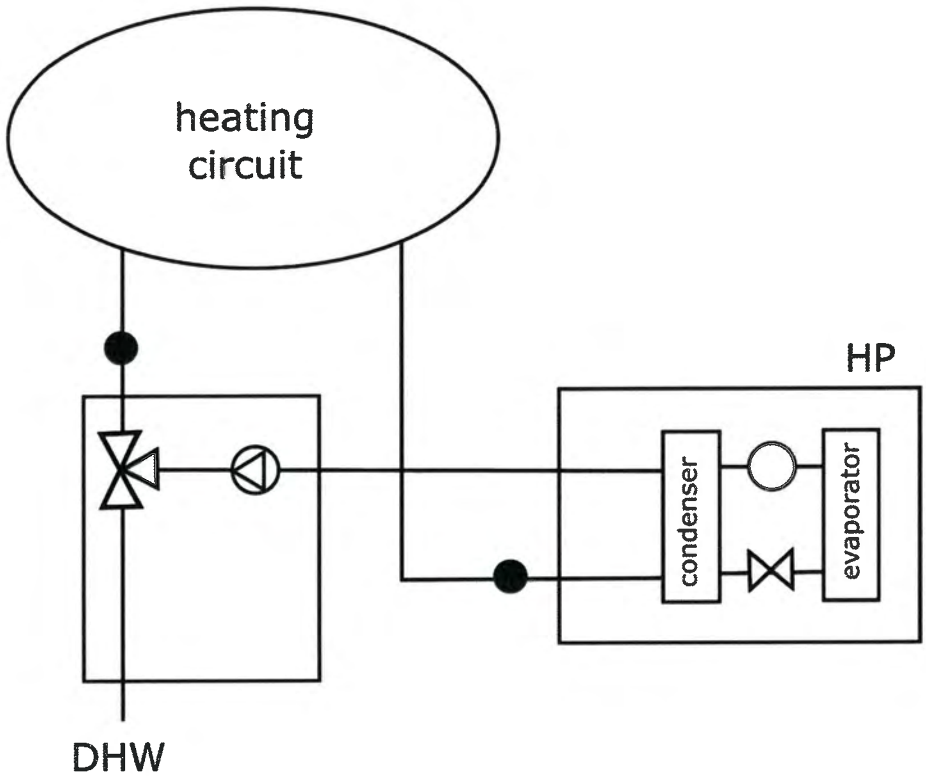
I. Description of product tested

The **Heat pump Airmax^3 7GT** supplied by the company **"Galmet Sp. z o.o." Sp. K.** is structurally adapted to operate in air/water system. Device is designed as monobloc, divided to the outdoor unit, placed outside on a pedestal and an indoor hydraulic unit. Outdoor and indoor units are connected by water pipes and electrical wires. Refrigerant R290 is used with charge 1.4 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:
- Serial number 21P001075
- Cubic shape with dimensions 1400 × 495 × 900 mm (W × D × H)
- Frame and casing made of varnished steel
- Cubic shaped evaporator, 1 row, dimensions 802 × 92 × 731 mm (W × D × H), spacing 4.00 mm
- Compressor Copeland Scroll YHV0291U-3X9-XXS (ABK)
- Plate condenser Swep B25THx40/1P-SC-M 2x12.8+2x1 1/4“, dimensions 140 × 122 × 545 mm (W × D × H) including insulation
- Refrigerant R290 (charge 1.4 kg)
- Electric expansion valve Emerson
- 4-way reversing valve
- Suction line accumulator ESK Schultze FA-18-2
- Invertor Emerson ED3018BU-H2-B
- Axial fan Ø480 mm
- Pressure switch Sanhua SHF(L)-7H-34U-51-V30435
- Pressure sensors
- Temperature sensors
- Filter dehydrator
- Air vent

Main components of the indoor unit:
- Serial number 21P001075
- Cubic shape with dimensions 403 × 229 × 712 mm (W × D × H)
- Frame and casing made of varnished steel
- Air vent
- Circulation pump Grundfos UPML 25-105 130
- 3-way valve Afriso AZV 643
- Temperature sensors
- Regulation
- Display
- Electric backup heater

Scheme:

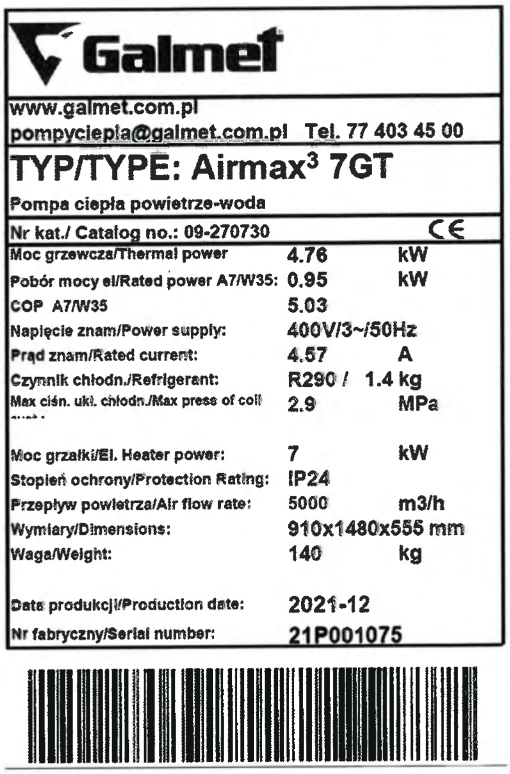


Photos:

Heat pump **Airmax³ 7GT**
– Front view –

Heat pump **Airmax³ 7GT**
– Back view –

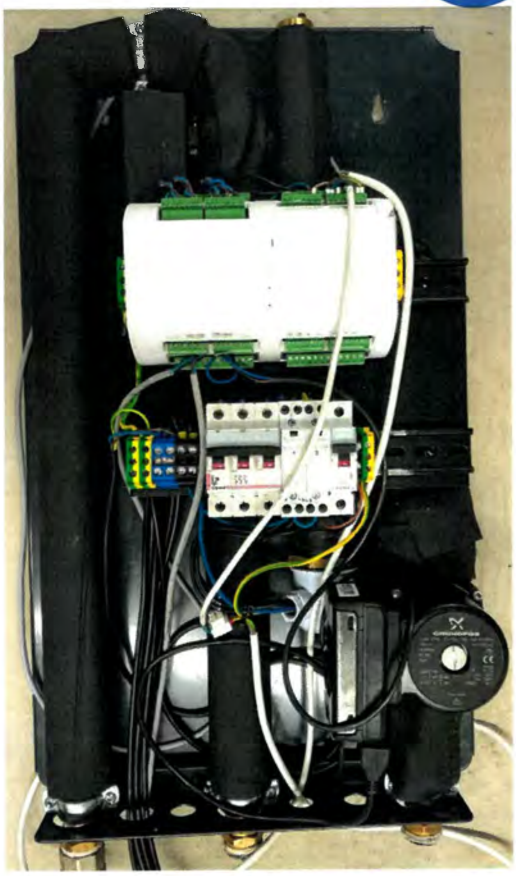
Heat pump **Airmax³ 7GT**
– Compressor label –



Heat pump **Airmax³ 7GT**
– Unit label –

Heat pump **Airmax³ 7GT**
– Without cover –

Indoor unit **Airmax³ 7GT**
– With cover –



Indoor unit **Airmax³ 7GT**
– Without cover –

II. Sample tested

SZU reg. no.	Product name	Date of submission
0213.21.35881.001	Heat pump **Airmax³ 7GT**	2021-12-01

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

III. Methods, results of tests and verifications

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

No.	Name:	Inventory number:	Calibration is valid to:	Accuracy see Calibration Sheet number:
1.	Electrical energy meter	E3.1	05/2031	0004/21
2.	Digital watt meter	1.2.3 ENERGIE ANALYZATOR_3	05/2023	K21050741
3.	Flow meter Krohne Optiflux	8.1.5 TECH_K3_V_DN15_SEK	04/2025	6015-KL-P0355-21
4.	Barometer	2.4 MAR18_1_PB	06/2023	4952/2021
5.	Differential pressure gauge	14.2.2 MAR18_3_dP_2	06/2023	KL-P-0063-21
6.	Temperature-humidity meter HF532	14.1.1 K3_VLHKOST_1	04/2026	6036-KL-V0118-21
7.	Temperature-humidity meter HF532	14.1.3 K3_VLHKOST_2	04/2026	6036-KL-V0119-21
8.	Thermometers	14.4 MAR18_T	05/2024	KL-T-0086-21

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

Testing method	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14825:2020 EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a
Sample tested	Heat pump **Airmax³ 7GT**
Measuring equipment used	See table above

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

Measured quantity	Unit	Uncertainty of measurement	Evaluation
Liquid			
- temperature difference (dT)	[K]	± 0,15 K	fulfilled
- temperature inlet/outlet	[°C]	± 0,15 K	fulfilled
- volume flow	[m3/s]	± 1 %	fulfilled
- static pressure difference	[kPa]	± 1 kPa (Δp ≤ 20 kPa) nebo ± 5 % (Δp > 20 kPa)	fulfilled
Air			
- dry bulb temperature	[°C]	± 0,2 K	fulfilled
- wet bulb temperature	[°C]	± 0,4 K	fulfilled
- volume flow	[m3/s]	± 5 %	not applied
- static pressure difference	[Pa]	± 5 Pa (Δp ≤ 100 Pa) nebo ± 5 % (Δp > 100 Pa)	not applied
Refrigerant			
- pressure at compressor outlet	[kPa]	± 1 %	not applied
- temperature	[°C]	± 0,5 K	not applied
Concentration (in volume)			
- heat transfer medium	[%]	± 2	not related
Electrical quantities			
- electric power	[W]	± 1 %	fulfilled
- voltage	[V]	± 0,5 %	fulfilled
- current	[A]	± 0,5 %	fulfilled
- electric energy	[kWh]	± 1 %	not applied
Compressor rotational speed	[min-1]	± 0,5 %	not applied
The heating or cooling capacities measured on the liquid side shall be determined within a maximum uncertainty of 5 % independent of the individual uncertainties of measurement including the uncertainties on the properties of fluids.			fulfilled

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

a) **Rating conditions:**

Measurement results:

Heat pump **Airmax³ 7GT**

Test number		1	2	3
Assessment condition		**Rating conditions**		
Specification of the assessment condition*		**A7/W35**	**A7/W55**	**A2/W35**
Date of testing		**2021-12-06**	**2021-12-07**	**2021-12-08**
Transient test procedure	YES / NO	NO	YES	NO
Average defrost time of 1 cycle	[min]	–	–	–
Average time of 1 cycle	[min]	–	–	–
Calculation time	[min]	70.0	180.0	70.0
Output heating water – temperature calculation	[°C]	35.03	54.97	34.97
Input heating water – temperature calculation	[°C]	30.03	47.55	29.99
Output heating water temperature	[°C]	35.03	54.97	34.97
Input heating water temperature	[°C]	30.03	47.55	29.99
Air temperature – dry bulb temperature	[°C]	7.00	7.00	1.98
Air temperature – wet bulb temperature	[°C]	6.01	6.01	0.99
Relative humidity	[%]	86.92	86.99	84.06
Barometric pressure	[kPa]	98.168	98.181	97.724
Ambient temperature	[°C]	7.00	7.00	1.98
Secondary circuit pressure difference	[kPa]	10.286	8.399	8.285
Efficiency of the secondary liquid pump	[–]	0.143	0.127	0.127
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.8286	0.5028	0.5140
Density of heating water	[$kg \cdot m^{-3}$]	994.1	986.4	994.2
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.179	4.175
Voltage	[V]	402.82	402.63	401.16
Total current	[A]	4.57	6.53	3.65
Overall power input	[kW]	0.963	1.419	0.737
Capacity correction of sec. liquid pump	[W]	14.222	8.043	8.100
Power input correction of sec. liquid pump	[W]	16.59	9.22	9.28
Heating capacity – heating water	[kW]	4.777	4.274	2.950
Corrected heating capacity – heating water	**[kW]**	**4.763**	**4.266**	**2.942**
Uncertainty of corrected heating capacity	[kW]	± 0.082	± 0.053	± 0.051
Effective electric power input	**[kW]**	**0.947**	**1.410**	**0.728**
COP	**[–]**	**5.031**	**3.026**	**4.042**
Uncertainty of COP	[–]	± 0.087	± 0.038	± 0.070
Control settings	**[rpm]**	**2900**	**2900**	**2100**
Circulation pump settings – heating water	[%]	35	28	28

*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:

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

Model	Heat pump **Airmax³ 7GT**
Design	Air / water – monobloc

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

Seasonal space heating energy efficiency	Heating	Average	**η_s / A**	**175.7**		%
		Warmer	η_s / W	**222.9**	(Not tested)	%
		Colder	η_s / C	**149.1**	(Not tested)	%
Seasonal efficiency according to ČSN EN 14825:2020	Heating	Average	**SCOP / A**	**4.47**		–
		Warmer	SCOP / W	**5.65**	(Not tested)	–
		Colder	SCOP / C	**3.80**	(Not tested)	–

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

Full heating load	Cooling		$P_{designc}$	–		kW
	Heating	Average	$P_{designh}$	5.02		kW
		Warmer	$P_{designh}$	4.68	(Not tested)	kW
		Colder	$P_{designh}$	5.81	(Not tested)	kW
Bivalent temperatures	Heating	Average	$T_{bivalent}$	-7		°C
		Warmer	$T_{bivalent}$	2		°C
		Colder	$T_{bivalent}$	-10		°C
Operation limit temperatures	Heating	Average	TOL	-10		°C
		Warmer	TOL	2		°C
		Colder	TOL	-20		°C
Seasonal power consumption according to ČSN EN 14825:2020	Cooling		Q_{CE}	–		kWh
	Heating	Average	Q_{HE}/A	2321		kWh
		Warmer	Q_{HE}/W	1108	(Not tested)	kWh
		Colder	Q_{HE}/C	3768	(Not tested)	kWh

Modes other than „active mode“	Off mode	P_{OFF}	16.5	W
	Thermostat off mode	P_{TO}	16.6	W
	Standby mode	P_{SB}	16.5	W
	Crankcase heater mode	P_{CK}	0.0	W

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

Calculation of SCOP according to ČSN EN 14825:2020:

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

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

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

Measured data:

P_{TO}	0.0166	[kW]
P_{SB}	0.0165	[kW]
P_{CK}	0.0000	[kW]
P_{OFF}	0.0165	[kW]
$P_{designh}$	5.02	[kW]
$SCOP_{ON}$	4.47	[–]

Coefficient and correction:

F(1)	3	[%]
F(2)	0	[%]
CC	2.5	[–]

Calculation of SCOP:

7.3 Calculation of the reference annual heating demand (Q_H)

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

$Q_H = 5.02 \cdot 2066 = 10371$ [kWh]

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

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

$Q_{HE} = 10371 / 4.47 + 178 \cdot 0.0166 + 0 \cdot 0.0165 + 178 \cdot 0 + 0 \cdot 0.0165 = 2321$ [kWh]

7.2 General formula for calculation of reference SCOP

$SCOP = Q_H / Q_{HE}$ [–]

$SCOP = 10371 / 2321 = 4.47$ [–]

7.1 Calculation of the seasonal space heating efficiency η_s

$\Sigma F(i) = F(1) + F(2)$ [–]

$\Sigma F = 0.03 + 0 = 0.03$ [–]

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

$\eta_s (A) = (1 / 2.5) \cdot 4.47 - 0.03 =$ **<u>1.757</u>** [–]

Test results for single part load conditions

Measurement results: Heat pump **Airmax³ 7GT**

Test number		**4**	**5**	**6**
Temperature level		Low temperature application (reference water temperature 35 °C)		
Reference heating season		„A“ = average ($T_{designh}$ = -10 °C)		
Assessment condition		**B**	**C**	**D**
Specification of the assessment condition*		**A2/W30**	**A7/W29.36**	**A12/W28**
Date of testing		**2021-12-16**	**2021-12-17**	**2021-12-16**
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]	29.93	29.33	27.90
Input heating water – temperature calculation	[°C]	25.05	24.33	22.90
Output heating water temperature	[°C]	29.93	29.33	27.90
Input heating water temperature	[°C]	25.05	24.33	22.90
Air temperature – dry bulb temperature	[°C]	1.99	6.99	12.00
Air temperature – wet bulb temperature	[°C]	1.01	6.01	11.01
Relative humidity	[%]	84.02	87.03	88.99
Barometric pressure	[kPa]	100.034	100.054	100.028
Ambient temperature	[°C]	1.99	6.99	12.00
Secondary circuit pressure difference	[kPa]	8.319	7.700	6.637
Efficiency of the secondary liquid pump	[–]	0.127	0.128	0.128
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.5012	0.5713	0.6683
Density of heating water	[$kg \cdot m^{-3}$]	995.7	995.8	996.2
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.176	4.176	4.177
Voltage	[V]	402.63	402.27	402.09
Total current	[A]	3.39	3.03	2.96
Overall power input	[kW]	0.648	0.589	0.564
Capacity correction of sec. liquid pump	[W]	7.953	8.331	8.389
Power input correction of sec. liquid pump	[W]	9.11	9.55	9.62
Heating capacity – heating water	[kW]	2.828	3.301	3.862
Corrected heating capacity – heating water	**[kW]**	**2.820**	**3.293**	**3.854**
Uncertainty of corrected heating capacity	[kW]	± 0.050	± 0.057	± 0.067
Effective electric power input	**[kW]**	**0.639**	**0.580**	**0.555**
COP	**[–]**	**4.411**	**5.678**	**6.948**
Uncertainty of COP	[–]	± 0.078	± 0.098	± 0.121
Control settings	**[rpm]**	**1900**	**1900**	**1900**
Circulation pump settings – heating water	[%]	28	28	28

* 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 **Airmax³ 7GT**

Test number		7	8
Temperature level		Low temperature application (reference water temperature 35 °C)	
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)	
Assessment condition		**TOL (E)**	**A, Tbiv (F)**
Specification of the assessment condition*		**A-10/W35**	**A-7/W34**
Date of testing		**2021-12-09**	**2021-12-09**
Transient test procedure	ANO / NE	NO	NO
Average defrost time of 1 cycle	[min]	–	–
Average time of 1 cycle	[min]	–	–
Calculation time	[min]	70.0	69.9
Output heating water – temperature calculation	[°C]	35.00	34.00
Input heating water – temperature calculation	[°C]	30.00	29.00
Output heating water temperature	[°C]	35.00	34.00
Input heating water temperature	[°C]	30.00	29.00
Air temperature – dry bulb temperature	[°C]	-10.01	-6.99
Air temperature – wet bulb temperature	[°C]	-10.85	-7.99
Relative humidity	[%]	74.69	75.04
Barometric pressure	[kPa]	97.355	97.381
Ambient temperature	[°C]	-10.01	-6.99
Secondary circuit pressure difference	[kPa]	10.729	9.787
Efficiency of the secondary liquid pump	[–]	0.139	0.139
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.6921	0.7733
Density of heating water	[$kg \cdot m^{-3}$]	994.1	994.4
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.175
Voltage	[V]	401.69	400.43
Total current	[A]	6.90	6.88
Overall power input	[kW]	1.456	1.447
Capacity correction of sec. liquid pump	[W]	12.800	12.996
Power input correction of sec. liquid pump	[W]	14.86	15.10
Heating capacity – heating water	[kW]	3.987	4.454
Corrected heating capacity – heating water	**[kW]**	**3.975**	**4.441**
Uncertainty of corrected heating capacity	[kW]	± 0.069	± 0.077
Effective electric power input	**[kW]**	**1.441**	**1.432**
COP	**[–]**	**2.758**	**3.101**
Uncertainty of COP	[–]	± 0.048	± 0.054
Control settings	**[rpm]**	**4000**	**4000**
Circulation pump settings – heating water	[%]	34	34

* 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 **Airmax³ 7GT**

Test number		9	10	11
Temperature level		Low temperature application (reference water temperature 35 °C)		
Reference heating season		„W“ = warmer (Tdesignh = 2 °C)	„C“ = colder (Tdesignh = -22 °C)	
Assessment condition		**B, TOL (E), Tbiv(F)**	**B**	**Tbiv (F)**
Specification of the assessment condition*		**A2/W35**	**A2/W28.24**	**A-10/W30.75**
Date of testing		**2021-12-17**	**2021-12-20**	**2021-12-19**
Transient test procedure	YES / NO	YES	NO	NO
Average defrost time of 1 cycle	[min]	5.7	–	–
Average time of 1 cycle	[min]	120.7	–	–
Calculation time	[min]	120.7	70.0	70.0
Output heating water – temperature calculation	[°C]	34.59	28.23	30.75
Input heating water – temperature calculation	[°C]	30.00	23.36	25.75
Output heating water temperature	[°C]	35.01	28.23	30.75
Input heating water temperature	[°C]	30.00	23.36	25.75
Air temperature – dry bulb temperature	[°C]	1.99	2.01	-10.00
Air temperature – wet bulb temperature	[°C]	1.01	1.02	-10.83
Relative humidity	[%]	84.01	83.97	74.67
Barometric pressure	[kPa]	100.042	98.992	98.698
Ambient temperature	[°C]	2.00	2.01	-10.00
Secondary circuit pressure difference	[kPa]	11.348	9.819	8.203
Efficiency of the secondary liquid pump	[–]	0.149	0.130	0.132
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.9143	0.5069	0.6913
Density of heating water	[$kg \cdot m^{-3}$]	994.2	996.1	995.4
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.177	4.176
Voltage	[V]	403.10	400.59	401.38
Total current	[A]	6.44	3.30	6.06
Overall power input	[kW]	1.386	0.619	1.289
Capacity correction of sec. liquid pump	[W]	15.322	9.253	10.315
Power input correction of sec. liquid pump	[W]	18.53	10.64	11.89
Heating capacity – heating water	[kW]	4.697	2.858	3.986
Corrected heating capacity – heating water	**[kW]**	**4.681**	**2.848**	**3.976**
Uncertainty of corrected heating capacity	[kW]	± 0.091	± 0.050	± 0.069
Effective electric power input	**[kW]**	**1.367**	**0.608**	**1.277**
COP	**[–]**	**3.424**	**4.685**	**3.114**
Uncertainty of COP	[–]	± 0.066	± 0.083	± 0.054
Control settings	**[rpm]**	**4000**	**1900**	**4000**
Circulation pump settings – heating water	[%]	35	30	30

* 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 **Airmax[3] 7GT**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A“ – average

	Outdoor heat exchanger / Outdoor air inlet	Indoor heat exchanger / Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPb in (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	34.00	88.46	4.44	4.441	3.101	0.900	1.00	3.101	–
B	2	30.00	53.85	2.70	2.820	4.411	0.900	1.00	4.411	–
C	7	29.36	34.62	1.74	3.293	5.678	0.971	0.53	5.536	0.0166
D	12	28.00	15.38	0.77	3.854	6.948	0.970	0.20	6.207	0.0166
TOL (E)	-10	35.00	100.00	5.02	3.975	2.758	0.900	1.00	2.758	–
Tbiv (F)	-7	34.00	88.46	4.44	4.441	3.101	0.900	1.00	3.101	–

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

General formulas and derivation:

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

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

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

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

For variable flow:

$\Delta t = 5$

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

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

Measured data:

$t_{outlet, average}$	24.00	[°C]
Declared capacity	3.854	[kW]
Declared capacity $_{standard rating condition A7/W35}$	–	[kW]
Part load	0.77	[kW]

Calculation of water temperature

$t_{outlet, capacity test, variable flow} = 24 + 5 - 0.77 / 3.854 \cdot 5 =$ **28.00** [°C]

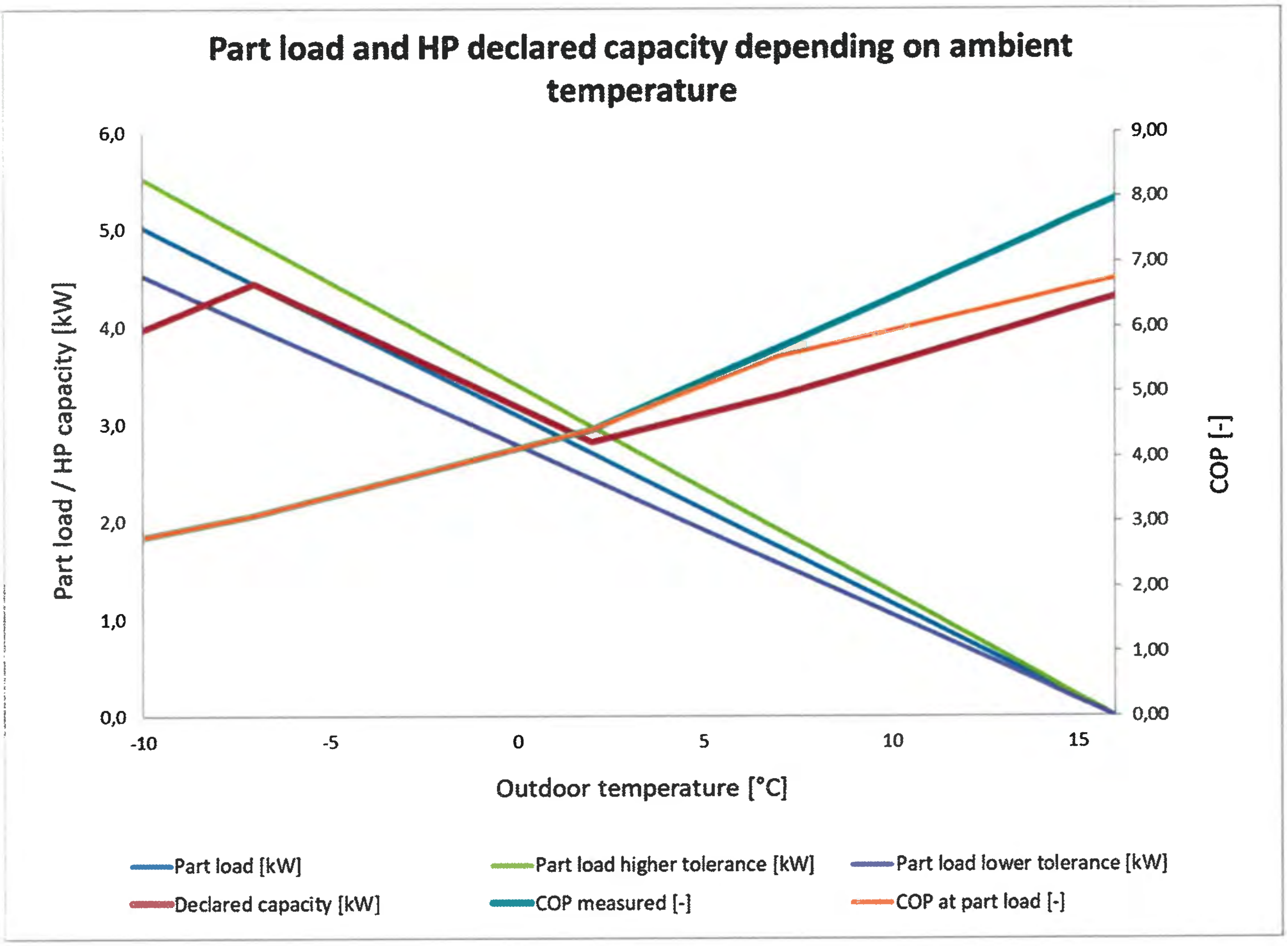
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax³ 7GT**)

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

	Bin j [–]	Outdoor temp. (dry bulb) Tj [°C]	Hours hj [h]	Part load ratio [%]	Heat load Ph(Tj) [kW]	Capacity of HP [kW]	Heat load covered by heat pump [kW]	Resistive heat elbu (Tj) elbu(Tj) [kW]	Annual resistive heat hj x elbu(Tj) [kWh]	COPbin (Tj) COPb in (Tj) [–]	Annual heating demand hj x P h(Tj) [kWh]	Annual power input including electric back up heating [kWh]	Net annual heating capacity hj × (P h(Tj) - elbu(Tj)) [kWh]	Net annual power input without electric back up heating [kWh]
TOL (E)	**21**	**-10**	**1**	**100.00**	**5.02**	**3.97**	**3.97**	**1.05**	**1.05**	**2.76**	**5**	**2**	**4**	**1**
	22	-9	25	96.15	4.83	4.13	4.13	0.70	17.42	2.87	121	53	103	36
	23	-8	23	92.31	4.63	4.29	4.29	0.35	8.01	2.99	107	41	99	33
A, Tbiv (F)	**24**	**-7**	**24**	**88.46**	**4.44**	**4.44**	**4.44**	**0.00**	**0.00**	**3.10**	**107**	**34**	**107**	**34**
	25	-6	27	84.62	4.25	4.26	4.25	0.00	0.00	3.25	115	35	115	35
	26	-5	68	80.77	4.05	4.08	4.05	0.00	0.00	3.39	276	81	276	81
	27	-4	91	76.92	3.86	3.90	3.86	0.00	0.00	3.54	351	99	351	99
	28	-3	89	73.08	3.67	3.72	3.67	0.00	0.00	3.68	326	89	326	89
	29	-2	165	69.23	3.48	3.54	3.48	0.00	0.00	3.83	573	150	573	150
	30	-1	173	65.38	3.28	3.36	3.28	0.00	0.00	3.97	568	143	568	143
	31	0	240	61.54	3.09	3.18	3.09	0.00	0.00	4.12	741	180	741	180
	32	1	280	57.69	2.90	3.00	2.90	0.00	0.00	4.27	811	190	811	190
B	**33**	**2**	**320**	**53.85**	**2.70**	**2.82**	**2.70**	**0.00**	**0.00**	**4.41**	**865**	**196**	**865**	**196**
	34	3	357	50.00	2.51	2.91	2.51	0.00	0.00	4.64	896	193	896	193
	35	4	356	46.15	2.32	3.01	2.32	0.00	0.00	4.86	825	170	825	170
	36	5	303	42.31	2.12	3.10	2.12	0.00	0.00	5.09	644	127	644	127
	37	6	330	38.46	1.93	3.20	1.93	0.00	0.00	5.31	637	120	637	120
C	**38**	**7**	**326**	**34.62**	**1.74**	**3.29**	**1.74**	**0.00**	**0.00**	**5.54**	**566**	**102**	**566**	**102**
	39	8	348	30.77	1.54	3.41	1.54	0.00	0.00	5.67	538	95	538	95
	40	9	335	26.92	1.35	3.52	1.35	0.00	0.00	5.80	453	78	453	78
	41	10	315	23.08	1.16	3.63	1.16	0.00	0.00	5.94	365	61	365	61
	42	11	215	19.23	0.97	3.74	0.97	0.00	0.00	6.07	208	34	208	34
D	**43**	**12**	**169**	**15.38**	**0.77**	**3.85**	**0.77**	**0.00**	**0.00**	**6.21**	**131**	**21**	**131**	**21**
	44	13	151	11.54	0.58	3.97	0.58	0.00	0.00	6.34	87	14	87	14
	45	14	105	7.69	0.39	4.08	0.39	0.00	0.00	6.48	41	6	41	6
	46	15	74	3.85	0.19	4.19	0.19	0.00	0.00	6.61	14	2	14	2
		Σ	4910							Σ	10370	2318	10343	2292

SCOPon	4.47	SCOPnet	4.51
		SCOP	**4.47**

Power diagram (Heat pump **Airmax³ 7GT**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average



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

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

Model	Heat pump **Airmax³ 7GT**
Design	Air / water – monobloc

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

Seasonal space heating energy efficiency	Heating	Average	**ηs / A**	**130.2**		%
		Warmer	ηs / W	**158.2**	(Not tested)	%
		Colder	ηs / C	**113.4**	(Not tested)	%
Seasonal efficiency according to ČSN EN 14825:2020	Heating	Average	**SCOP / A**	**3.33**		–
		Warmer	SCOP / W	**4.03**	(Not tested)	–
		Colder	SCOP / C	**2.91**	(Not tested)	–

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

Full heating load	Cooling		$P_{designc}$	–		kW
	Heating	Average	$P_{designh}$	4.69		kW
		Warmer	$P_{designh}$	4.41	(Not tested)	kW
		Colder	$P_{designh}$	4.72	(Not tested)	kW
Bivalent temperatures	Heating	Average	$T_{bivalent}$	-7		°C
		Warmer	$T_{bivalent}$	2		°C
		Colder	$T_{bivalent}$	-10		°C
Operation limit temperatures	Heating	Average	TOL	-10		°C
		Warmer	TOL	2		°C
		Colder	TOL	-20		°C
Seasonal power consumption according to ČSN EN 14825:2020	Cooling		Q_{CE}	–		kWh
	Heating	Average	Q_{HE}/A	2912		kWh
		Warmer	Q_{HE}/W	1463	(Not tested)	kWh
		Colder	Q_{HE}/C	4000	(Not tested)	kWh
Modes other than „active mode"	Off mode		P_{OFF}	16.5		W
	Thermostat off mode		P_{TO}	16.6		W
	Standby mode		P_{SB}	16.5		W
	Crankcase heater mode		P_{CK}	0.0		W

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

Calculation of SCOP according to ČSN EN 14825:2020:

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

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

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

Measured data:

P_{TO}	0.0166	[kW]
P_{SB}	0.0165	[kW]
P_{CK}	0.0000	[kW]
P_{OFF}	0.0165	[kW]
$P_{designh}$	4.69	[kW]
$SCOP_{ON}$	3.33	[–]

Coefficient and correction:

F(1)	3	[%]
F(2)	0	[%]
CC	2.5	[–]

Calculation of SCOP:

7.3 Calculation of the reference annual heating demand (Q_H)

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

$Q_H = 4.69 \cdot 2066 = 9698$ [kWh]

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

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

$Q_{HE} = 9698 / 3.33 + 178 \cdot 0.0166 + 0 \cdot 0.0165 + 178 \cdot 0 + 0 \cdot 0.0165 = 2912$ [kWh]

7.2 General formula for calculation of reference SCOP

$SCOP = Q_H / Q_{HE}$ [–]

$SCOP = 9698 / 2912 = 3.33$ [–]

7.1 Calculation of the seasonal space heating efficiency η_s

$\Sigma F(i) = F(1) + F(2)$ [–]

$\Sigma F = 0.03 + 0 = 0.03$ [–]

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

$\eta_s (A) = (1 / 2.5) \cdot 3.33 – 0.03 =$ **1.302** [–]

Test results for single part load conditions

Measurement results:

Heat pump **Airmax³ 7GT**

Test number		12	13	14
Temperature level		Medium temperature application (reference water temperature 55 °C)		
Reference heating season		„A“ = average ($T_{designh}$ = -10 °C)		
Assessment condition		**B**	**C**	**D**
Specification of the assessment condition*		**A2/W42**	**A7/W39.87**	**A12/W36.45**
Date of testing		**2021-12-15**	**2021-12-20**	**2021-12-15**
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	60.0
Output heating water – temperature calculation	[°C]	41.93	39.79	36.49
Input heating water – temperature calculation	[°C]	37.35	34.34	30.07
Output heating water temperature	[°C]	41.93	39.79	36.49
Input heating water temperature	[°C]	37.35	34.34	30.07
Air temperature – dry bulb temperature	[°C]	2.00	7.00	12.01
Air temperature – wet bulb temperature	[°C]	1.02	6.01	11.01
Relative humidity	[%]	84.04	86.97	88.98
Barometric pressure	[kPa]	99.966	99.174	100.001
Ambient temperature	[°C]	2.00	7.00	12.01
Secondary circuit pressure difference	[kPa]	8.338	9.902	8.342
Efficiency of the secondary liquid pump	[–]	0.127	0.130	0.127
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.5041	0.5031	0.5032
Density of heating water	[$kg \cdot m^{-3}$]	991.8	992.5	993.6
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.175	4.175	4.175
Voltage	[V]	403.07	401.07	403.06
Total current	[A]	4.07	3.72	3.43
Overall power input	[kW]	0.822	0.751	0.686
Capacity correction of sec. liquid pump	[W]	8.010	9.259	8.001
Power input correction of sec. liquid pump	[W]	9.18	10.64	9.17
Heating capacity – heating water	[kW]	2.655	3.155	3.726
Corrected heating capacity – heating water	**[kW]**	**2.647**	**3.146**	**3.718**
Uncertainty of corrected heating capacity	[kW]	± 0.050	± 0.050	± 0.051
Effective electric power input	**[kW]**	**0.813**	**0.740**	**0.676**
COP	**[–]**	**3.255**	**4.251**	**5.497**
Uncertainty of COP	[–]	± 0.061	± 0.068	± 0.075
Control settings	**[rpm]**	**1900**	**1900**	**1900**
Circulation pump settings – heating water	[%]	28	30	28

* 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 **Airmax³ 7GT**

Test number		**15**	**16**
Temperature level		Medium temperature application (reference water temperature 55 °C)	
Reference heating season		„A“ = average ($T_{designh}$ = -10 °C	
Assessment condition		**TOL (E)**	**A, Tbiv (F)**
Specification of the assessment condition*		**A-10/W55**	**A-7/W52**
Date of testing		**2021-12-09**	**2021-12-08**
Transient test procedure	ANO / NE	NO	NO
Average defrost time of 1 cycle	[min]	–	–
Average time of 1 cycle	[min]	–	–
Calculation time	[min]	70.0	70.0
Output heating water – temperature calculation	[°C]	55.00	52.03
Input heating water – temperature calculation	[°C]	48.51	44.82
Output heating water temperature	[°C]	55.00	52.03
Input heating water temperature	[°C]	48.51	44.82
Air temperature – dry bulb temperature	[°C]	-10.10	-7.01
Air temperature – wet bulb temperature	[°C]	-10.88	-7.96
Relative humidity	[%]	76.47	76.54
Barometric pressure	[kPa]	97.436	97.386
Ambient temperature	[°C]	-10.10	-7.01
Secondary circuit pressure difference	[kPa]	8.474	8.363
Efficiency of the secondary liquid pump	[–]	0.127	0.127
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.4995	0.5035
Density of heating water	[$kg \cdot m^{-3}$]	986.5	987.8
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.179	4.178
Voltage	[V]	401.07	401.52
Total current	[A]	8.96	8.61
Overall power input	[kW]	1.923	1.854
Capacity correction of sec. liquid pump	[W]	8.059	8.023
Power input correction of sec. liquid pump	[W]	9.24	9.19
Heating capacity – heating water	[kW]	3.716	4.161
Corrected heating capacity – heating water	**[kW]**	**3.708**	**4.153**
Uncertainty of corrected heating capacity	[kW]	± 0.050	± 0.051
Effective electric power input	**[kW]**	**1.914**	**1.845**
COP	**[–]**	**1.937**	**2.251**
Uncertainty of COP	[–]	± 0.026	± 0.027
Control settings	**[rpm]**	**4000**	**4000**
Circulation pump settings – heating water	[%]	28	28

* 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 **Airmax³ 7GT**

Test number		**17**	**18**	**19**
Temperature level		Medium temperature application (reference water temperature 55 °C)		
Reference heating season		„W“ = warmer (Tdesignh = 2 °C)	„C“ = colder (Tdesignh = -22 °C)	
Assessment condition		**B, TOL(E), Tbiv(F)**	**B**	**Tbiv (F)**
Specification of the assessment condition*		**A2/W55**	**A2/W39.83**	**A-10/W45.88**
Date of testing		**2021-12-17**	**2021-12-20**	**2021-12-20**
Transient test procedure	YES / NO	YES	NO	YES
Average defrost time of 1 cycle	[min]	5.5	–	–
Average time of 1 cycle	[min]	131.6	–	–
Calculation time	[min]	131.6	70.0	180.0
Output heating water – temperature calculation	[°C]	54.30	39.73	45.65
Input heating water – temperature calculation	[°C]	47.00	35.06	40.01
Output heating water temperature	[°C]	54.93	39.73	45.65
Input heating water temperature	[°C]	47.01	35.06	40.01
Air temperature – dry bulb temperature	[°C]	2.00	2.02	-10.00
Air temperature – wet bulb temperature	[°C]	1.02	1.03	-10.88
Relative humidity	[%]	83.95	83.92	73.62
Barometric pressure	[kPa]	100.089	98.913	98.851
Ambient temperature	[°C]	2.01	2.02	-10.00
Secondary circuit pressure difference	[kPa]	11.331	9.875	9.945
Efficiency of the secondary liquid pump	[–]	0.135	0.130	0.130
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.5586	0.5024	0.4996
Density of heating water	[$kg \cdot m^{-3}$]	986.8	992.6	990.4
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.178	4.175	4.176
Voltage	[V]	402.86	402.83	402.32
Total current	[A]	8.61	3.94	7.23
Overall power input	[kW]	1.874	0.788	1.567
Capacity correction of sec. liquid pump	[W]	10.697	9.227	9.239
Power input correction of sec. liquid pump	[W]	12.78	10.61	10.62
Heating capacity – heating water	[kW]	4.423	2.703	3.241
Corrected heating capacity – heating water	**[kW]**	**4.412**	**2.694**	**3.231**
Uncertainty of corrected heating capacity	[kW]	± 0.056	± 0.050	± 0.050
Effective electric power input	**[kW]**	**1.861**	**0.778**	**1.556**
COP	**[–]**	**2.370**	**3.463**	**2.077**
Uncertainty of COP	[–]	± 0.030	± 0.064	± 0.032
Control settings	**[rpm]**	**4000**	**1900**	**4000**
Circulation pump settings – heating water	[%]	30	30	30

* 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 **Airmax³ 7GT**)

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

	Outdoor heat exchanger / Outdoor air inlet	Indoor heat exchanger / Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPb in (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	52.00	88.46	4.15	4.153	2.251	0.900	1.00	2.251	–
B	2	42.00	53.85	2.53	2.647	3.255	0.900	1.00	3.255	–
C	7	39.87	34.62	1.62	3.146	4.251	0.978	0.52	4.163	0.0166
D	12	36.45	15.38	0.72	3.718	5.497	0.975	0.19	4.989	0.0166
TOL (E)	-10	55.00	100.00	4.69	3.708	1.937	0.900	1.00	1.937	–
Tbiv (F)	-7	52.00	88.46	4.15	4.153	2.251	0.900	1.00	2.251	–

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:

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

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

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

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

For variable flow:

$\Delta t = 8$

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

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

Measured data:

$t_{outlet, average}$	30,00	[°C]
Declared capacity	3.718	[kW]
Declared capacity $_{standard rating condition A7/W55}$	–	[kW]
Part load	0.72	[kW]

Calculation of water temperature

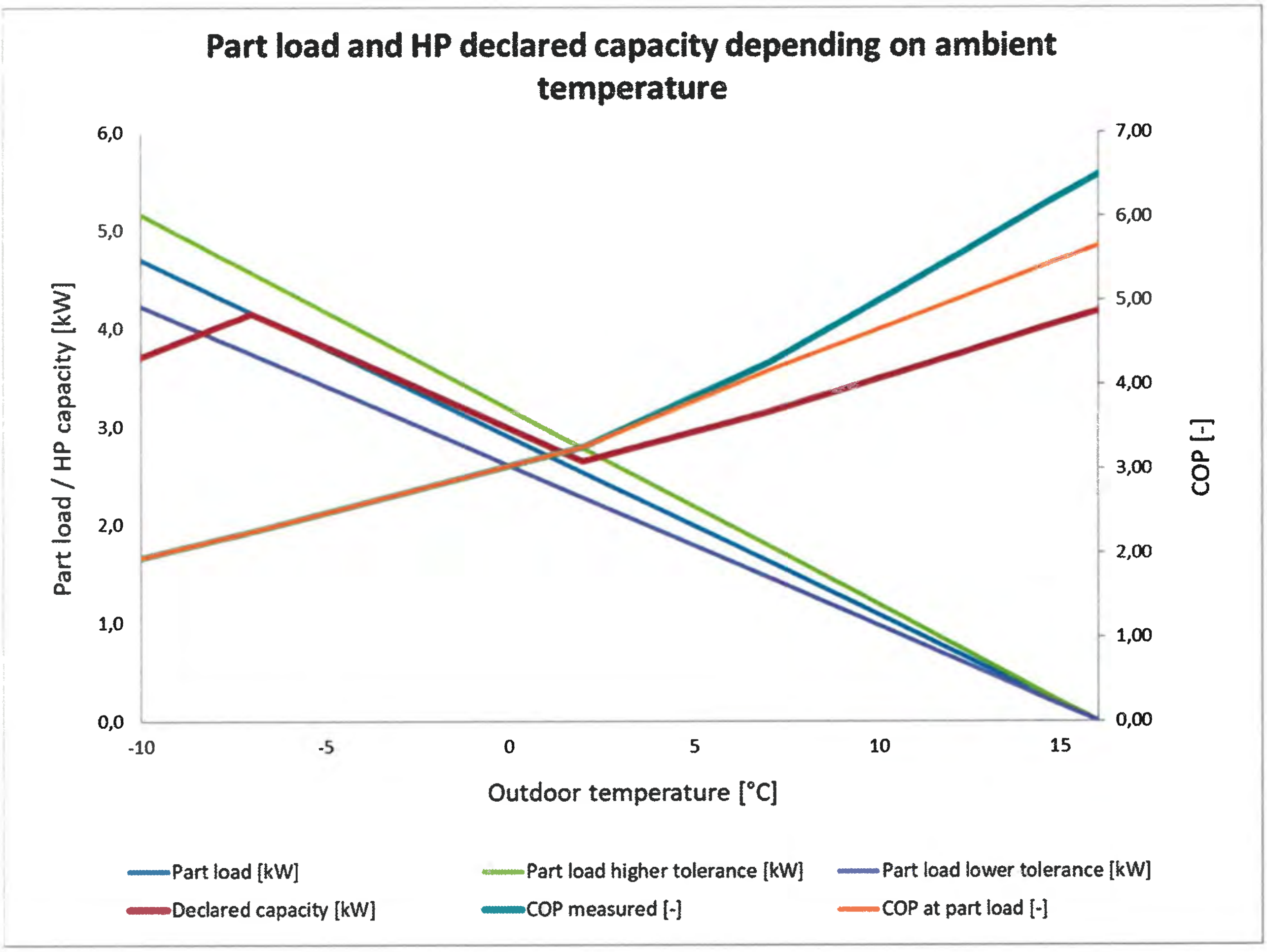
$t_{outlet, capacity test, variable flow}$ = 30 + 8 – 0.72 / 3.718 · 8 = **36.45** [°C]

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax³ 7GT**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A“ – average

	Bin j [–]	Outdoor temp. (dry bulb) Tj [°C]	Hours hj [h]	Part load ratio [%]	Heat load Ph(Tj) [kW]	Capacity of HP [kW]	Heat load covered by heat pump [kW]	Resistive heat elbu (Tj) elbu(Tj) [kW]	Annual resistive heat hj x elbu(Tj) [kWh]	COPbin (Tj) COPb in (Tj) [–]	Annual heating demand hj x P h(Tj) [kWh]	Annual power input including electric back up heating [kWh]	Net annual heating capacity hj × (P h(Tj) - elbu(Tj)) [kWh]	Net annual power input without electric back up heating [kWh]
TOL (E)	**21**	**-10**	**1**	**100.00**	**4.69**	**3.71**	**3.71**	**0.99**	**0.99**	**1.94**	**5**	**3**	**4**	**2**
	22	-9	25	96.15	4.51	3.86	3.86	0.66	16.44	2.04	113	64	96	47
	23	-8	23	92.31	4.33	4.00	4.00	0.33	7.56	2.15	100	50	92	43
A. Tbiv (F)	**24**	**-7**	**24**	**88.46**	**4.15**	**4.15**	**4.15**	**0.00**	**0.00**	**2.25**	**100**	**44**	**100**	**44**
	25	-6	27	84.62	3.97	3.99	3.97	0.00	0.00	2.36	107	45	107	45
	26	-5	68	80.77	3.79	3.82	3.79	0.00	0.00	2.47	258	104	258	104
	27	-4	91	76.92	3.61	3.65	3.61	0.00	0.00	2.59	329	127	329	127
	28	-3	89	73.08	3.43	3.48	3.43	0.00	0.00	2.70	305	113	305	113
	29	-2	165	69.23	3.25	3.32	3.25	0.00	0.00	2.81	536	191	536	191
	30	-1	173	65.38	3.07	3.15	3.07	0.00	0.00	2.92	531	182	531	182
	31	0	240	61.54	2.89	2.98	2.89	0.00	0.00	3.03	693	229	693	229
	32	1	280	57.69	2.71	2.81	2.71	0.00	0.00	3.14	758	241	758	241
B	**33**	**2**	**320**	**53.85**	**2.53**	**2.65**	**2.53**	**0.00**	**0.00**	**3.25**	**809**	**249**	**809**	**249**
	34	3	357	50.00	2.35	2.75	2.35	0.00	0.00	3.44	838	244	838	244
	35	4	356	46.15	2.17	2.85	2.17	0.00	0.00	3.62	771	213	771	213
	36	5	303	42.31	1.99	2.95	1.99	0.00	0.00	3.80	602	158	602	158
	37	6	330	38.46	1.81	3.05	1.81	0.00	0.00	3.98	596	150	596	150
C	**38**	**7**	**326**	**34.62**	**1.62**	**3.15**	**1.62**	**0.00**	**0.00**	**4.16**	**530**	**127**	**530**	**127**
	39	8	348	30.77	1.44	3.26	1.44	0.00	0.00	4.33	503	116	503	116
	40	9	335	26.92	1.26	3.37	1.26	0.00	0.00	4.49	423	94	423	94
	41	10	315	23.08	1.08	3.49	1.08	0.00	0.00	4.66	341	73	341	73
	42	11	215	19.23	0.90	3.60	0.90	0.00	0.00	4.82	194	40	194	40
D	**43**	**12**	**169**	**15.38**	**0.72**	**3.72**	**0.72**	**0.00**	**0.00**	**4.99**	**122**	**24**	**122**	**24**
	44	13	151	11.54	0.54	3.83	0.54	0.00	0.00	5.15	82	16	82	16
	45	14	105	7.69	0.36	3.95	0.36	0.00	0.00	5.32	38	7	38	7
	46	15	74	3.85	0.18	4.06	0.18	0.00	0.00	5.48	13	2	13	2
		Σ	4910							Σ	9697	2908	9672	2883

SCOPon	3.33	SCOPnet	3.35
		SCOP	**3.33**

Power diagram (Heat pump **Airmax³ 7GT**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A" – average

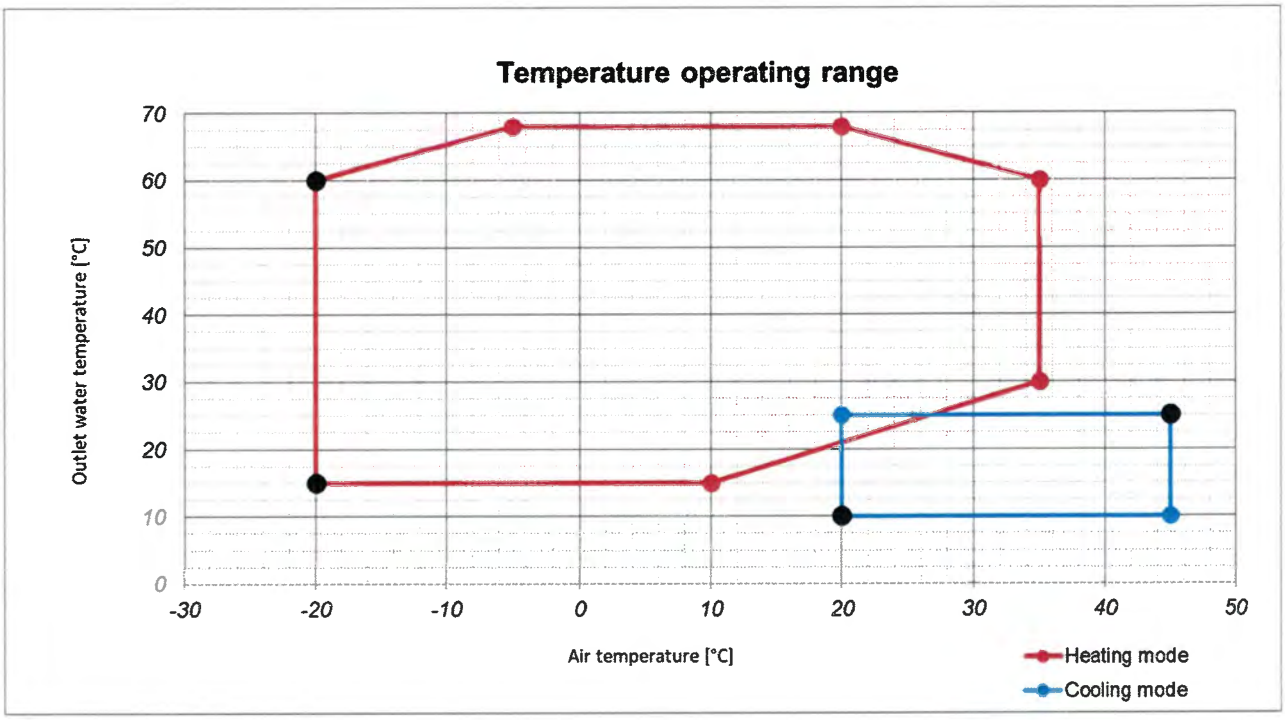


Accredited test number: **T 037*** Test title: **Tests of leakage, pressure resistance, thermal and technical parameters, combustion efficiency, safety functions**

Testing method	ČSN EN 14511-4:2019
Sample tested	Heat pump **Airmax³ 7GT**
Measuring equipment used	See page 6

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

1) Temperature operating range



Test point	Inlet air dry bulb temperature [°C]		Outlet heating water temperature [°C]		Water flow rate in condenser [m³/h]	Note
Heating mode						
1.	A	-20	W	15	Minimum	Minimum water flow rate: **0.500 m³·h⁻¹** Maximum water flow rate: **2.500 m³·h⁻¹**
2.	A	-20	W	60	Minimum	
Cooling mode						
1.	A	20	W	10	Minimum	Minimum starting water flow rate: **0.500 m³·h⁻¹** Maximum water flow rate: **2.500 m³·h⁻¹**
2.	A	45	W	25	Maximum	

Heat pump **Airmax³ 7GT** is fully operational in the temperature operating range.

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

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

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

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

Operational requirements conditions for air-to-water units					
Test point	**Inlet temperature at outdoor heat exchanger (°C)**	**Inlet temperature at indoor heat exchanger (°C)**	**Water flow rate at indoor heat exchanger**	**Voltage (V)**	**Test result**
1 (starting)	Lower limit of use	Lower limit of use	minimum	Rated voltage	+
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	+	Error flow too low
Test for section a) Art. 4.5 ČSN EN 14511-4:2019 – cooling	+	Error flow too low
Test for section b) Art. 4.5 ČSN EN 14511-4:2019 – heating	+	Reduced heating capacity
Test for section b) Art. 4.5 ČSN EN 14511-4:2019 – cooling	+	Compressor alarm, high pressure switch alarm
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	x	–

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.

IV. 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 **Airmax³ 7GT**

Data for SCOP calculation (Heat pump **Airmax3 7GT**)
- 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]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	–	–	–	–	–	–	–	–	–	–
B	2	35.00	100.00	4.68	4.681	3.424	0.900	1.00	3.424	–
C	7	31.00	64.29	3.01	3.220	5.400	0.900	1.00	5.400	–
D	12	29.22	28.57	1.34	3.750	6.800	0.970	0.36	6.450	0.0166
TOL (E)	2	35.00	100.00	4.68	4.681	3.424	0.900	1.00	3.424	–
Tbiv (F)	2	35.00	100.00	4.68	4.681	3.424	0.900	1.00	3.424	–

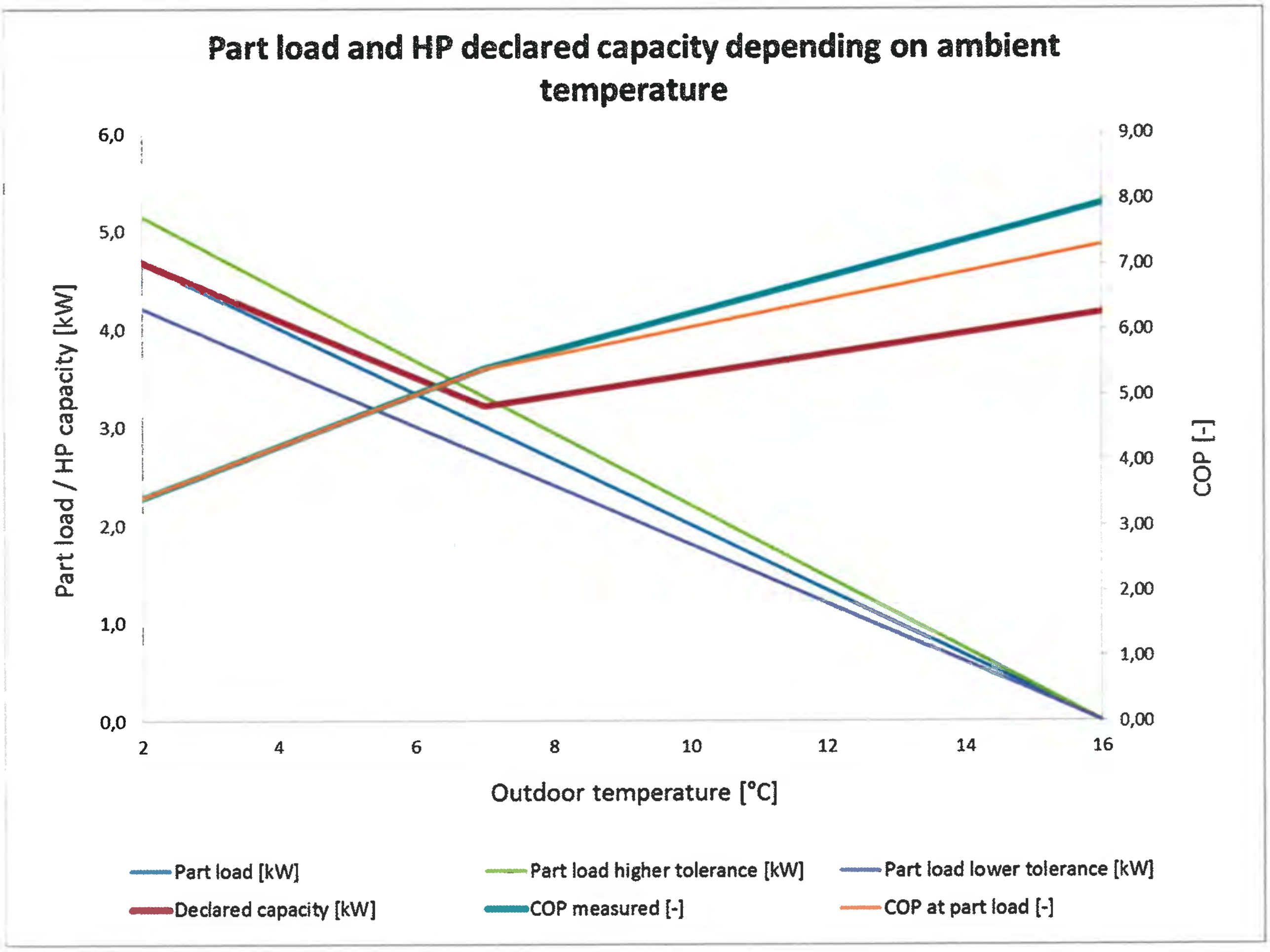
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax3 7GT**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „W" – warmer

	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	T_j	h_j		$P_{h(Tj)}$			$elbu_{(Tj)}$	h_j x $elbu_{(Tj)}$	COPbin (Tj)	h_j x $P_{h(Tj)}$		$h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
B, TOL (E), Tbiv (F)	**33**	**2**	**3**	**100.00**	**4.68**	**4.68**	**4.68**	**0.00**	**0.00**	**3.42**	**14**	**4**	**14**	**4**
	34	3	22	92.86	4.35	4.39	4.35	0.00	0.00	3.82	96	25	96	25
	35	4	63	85.71	4.01	4.10	4.01	0.00	0.00	4.21	253	60	253	60

	36	5	63	78.57	3.68	3.80	3.68	0.00	0.00	4.61	232	50	232	50
	37	6	175	71.43	3.34	3.51	3.34	0.00	0.00	5.00	585	117	585	117
C	**38**	**7**	**162**	**64.29**	**3.01**	**3.22**	**3.01**	**0.00**	**0.00**	**5.40**	**488**	**90**	**488**	**90**
	39	8	259	57.14	2.68	3.33	2.68	0.00	0.00	5.61	693	124	693	124
	40	9	360	50.00	2.34	3.43	2.34	0.00	0.00	5.82	843	145	843	145
	41	10	428	42.86	2.01	3.54	2.01	0.00	0.00	6.03	859	142	859	142
	42	11	430	35.71	1.67	3.64	1.67	0.00	0.00	6.24	719	115	719	115
D	**43**	**12**	**503**	**28.57**	**1.34**	**3.75**	**1.34**	**0.00**	**0.00**	**6.45**	**673**	**104**	**673**	**104**
	44	13	444	21.43	1.00	3.86	1.00	0.00	0.00	6.66	445	67	445	67
	45	14	384	14.29	0.67	3.96	0.67	0.00	0.00	6.87	257	37	257	37
	46	15	294	7.14	0.33	4.07	0.33	0.00	0.00	7.08	98	14	98	14
		Σ	3590							Σ	6253	1095	6253	1095

SCOPon	5.71	SCOPnet	5.71
		SCOP	**5.65**

Power diagram (Heat pump **Airmax³ 7GT**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „W“ – warmer



Data for SCOP calculation (Heat pump **Airmax³ 7GT**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C" – colder

	Outdoor heat exchanger: Outdoor air inlet	Indoor heat exchanger: Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	30.00	60.53	3.52	3.510	3.490	0.900	1.00	3.490	–
B	2	28.33	36.84	2.14	2.920	4.685	0.973	0.73	4.640	0.0166
C	7	28.16	23.68	1.38	3.730	5.980	0.973	0.37	5.720	0.0166
D	12	28.21	10.53	0.61	3.850	6.945	0.970	0.16	5.995	0.0166
TOL (E)	-20	34.14	94.74	5.51	2.920	2.580	0.900	1.00	2.580	–
Tbiv (F)	-10	30.75	68.42	3.98	3.976	3.114	0.900	1.00	3.114	–
G	-15	32.00	81.58	4.74	3.448	2.847	0.900	1.00	2.847	–

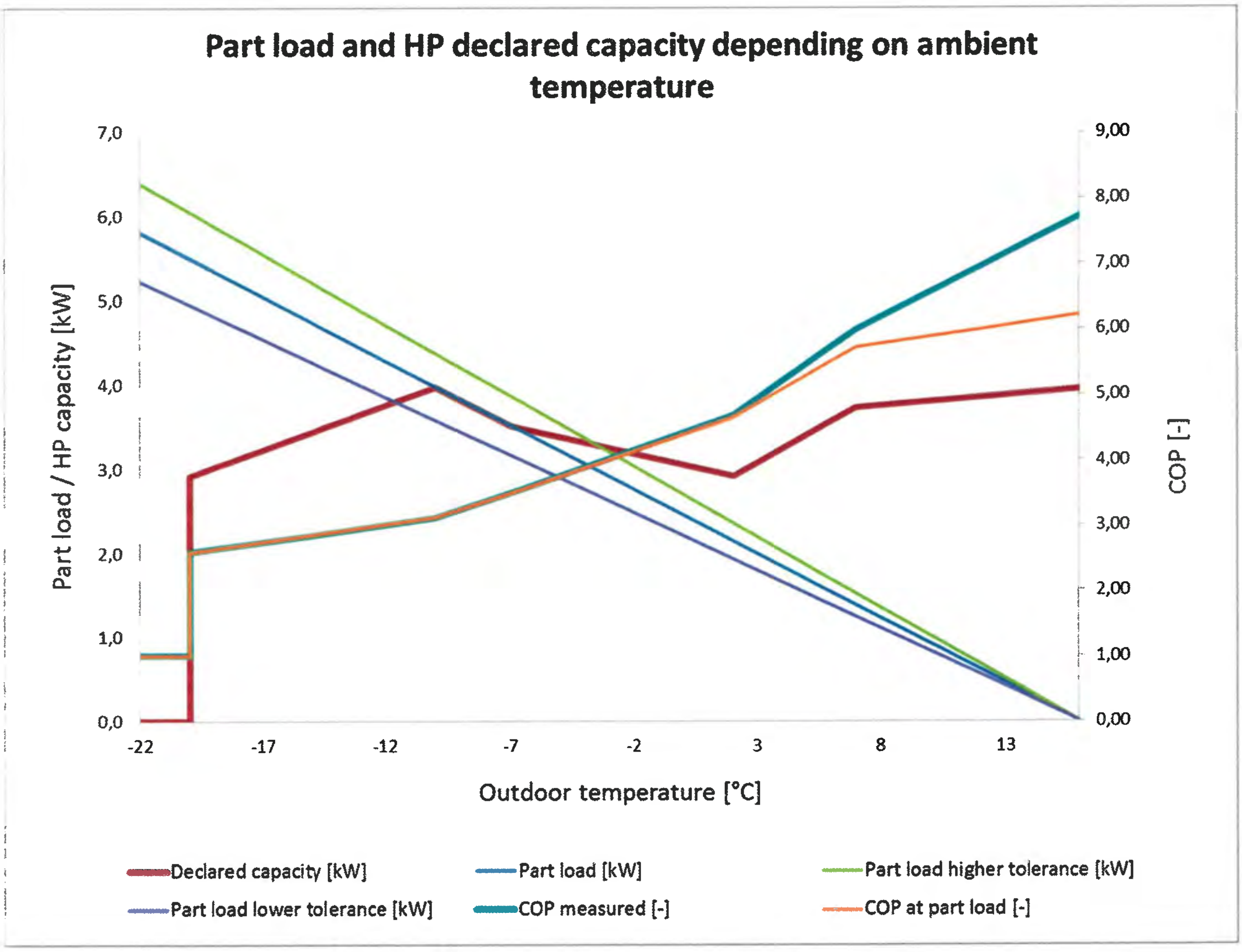
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax³ 7GT**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C" – colder

	Bin j	Outdoor temp. (dry bulb) T_j	Hours h_j	Part load ratio	Heat load $P_{h(Tj)}$	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj) $elbu_{(Tj)}$	Annual resistive heat h_j x $elbu_{(Tj)}$	COPbin (Tj) COP bin (Tj)	Annual heating demand h_j x $P_{h(Tj)}$	Annual power input including electric back up heating	Net annual heating capacity h_j × ($P_{h(Tj)}$ - $elbu_{(Tj)}$)	Net annual power input without electric back up heating
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
	9	-22	1	100.00	5.81	0.00	0.00	5.81	5.81	1.00	6	6	0	0
	10	-21	6	97.37	5.66	0.00	0.00	5.66	33.95	1.00	34	34	0	0
TOL (E)	**11**	**-20**	**13**	**94.74**	**5.51**	**2.92**	**2.92**	**2.59**	**33.61**	**2.58**	**72**	**48**	**38**	**15**
	12	-19	17	92.11	5.35	3.03	3.03	2.33	39.55	2.63	91	59	51	20
	13	-18	19	89.47	5.20	3.13	3.13	2.07	39.30	2.69	99	61	59	22
	14	-17	26	86.84	5.05	3.24	3.24	1.81	47.05	2.74	131	78	84	31
	15	-16	39	84.21	4.89	3.34	3.34	1.55	60.49	2.79	191	107	130	47
G	**16**	**-15**	**41**	**81.58**	**4.74**	**3.45**	**3.45**	**1.29**	**53.00**	**2.85**	**194**	**103**	**141**	**50**
	17	-14	35	78.95	4.59	3.55	3.55	1.03	36.19	2.90	161	79	124	43
	18	-13	52	76.32	4.43	3.66	3.66	0.78	40.33	2.95	231	105	190	64
	19	-12	37	73.68	4.28	3.76	3.76	0.52	19.13	3.01	158	65	139	46
	20	-11	41	71.05	4.13	3.87	3.87	0.26	10.60	3.06	169	62	159	52
Tbiv (F)	**21**	**-10**	**43**	**68.42**	**3.98**	**3.98**	**3.98**	**0.00**	**0.00**	**3.11**	**171**	**55**	**171**	**55**

	22	-9	54	65.79	3.82	3.82	3.82	0.00	0.00	3.24	206	64	206	64
	23	-8	90	63.16	3.67	3.67	3.67	0.00	0.00	3.36	330	98	330	98
A	**24**	**-7**	**125**	**60.53**	**3.52**	**3.51**	**3.51**	**0.00**	**0.00**	**3.49**	**440**	**126**	**440**	**126**
	25	-6	169	57.89	3.36	3.44	3.36	0.00	0.00	3.62	569	157	569	157
	26	-5	195	55.26	3.21	3.38	3.21	0.00	0.00	3.75	626	167	626	167
	27	-4	278	52.63	3.06	3.31	3.06	0.00	0.00	3.87	850	220	850	220
	28	-3	306	50.00	2.91	3.25	2.91	0.00	0.00	4.00	889	222	889	222
	29	-2	454	47.37	2.75	3.18	2.75	0.00	0.00	4.13	1250	303	1250	303
	30	-1	385	44.74	2.60	3.12	2.60	0.00	0.00	4.26	1001	235	1001	235
	31	0	490	42.11	2.45	3.05	2.45	0.00	0.00	4.38	1199	273	1199	273
	32	1	533	39.47	2.29	2.99	2.29	0.00	0.00	4.51	1223	271	1223	271
B	**33**	**2**	**380**	**36.84**	**2.14**	**2.92**	**2.14**	**0.00**	**0.00**	**4.64**	**814**	**175**	**814**	**175**
	34	3	228	34.21	1.99	3.08	1.99	0.00	0.00	4.86	453	93	453	93
	35	4	261	31.58	1.84	3.24	1.84	0.00	0.00	5.07	479	94	479	94
	36	5	279	28.95	1.68	3.41	1.68	0.00	0.00	5.29	469	89	469	89
	37	6	229	26.32	1.53	3.57	1.53	0.00	0.00	5.50	350	64	350	64
C	**38**	**7**	**269**	**23.68**	**1.38**	**3.73**	**1.38**	**0.00**	**0.00**	**5.72**	**370**	**65**	**370**	**65**
	39	8	233	21.05	1.22	3.75	1.22	0.00	0.00	5.77	285	49	285	49
	40	9	230	18.42	1.07	3.78	1.07	0.00	0.00	5.83	246	42	246	42
	41	10	243	15.79	0.92	3.80	0.92	0.00	0.00	5.88	223	38	223	38
	42	11	191	13.16	0.76	3.83	0.76	0.00	0.00	5.94	146	25	146	25
D	**43**	**12**	**146**	**10.53**	**0.61**	**3.85**	**0.61**	**0.00**	**0.00**	**5.99**	**89**	**15**	**89**	**15**
	44	13	150	7.89	0.46	3.87	0.46	0.00	0.00	6.05	69	11	69	11
	45	14	97	5.26	0.31	3.90	0.31	0.00	0.00	6.10	30	5	30	5
	46	15	61	2.63	0.15	3.92	0.15	0.00	0.00	6.16	9	2	9	2
		Σ	6446							Σ	14323	3766	13904	3347

SCOPon	3.80	SCOPnet	4.15
		SCOP	**3.80**

Power diagram (Heat pump **Airmax^3 7GT**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C“ – colder



Data for SCOP calculation (Heat pump **Airmax³ 7GT**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „W“ – warmer

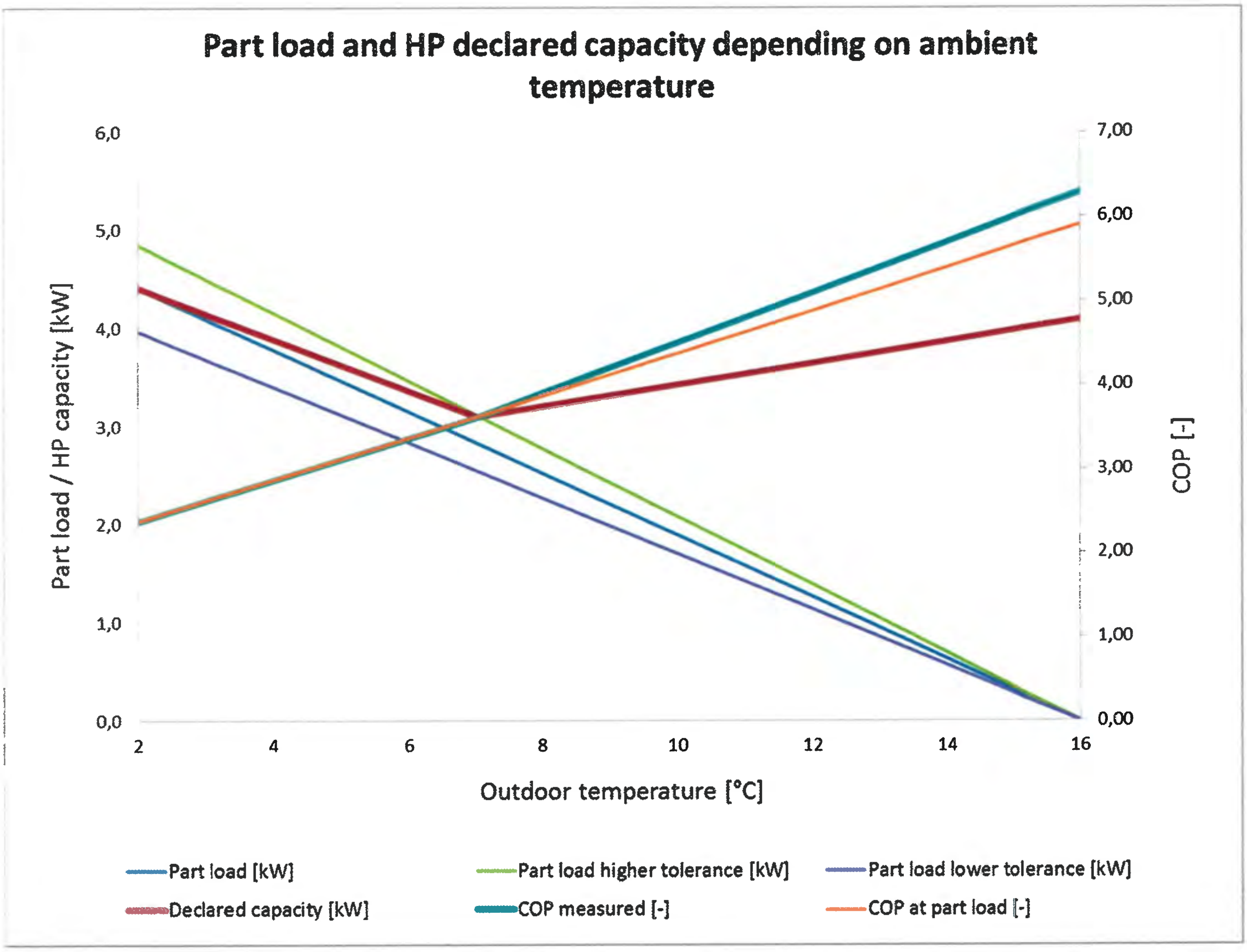
	Outdoor heat exchanger / Outdoor air inlet	Indoor heat exchanger / Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	–	–	–	–	–	–	–	–	–	–
B	2	55.00	100.00	4.41	4.412	2.370	0.900	1.00	2.370	–
C	7	46.00	64.29	2.84	3.100	3.610	0.900	1.00	3.610	–
D	12	39.24	28.57	1.26	3.650	5.100	0.977	0.35	4.885	0.0166
TOL (E)	2	55.00	100.00	4.41	4.412	2.370	0.900	1.00	2.370	–
Tbiv (F)	2	55.00	100.00	4.41	4.412	2.370	0.900	1.00	2.370	–

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax³ 7GT**)
- 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	T_j	h_j		$P_{h(Tj)}$			$elbu_{(Tj)}$	$h_j \times elbu_{(Tj)}$	COPbin (Tj)	$h_j \times P_{h(Tj)}$		$h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
B, TOL (E), Tbiv (F)	**33**	**2**	**3**	**100.00**	**4.41**	**4.41**	**4.41**	**0.00**	**0.00**	**2.37**	**13**	**6**	**13**	**6**
	34	3	22	92.86	4.10	4.15	4.10	0.00	0.00	2.62	90	34	90	34
	35	4	63	85.71	3.78	3.89	3.78	0.00	0.00	2.87	238	83	238	83
	36	5	63	78.57	3.47	3.62	3.47	0.00	0.00	3.11	218	70	218	70
	37	6	175	71.43	3.15	3.36	3.15	0.00	0.00	3.36	552	164	552	164
C	**38**	**7**	**162**	**64.29**	**2.84**	**3.10**	**2.84**	**0.00**	**0.00**	**3.61**	**459**	**127**	**459**	**127**
	39	8	259	57.14	2.52	3.21	2.52	0.00	0.00	3.87	653	169	653	169
	40	9	360	50.00	2.21	3.32	2.21	0.00	0.00	4.12	794	193	794	193
	41	10	428	42.86	1.89	3.43	1.89	0.00	0.00	4.38	809	185	809	185
	42	11	430	35.71	1.58	3.54	1.58	0.00	0.00	4.63	678	146	678	146
D	**43**	**12**	**503**	**28.57**	**1.26**	**3.65**	**1.26**	**0.00**	**0.00**	**4.89**	**634**	**130**	**634**	**130**
	44	13	444	21.43	0.95	3.76	0.95	0.00	0.00	5.14	420	82	420	82
	45	14	384	14.29	0.63	3.87	0.63	0.00	0.00	5.40	242	45	242	45

	46	15	294	7.14	0.32	3.98	0.32	0.00	0.00	5.65	93	16	93	16
		Σ	3590							Σ	5894	1450	5894	1450
											SCOPon	4.06	SCOPnet	4.06
													SCOP	**4.03**

Power diagram (Heat pump **Airmax³ 7GT**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „W“ – warmer



Data for SCOP calculation (Heat pump **Airmax³ 7GT**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C“ – colder

	Outdoor heat exchanger – Outdoor air inlet	Indoor heat exchanger – Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	44.00	60.53	2.86	2.850	2.770	0.900	1.00	2.770	–
B	2	39.83	36.84	1.74	2.694	3.463	0.979	0.65	3.423	0.0166
C	7	37.46	23.68	1.12	3.530	4.880	0.977	0.32	4.650	0.0166
D	12	34.98	10.53	0.50	3.910	5.600	0.976	0.13	4.814	0.0166
TOL (E)	-20	53.29	94.74	4.47	2.330	1.500	0.900	1.00	1.500	–
Tbiv (F)	-10	45.88	68.42	3.23	3.231	2.077	0.900	1.00	2.077	–
G	-15	49.00	81.58	3.85	2.781	1.788	0.900	1.00	1.788	–

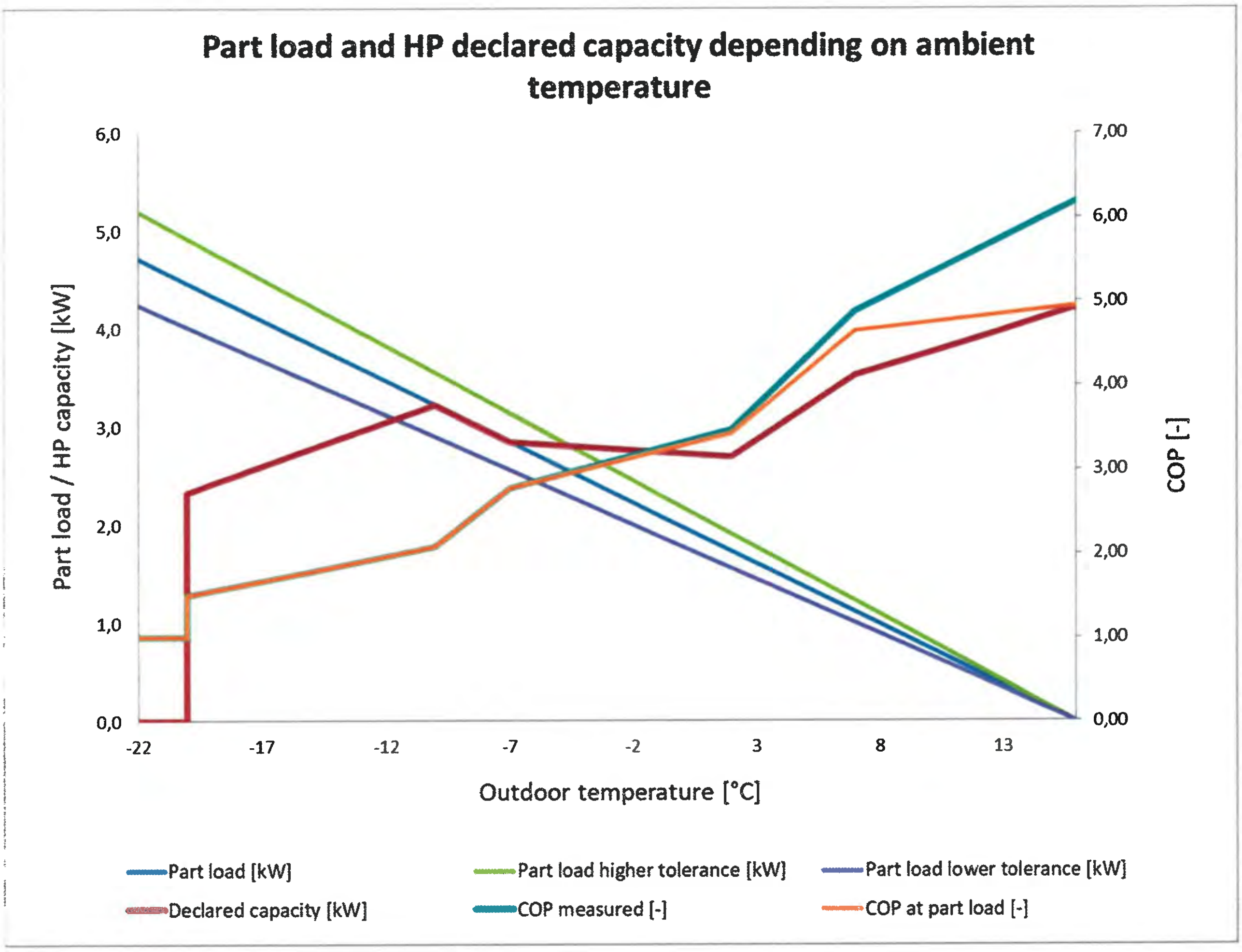
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax³ 7GT**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C“ – colder

	Bin j [–]	Outdoor temp. (dry bulb) T_j [°C]	Hours h_j [h]	Part load ratio [%]	Heat load $P_{h(Tj)}$ [kW]	Capacity of HP [kW]	Heat load covered by heat pump [kW]	Resistive heat elbu (Tj) $elbu_{(Tj)}$ [kW]	Annual resistive heat h_j x $elbu_{(Tj)}$ [kWh]	COPbin (Tj) COP bin (Tj) [–]	Annual heating demand h_j x $P_{h(Tj)}$ [kWh]	Annual power input including electric back up heating [kWh]	Net annual heating capacity h_j × ($P_{h(Tj)}$ - $elbu_{(Tj)}$) [kWh]	Net annual power input without electric back up heating [kWh]
	9	-22	1	100.00	4.72	0.00	0.00	4.72	4.72	1.00	5	5	0	0
	10	-21	6	97.37	4.60	0.00	0.00	4.60	27.59	1.00	28	28	0	0
TOL (E)	**11**	**-20**	**13**	**94.74**	**4.47**	**2.33**	**2.33**	**2.14**	**27.88**	**1.50**	**58**	**48**	**30**	**20**
	12	-19	17	92.11	4.35	2.42	2.42	1.93	32.81	1.56	74	59	41	26
	13	-18	19	89.47	4.23	2.51	2.51	1.72	32.59	1.62	80	62	48	30
	14	-17	26	86.84	4.10	2.60	2.60	1.50	39.03	1.67	107	79	68	40
	15	-16	39	84.21	3.98	2.69	2.69	1.29	50.18	1.73	155	111	105	61
G	**16**	**-15**	**41**	**81.58**	**3.85**	**2.78**	**2.78**	**1.07**	**43.96**	**1.79**	**158**	**108**	**114**	**64**
	17	-14	35	78.95	3.73	2.87	2.87	0.86	30.02	1.85	131	84	100	54
	18	-13	52	76.32	3.60	2.96	2.96	0.64	33.45	1.90	187	114	154	81
	19	-12	37	73.68	3.48	3.05	3.05	0.43	15.87	1.96	129	73	113	58
	20	-11	41	71.05	3.36	3.14	3.14	0.21	8.79	2.02	138	73	129	64

Tbiv (F)	**21**	**-10**	**43**	**68.42**	**3.23**	**3.23**	**3.23**	**0.00**	**0.00**	**2.08**	**139**	**67**	**139**	**67**
	22	-9	54	65.79	3.11	3.10	3.10	0.00	0.00	2.31	168	73	168	73
	23	-8	90	63.16	2.98	2.98	2.98	0.00	0.00	2.54	268	106	268	106
A	**24**	**-7**	**125**	**60.53**	**2.86**	**2.85**	**2.85**	**0.00**	**0.00**	**2.77**	**357**	**129**	**357**	**129**
	25	-6	169	57.89	2.73	2.83	2.73	0.00	0.00	2.84	462	163	462	163
	26	-5	195	55.26	2.61	2.82	2.61	0.00	0.00	2.92	509	175	509	175
	27	-4	278	52.63	2.49	2.80	2.49	0.00	0.00	2.99	691	231	691	231
	28	-3	306	50.00	2.36	2.78	2.36	0.00	0.00	3.06	723	236	723	236
	29	-2	454	47.37	2.24	2.76	2.24	0.00	0.00	3.13	1016	324	1016	324
	30	-1	385	44.74	2.11	2.75	2.11	0.00	0.00	3.21	813	254	813	254
	31	0	490	42.11	1.99	2.73	1.99	0.00	0.00	3.28	974	297	974	297
	32	1	533	39.47	1.86	2.71	1.86	0.00	0.00	3.35	994	297	994	297
B	**33**	**2**	**380**	**36.84**	**1.74**	**2.69**	**1.74**	**0.00**	**0.00**	**3.42**	**661**	**193**	**661**	**193**
	34	3	228	34.21	1.62	2.86	1.62	0.00	0.00	3.67	368	100	368	100
	35	4	261	31.58	1.49	3.03	1.49	0.00	0.00	3.91	389	99	389	99
	36	5	279	28.95	1.37	3.20	1.37	0.00	0.00	4.16	381	92	381	92
	37	6	229	26.32	1.24	3.36	1.24	0.00	0.00	4.40	285	65	285	65
C	**38**	**7**	**269**	**23.68**	**1.12**	**3.53**	**1.12**	**0.00**	**0.00**	**4.65**	**301**	**65**	**301**	**65**
	39	8	233	21.05	0.99	3.61	0.99	0.00	0.00	4.68	232	49	232	49
	40	9	230	18.42	0.87	3.68	0.87	0.00	0.00	4.72	200	42	200	42
	41	10	243	15.79	0.75	3.76	0.75	0.00	0.00	4.75	181	38	181	38
	42	11	191	13.16	0.62	3.83	0.62	0.00	0.00	4.78	119	25	119	25
D	**43**	**12**	**146**	**10.53**	**0.50**	**3.91**	**0.50**	**0.00**	**0.00**	**4.81**	**73**	**15**	**73**	**15**
	44	13	150	7.89	0.37	3.99	0.37	0.00	0.00	4.85	56	12	56	12
	45	14	97	5.26	0.25	4.06	0.25	0.00	0.00	4.88	24	5	24	5
	46	15	61	2.63	0.12	4.14	0.12	0.00	0.00	4.91	8	2	8	2
		Σ	6446							Σ	11641	3997	11294	3650

SCOPon	2.91	SCOPnet	3.09
		SCOP	**2.91**

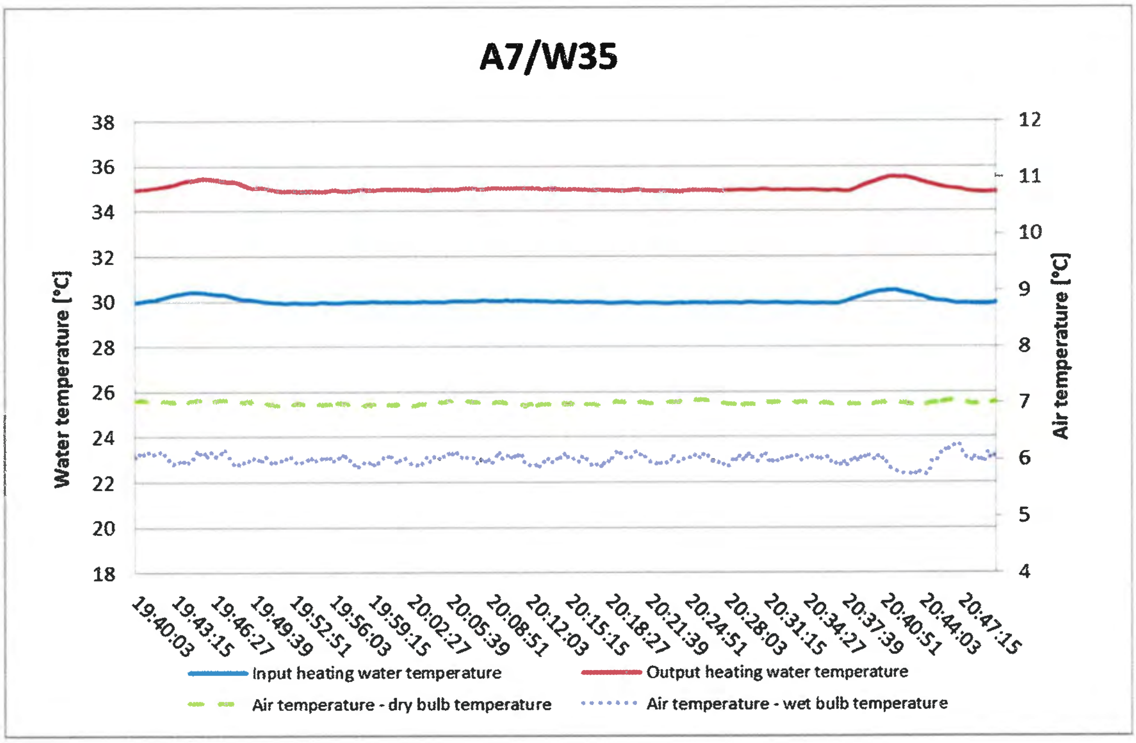
Power diagram (Heat pump **Airmax³ 7GT**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C" – colder

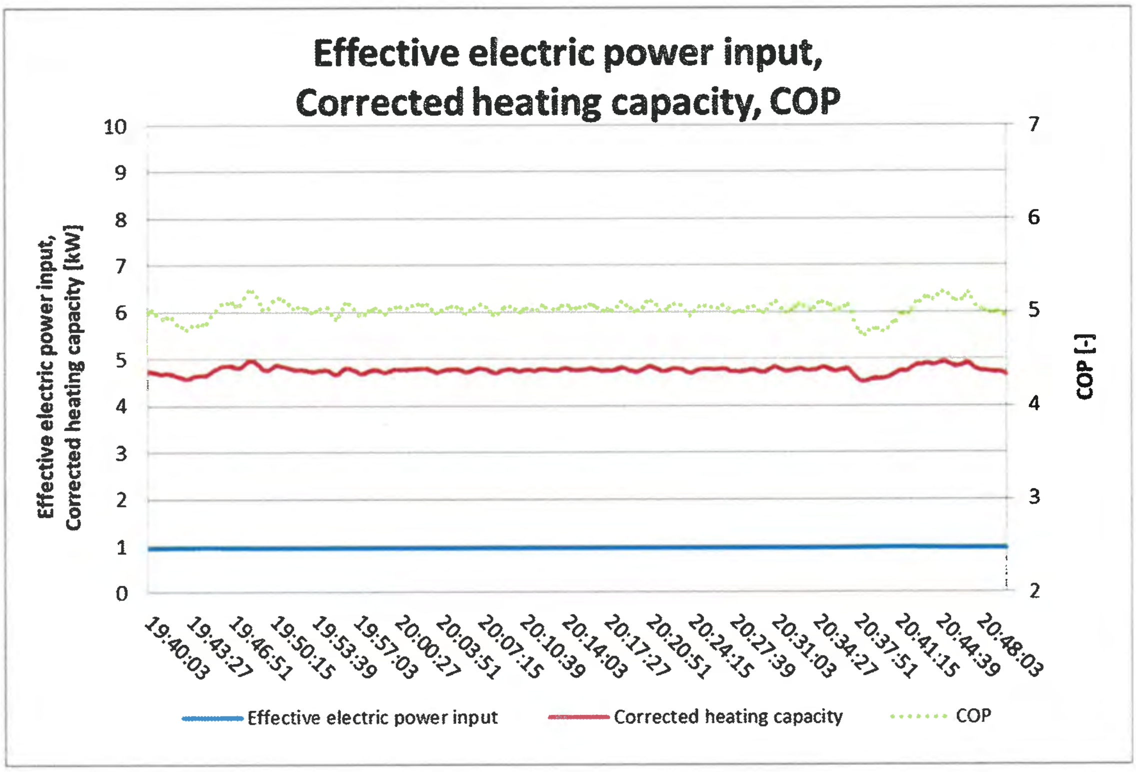


Tested by:	Ing. Dominik Šedivý	Date:	2022-01-31	Signed:
Reviewed by:	Ing. Mario Jankola	Date:	2022-01-31	Signed:

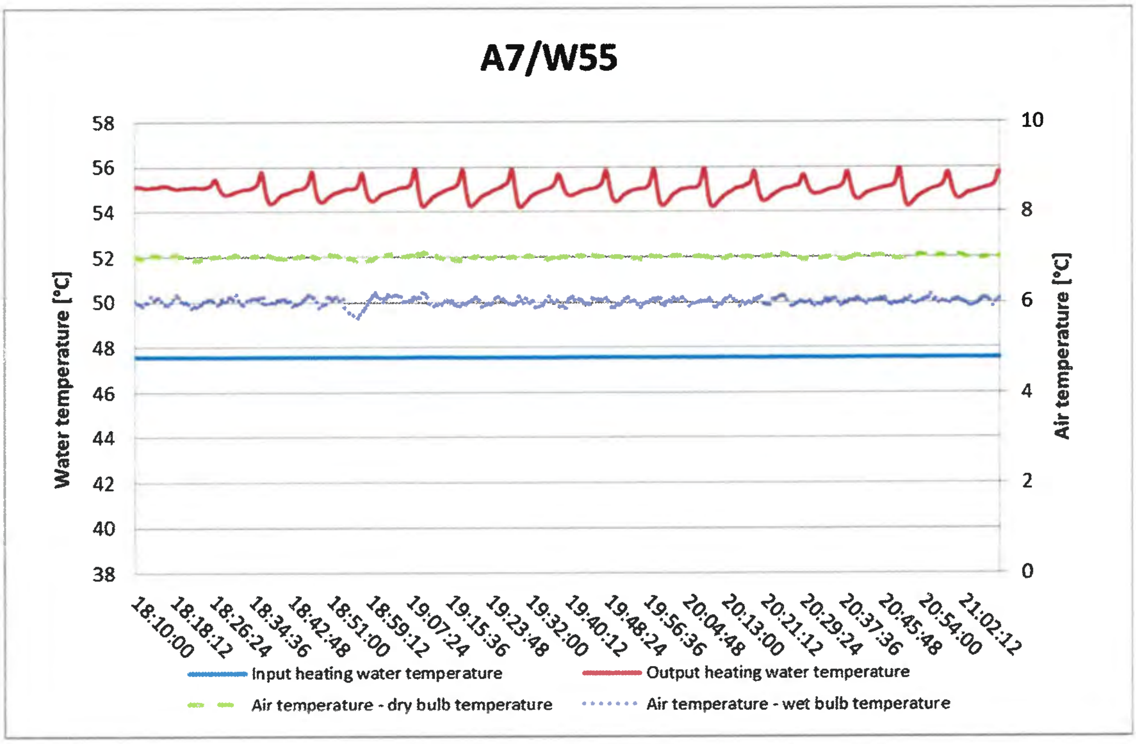
V. <u>Graphs</u>

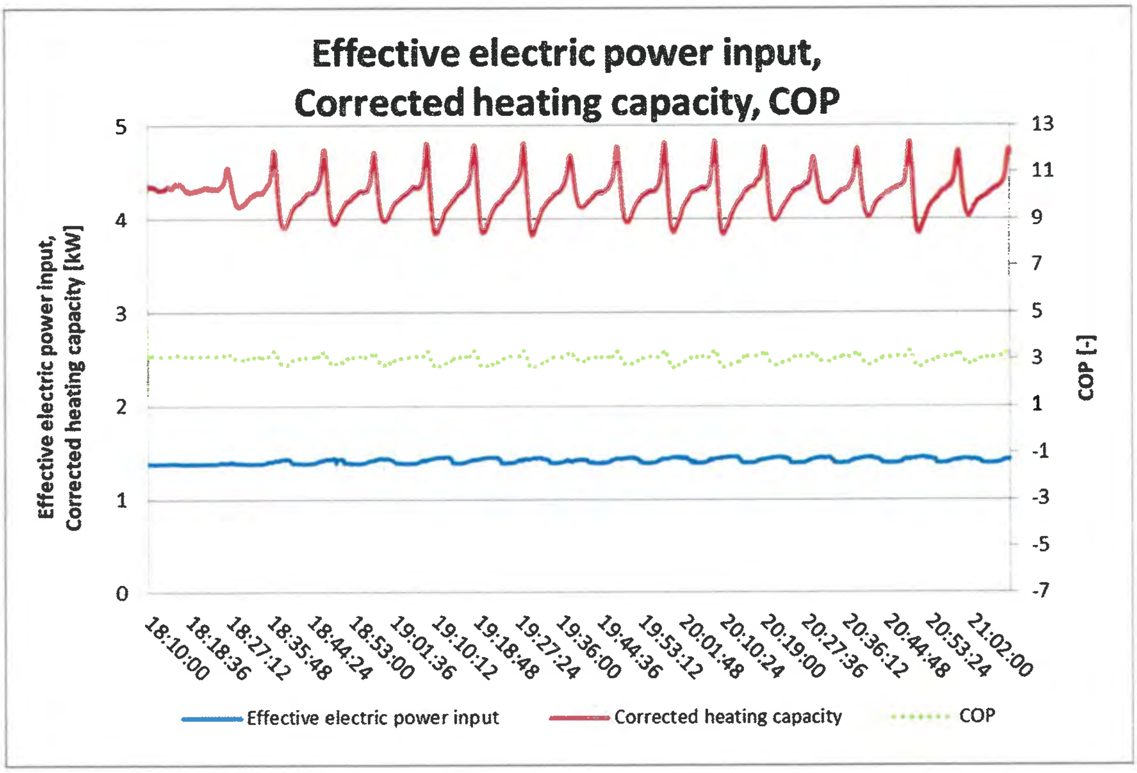
Heat pump **Airmax³ 7GT**: A7/W35 (2900 rpm)



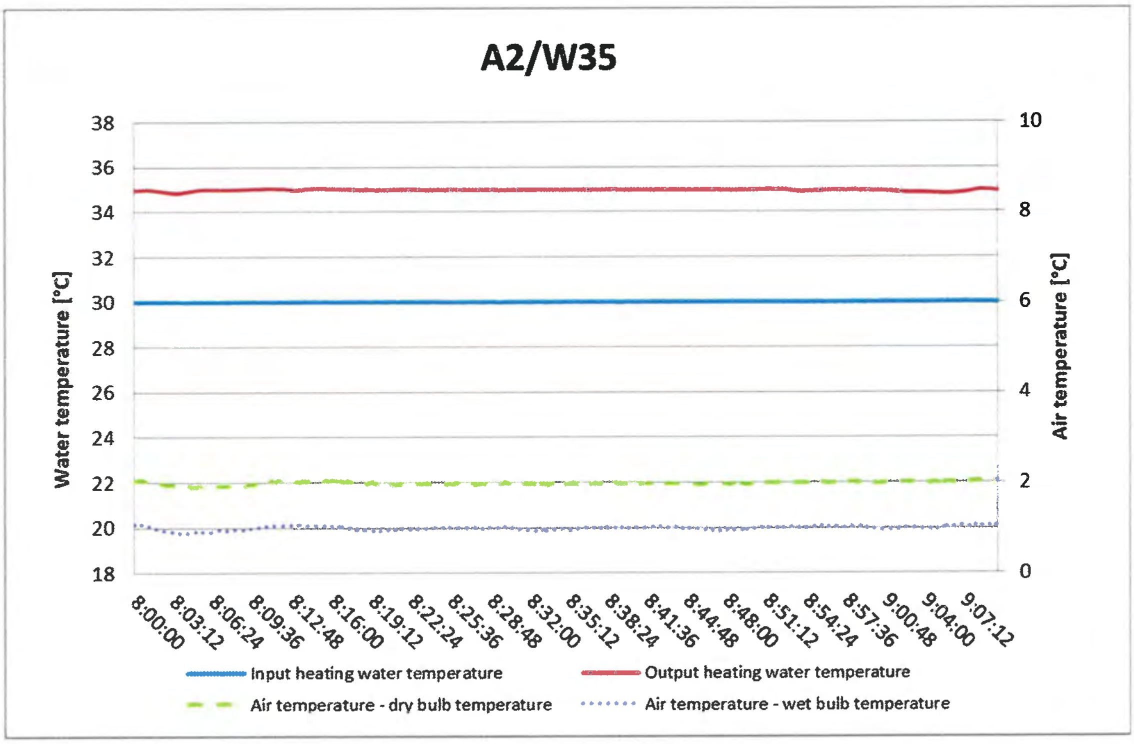


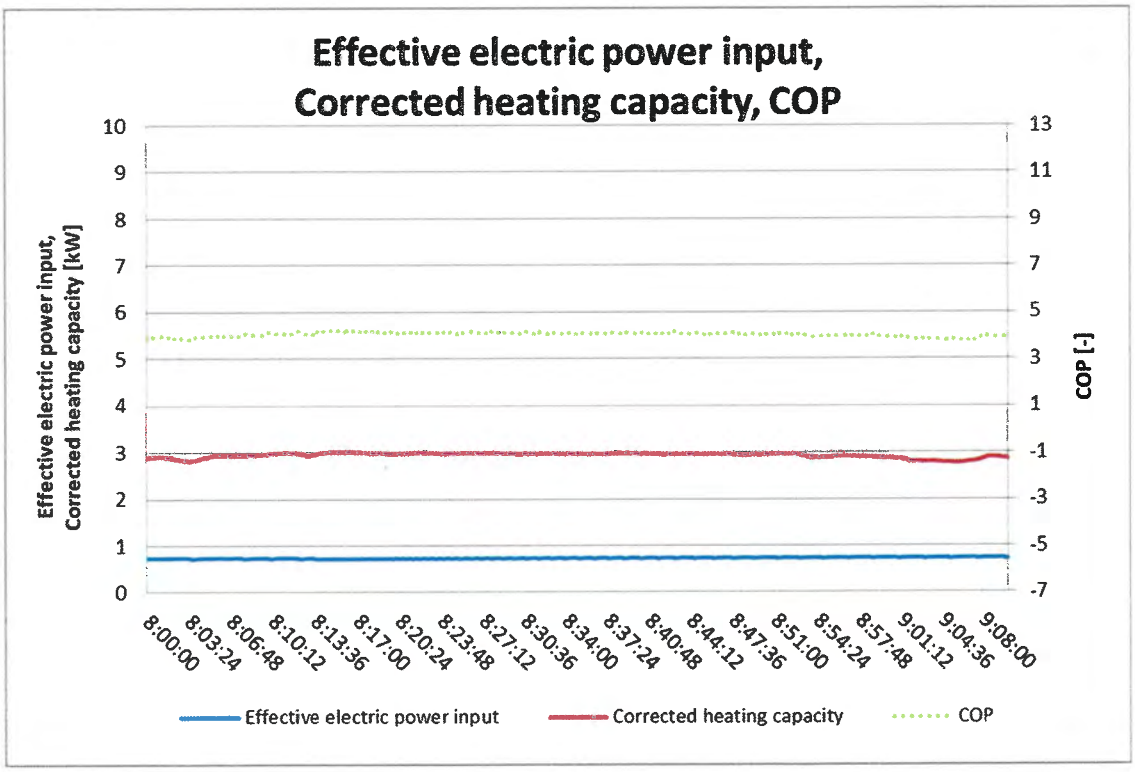
Heat pump **Airmax³ 7GT**: A7/W55 (2900 rpm)



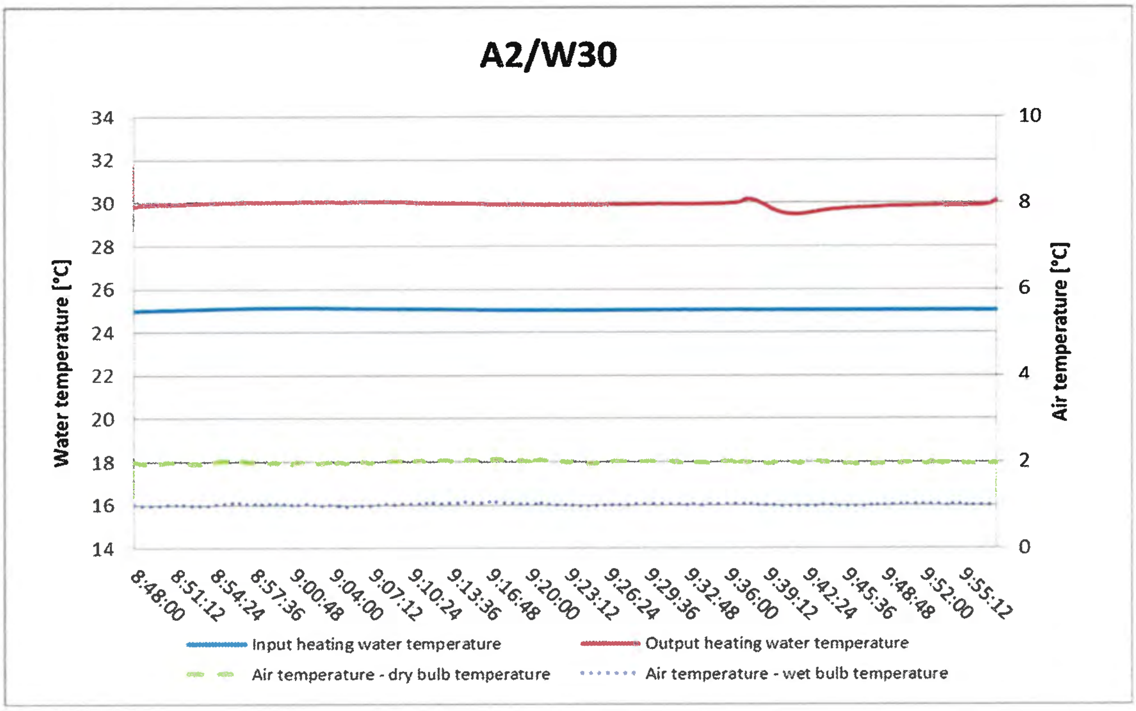


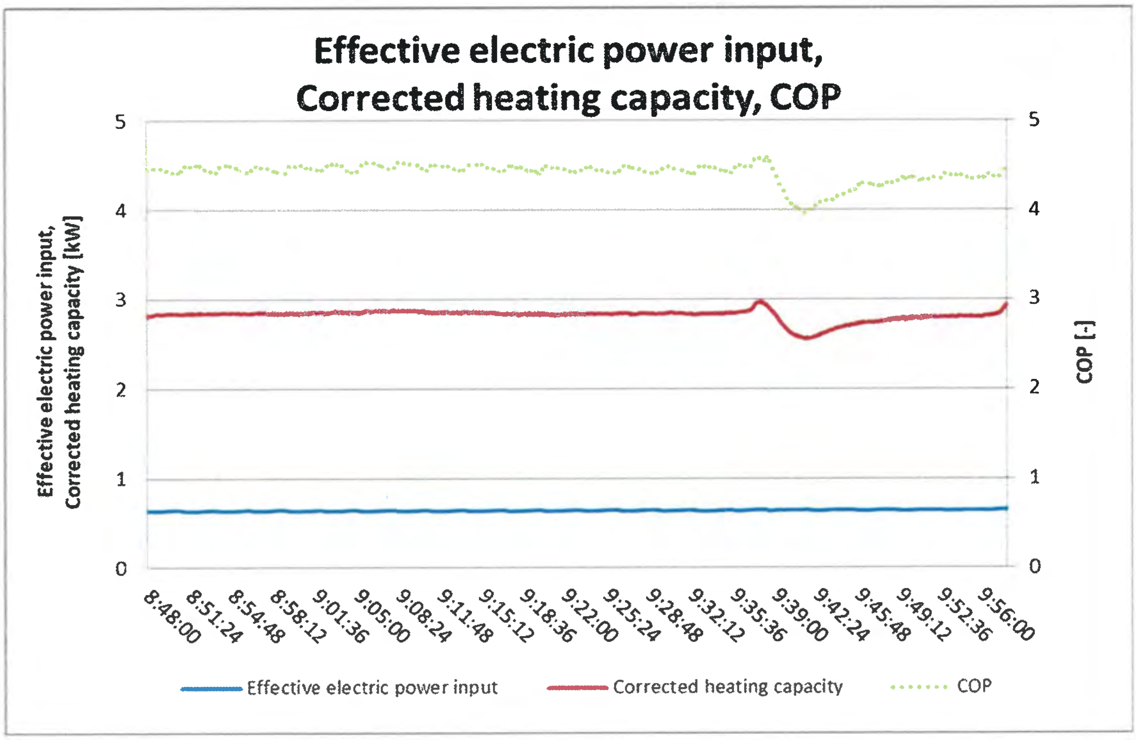
Heat pump **Airmax³ 7GT**: A2/W35 (2100 rpm)



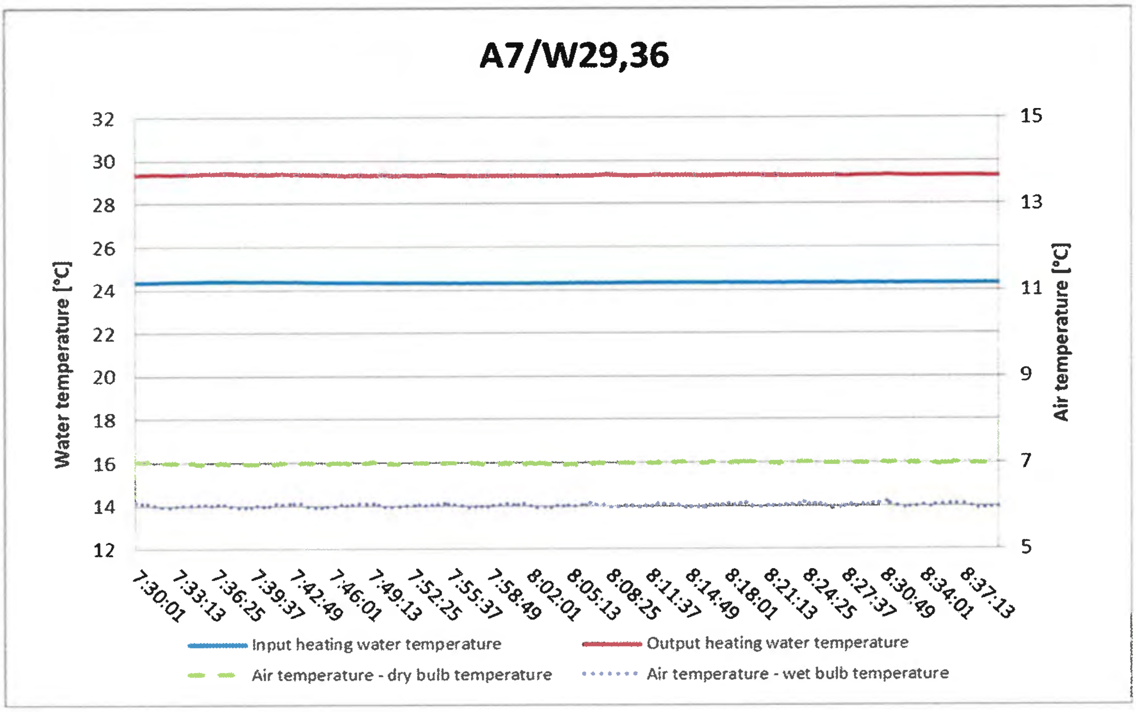


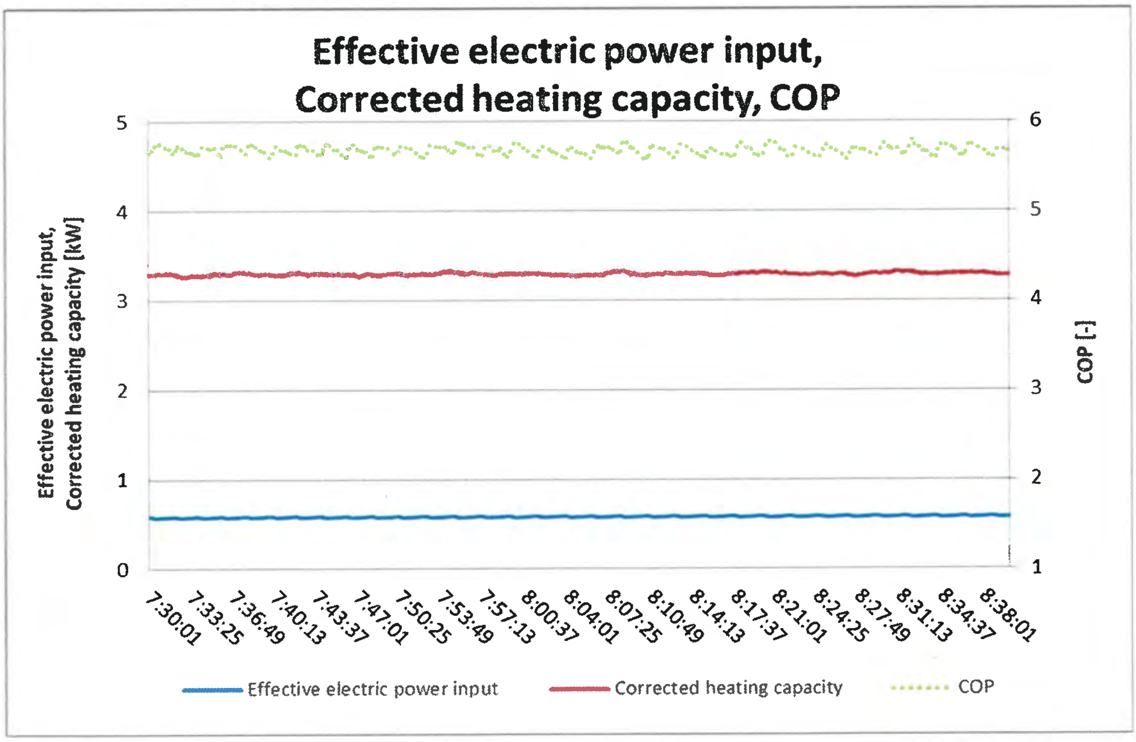
Heat pump **Airmax³ 7GT:** A2/W30 (1900 rpm)



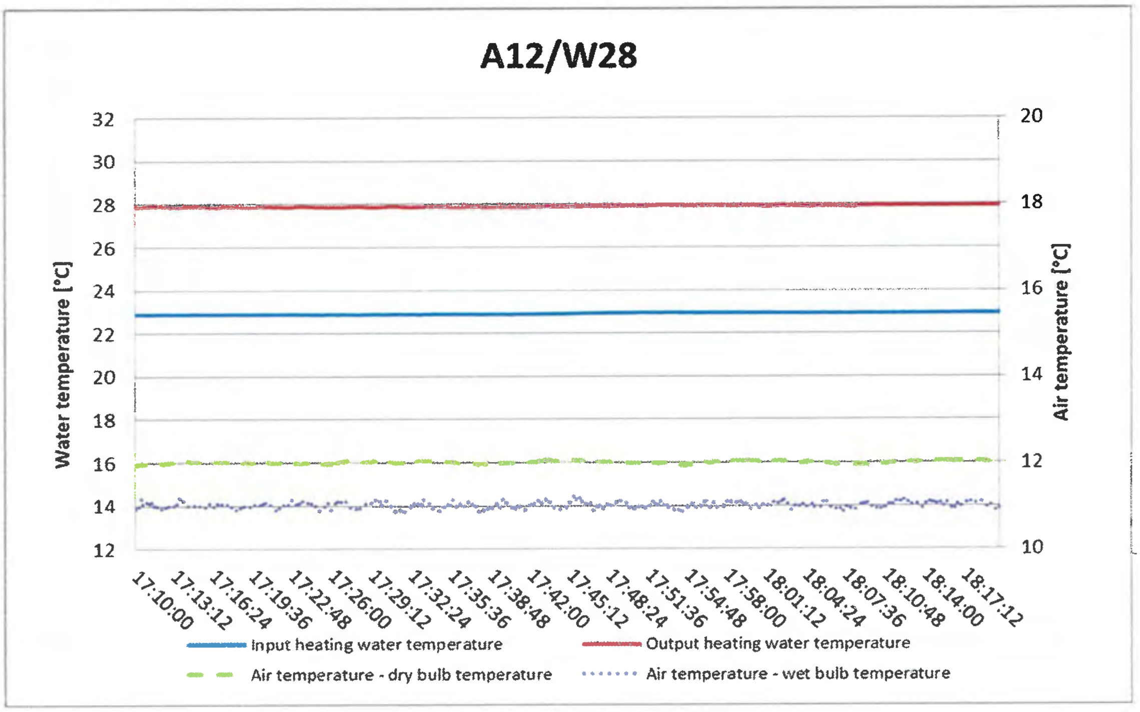


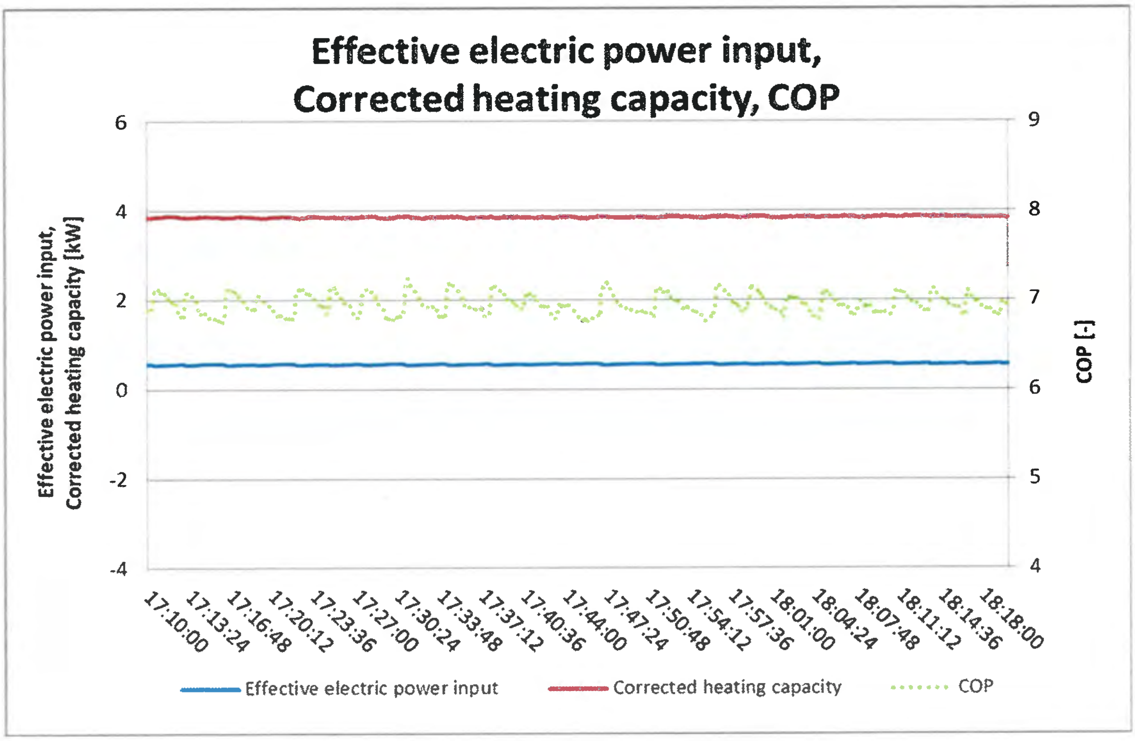
Heat pump **Airmax³ 7GT:** A7/W29.36 (1900 rpm)



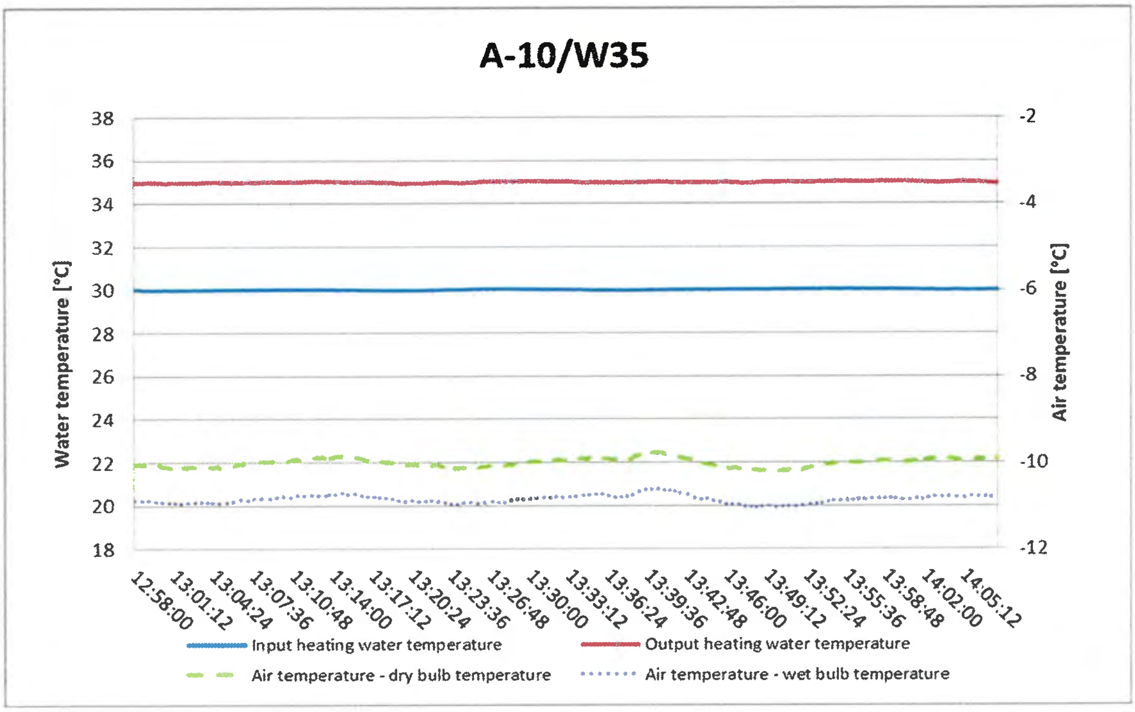


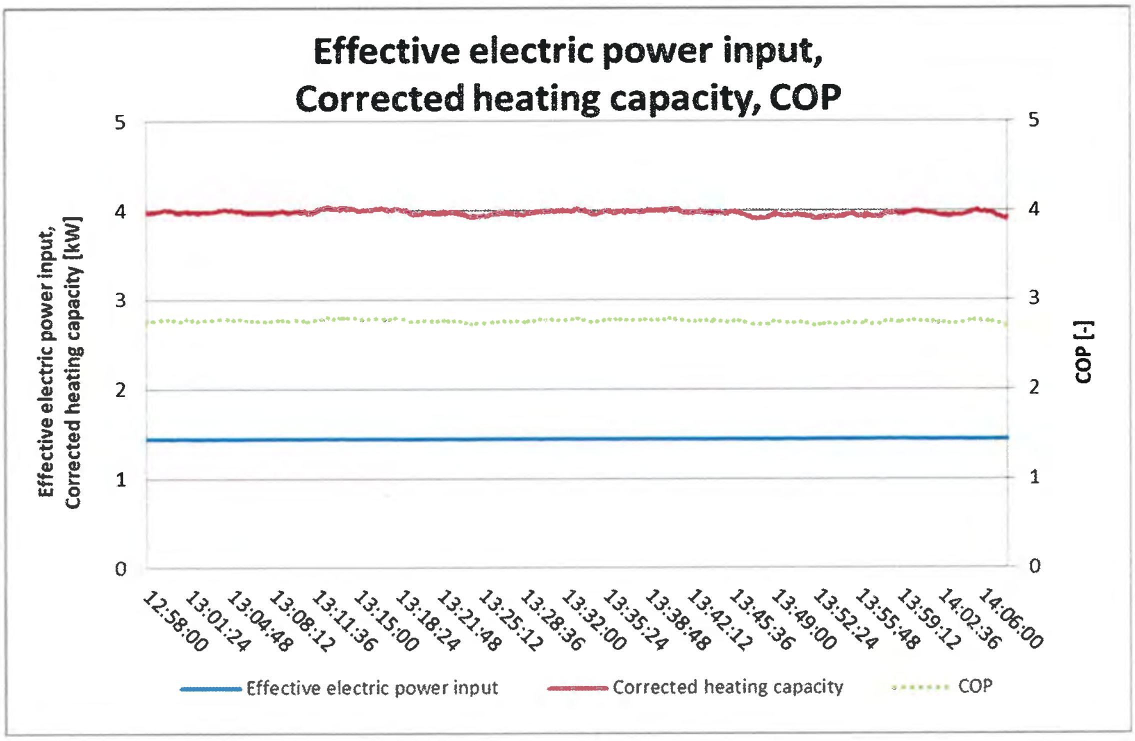
Heat pump **Airmax³ 7GT:** A12/W28 (1900 rpm)



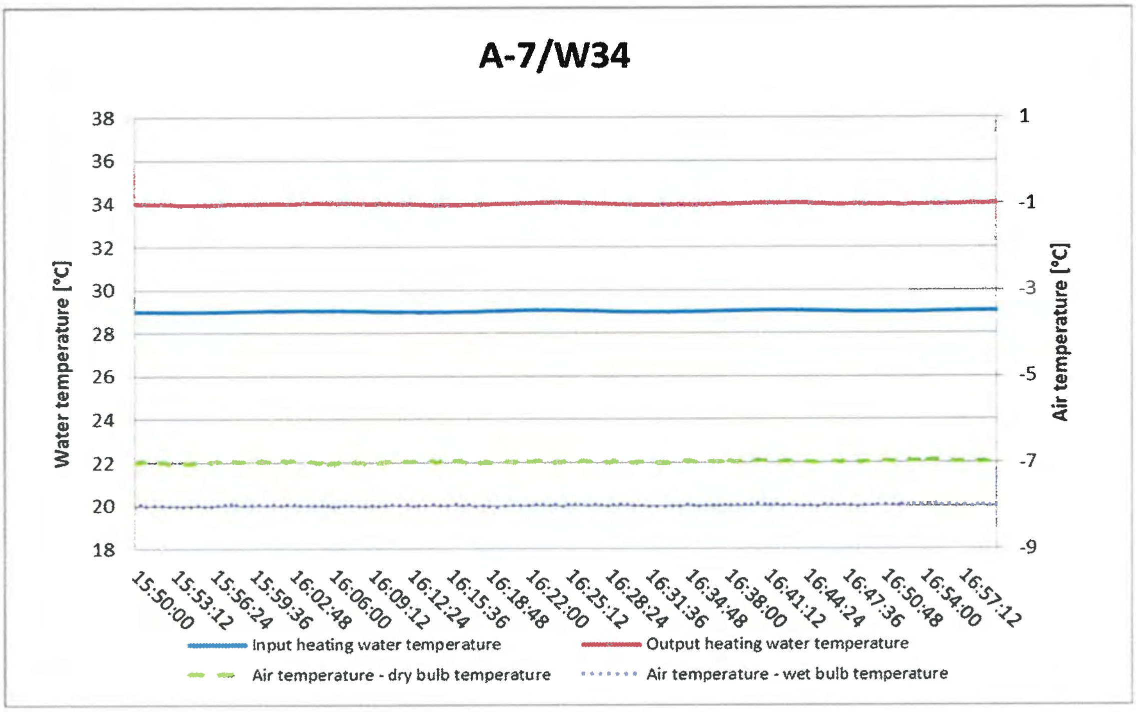


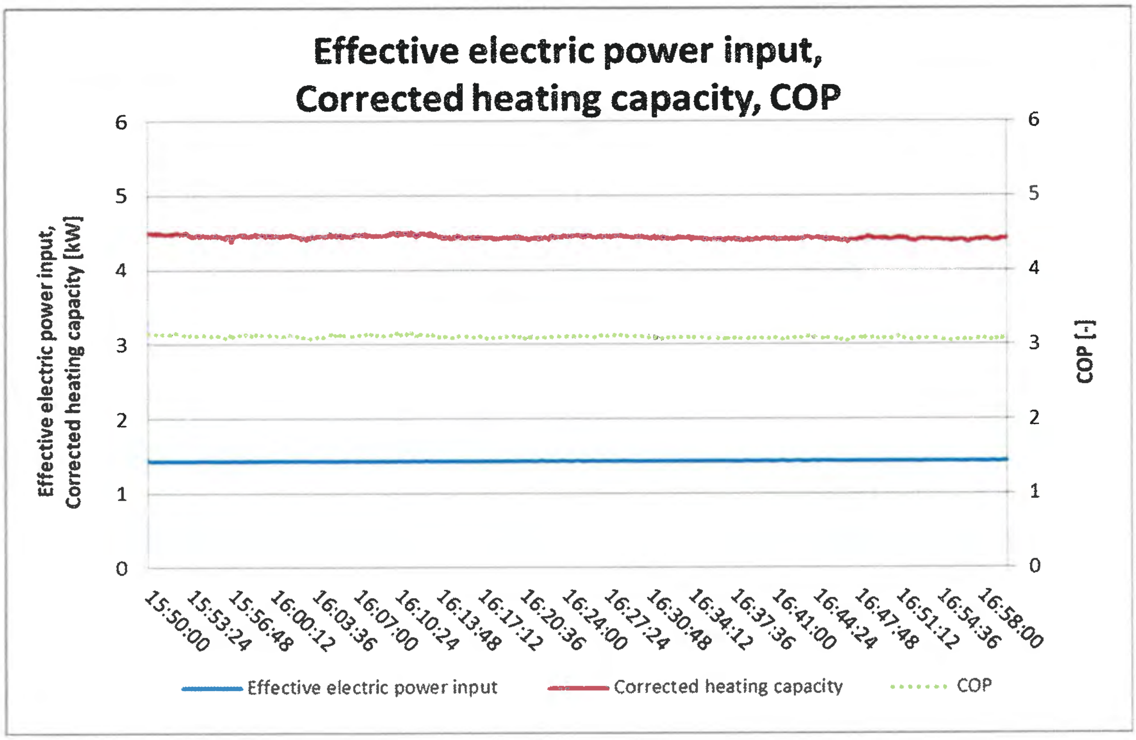
Heat pump **Airmax³ 7GT**: A-10/W35 (4000 rpm)



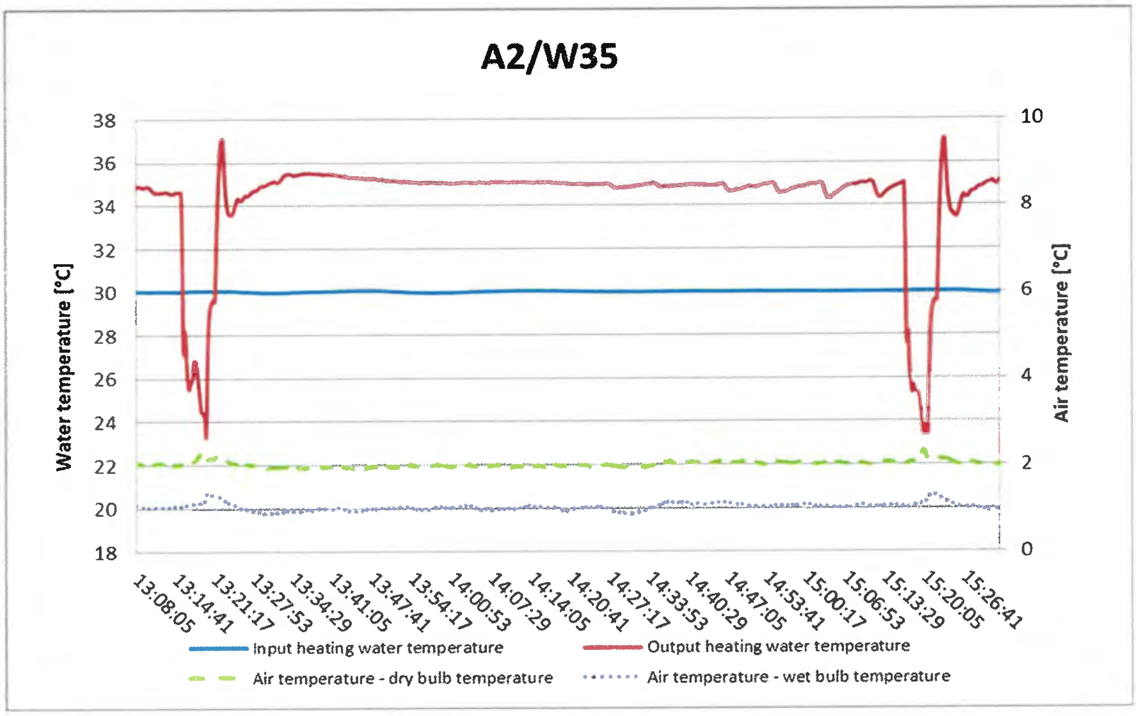


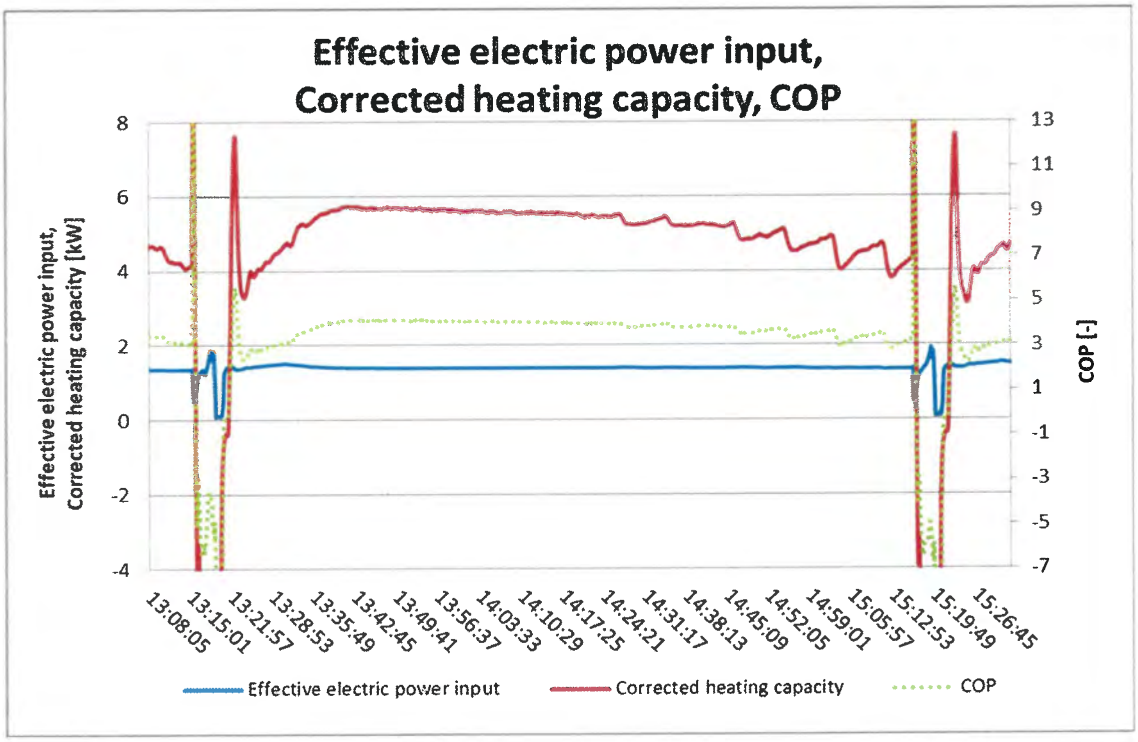
Heat pump **Airmax³ 7GT:** A-7/W34 (4000 rpm)



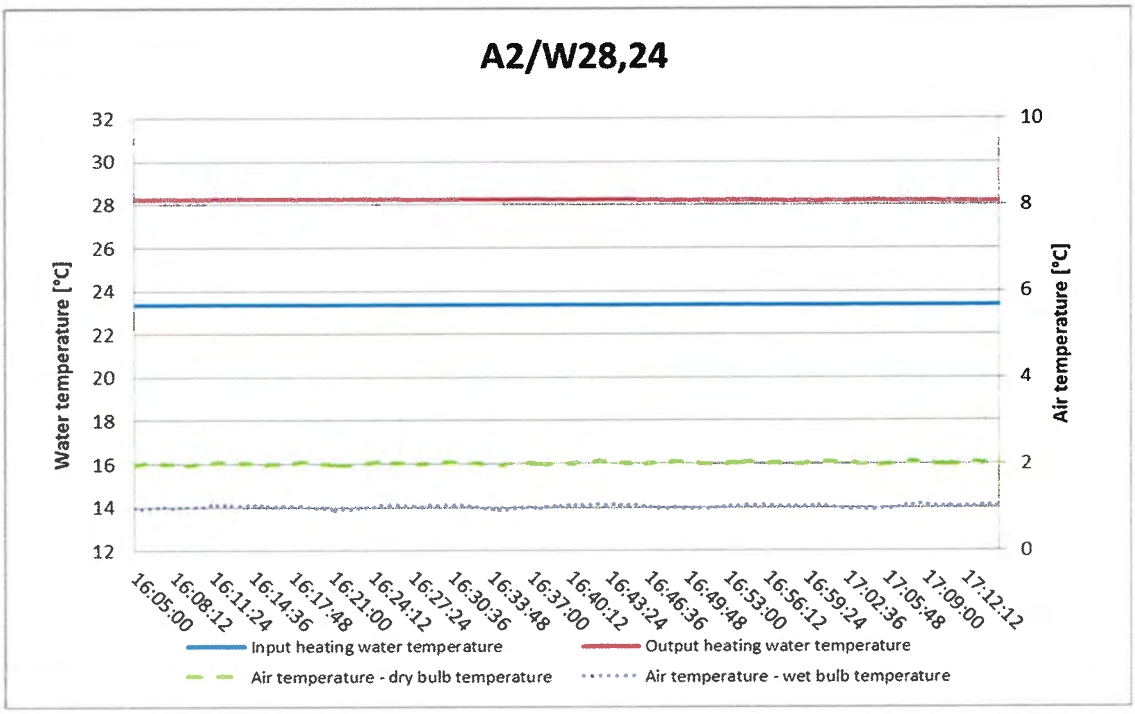


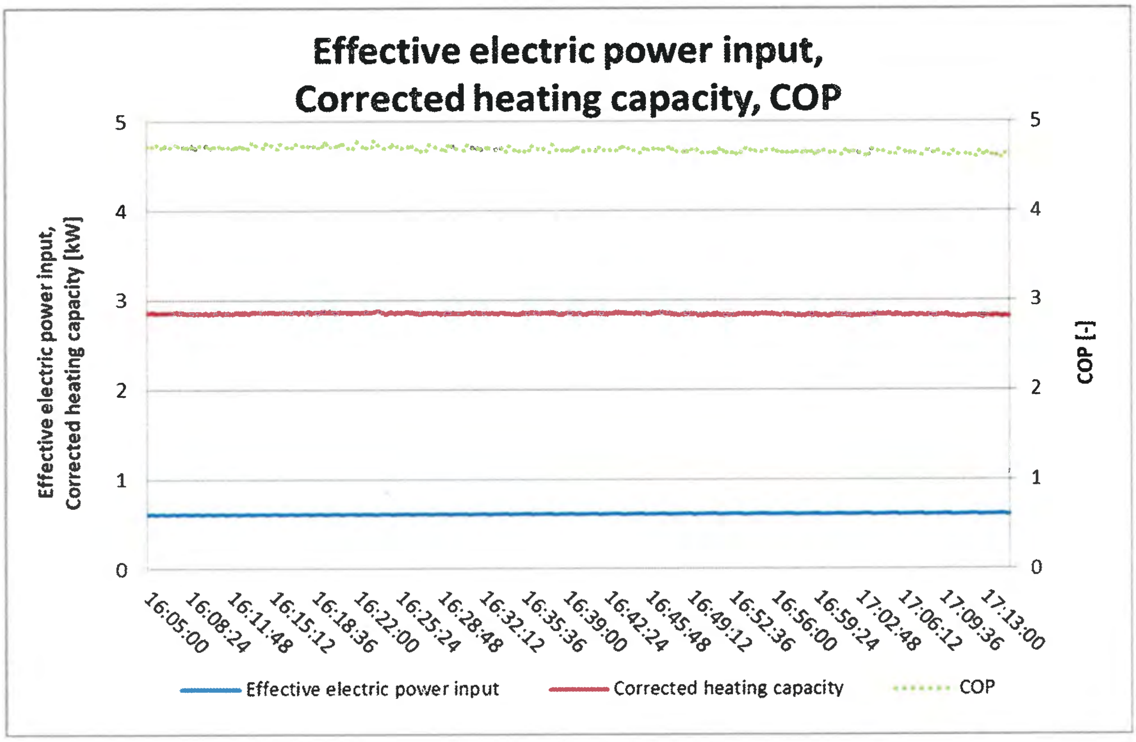
Heat pump **Airmax³ 7GT:** A2/W35 (4000 rpm)



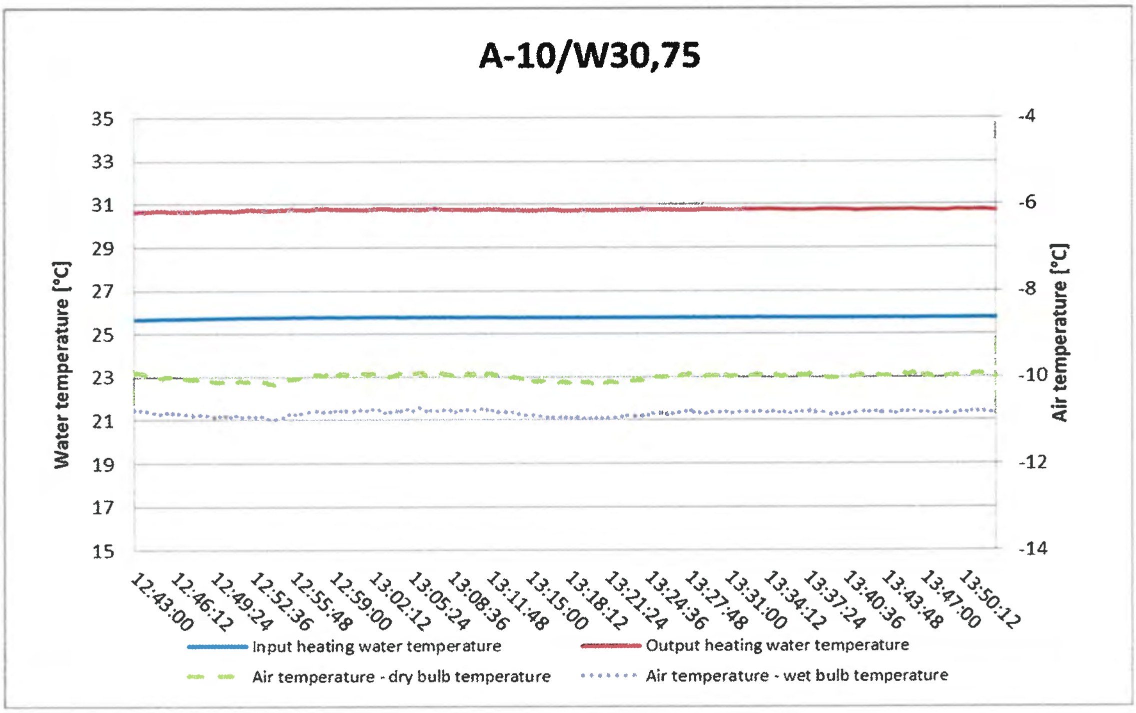


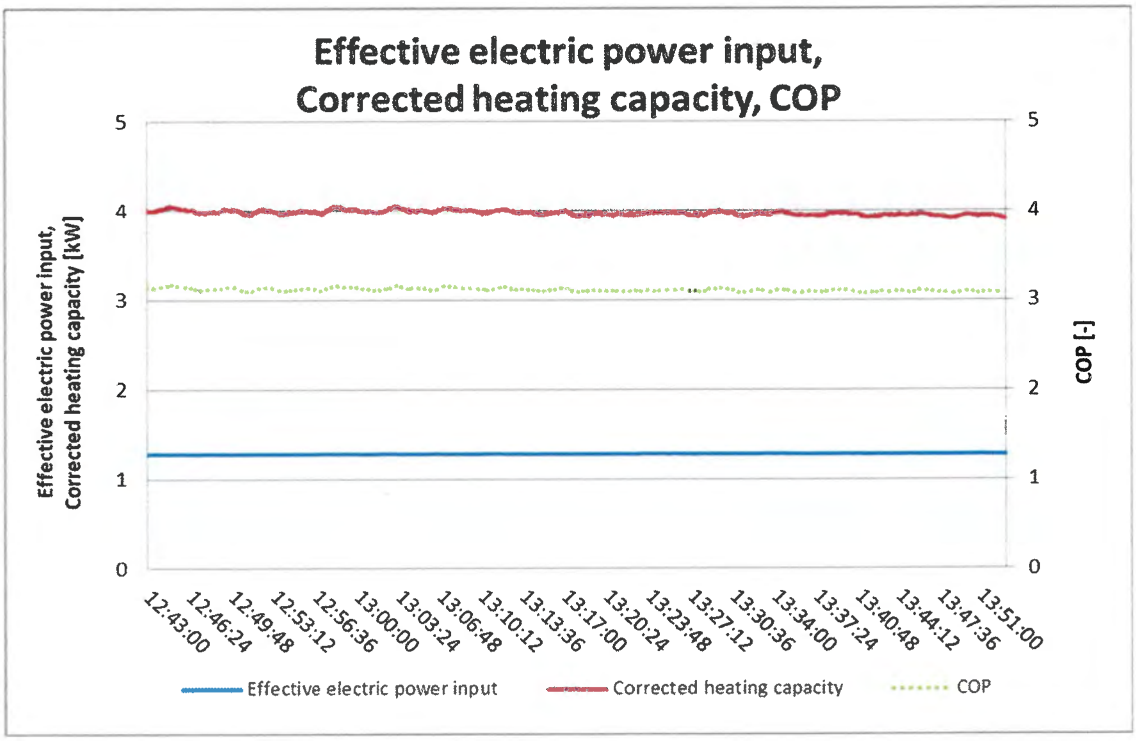
Heat pump **Airmax³ 7GT:** A2/W28.24 (1900 rpm)



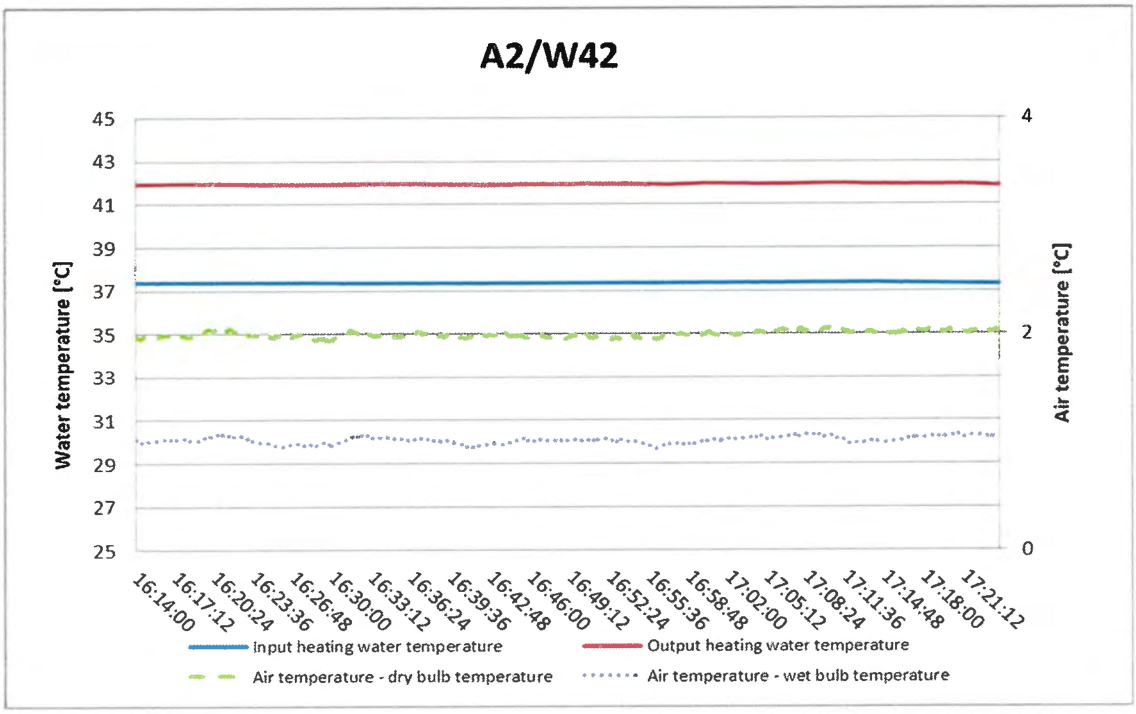


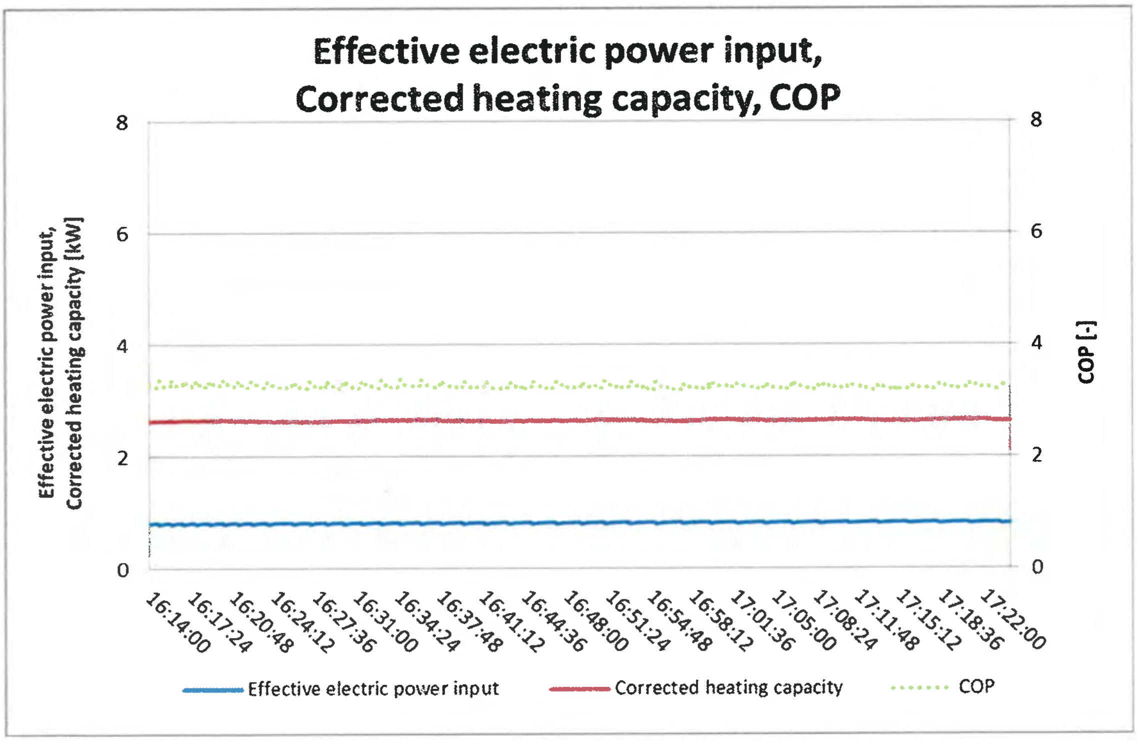
Heat pump **Airmax³ 7GT:** A-10/W30.75 (4000 rpm)



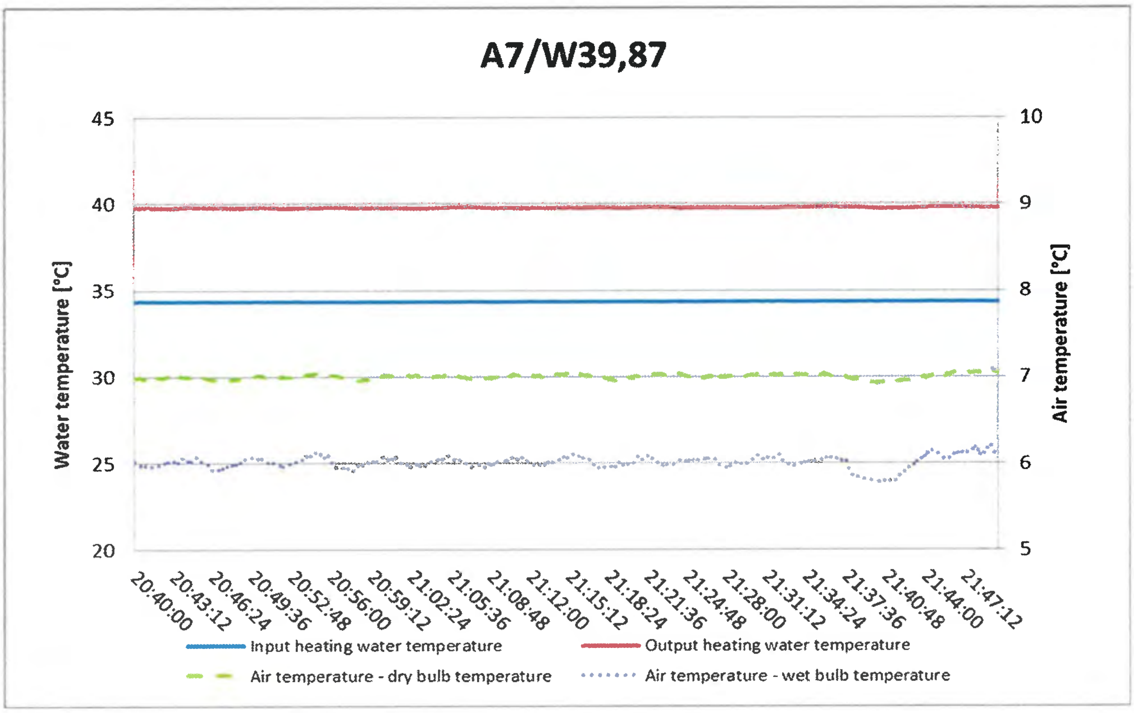


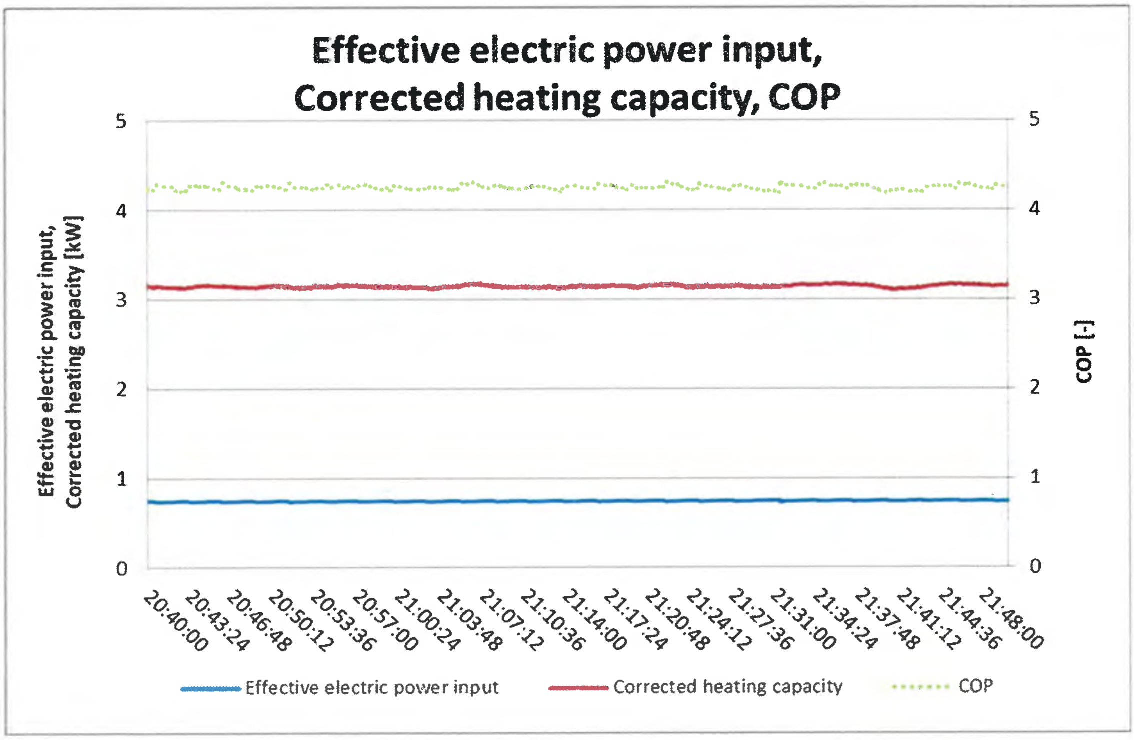
Heat pump **Airmax³ 7GT:** A2/W42 (1900 rpm)



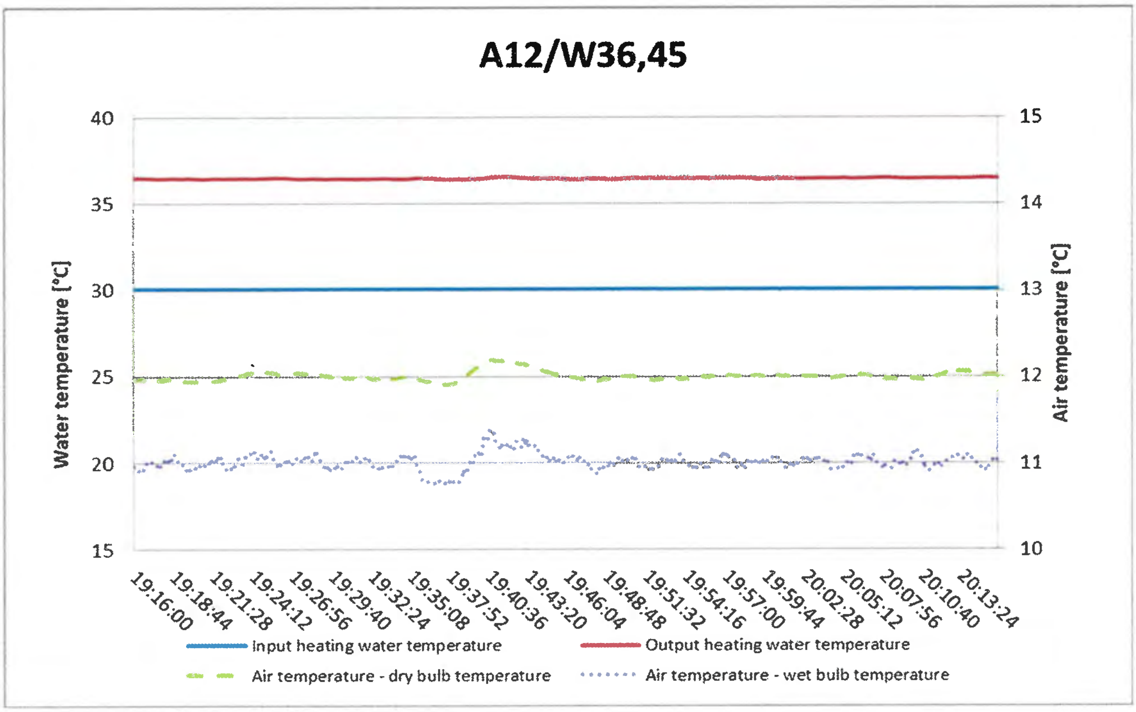


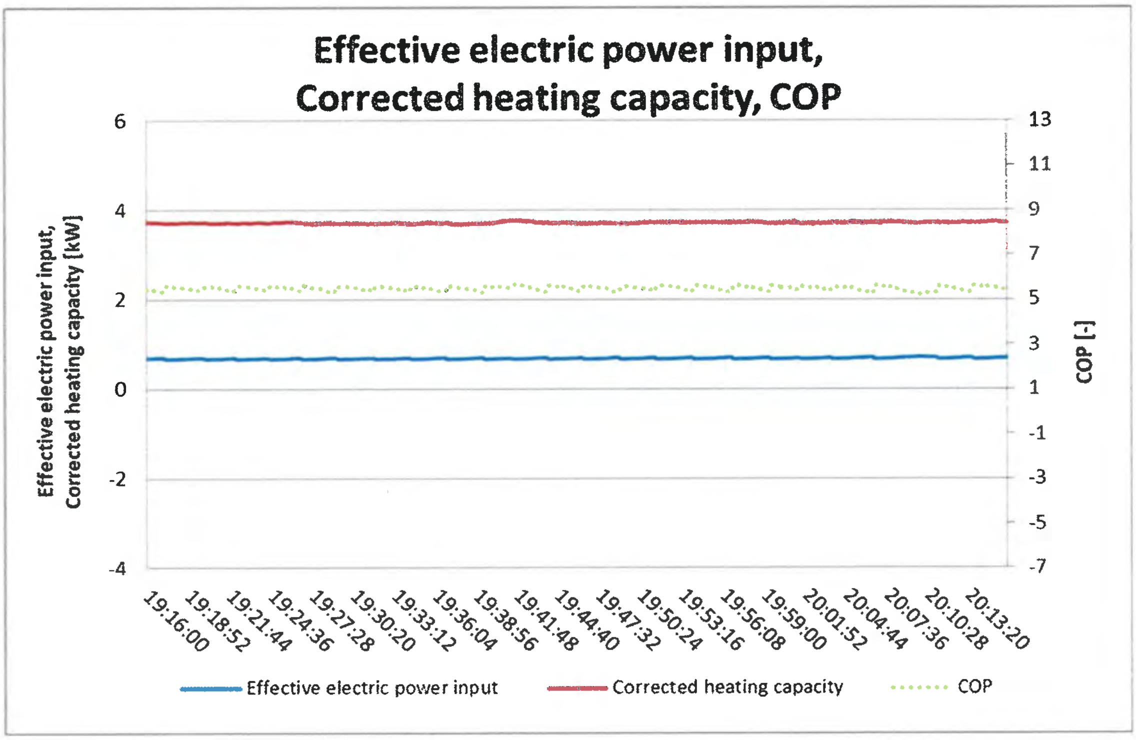
Heat pump **Airmax³ 7GT:** A7/W39.87 (1900 rpm)



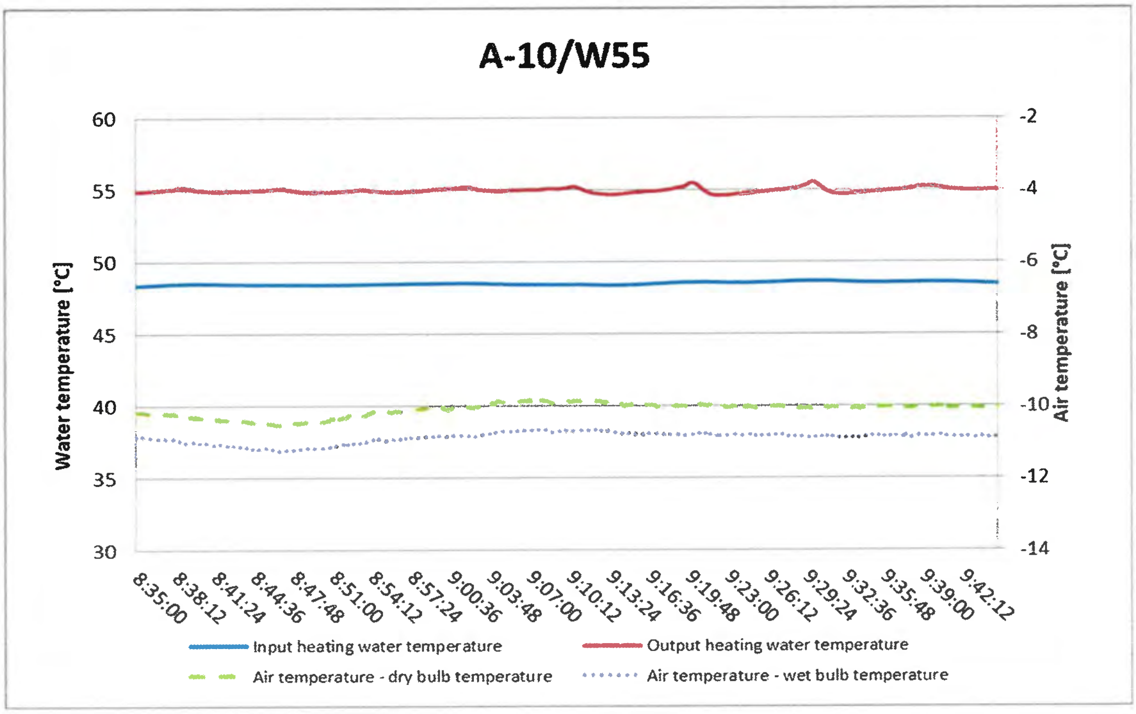


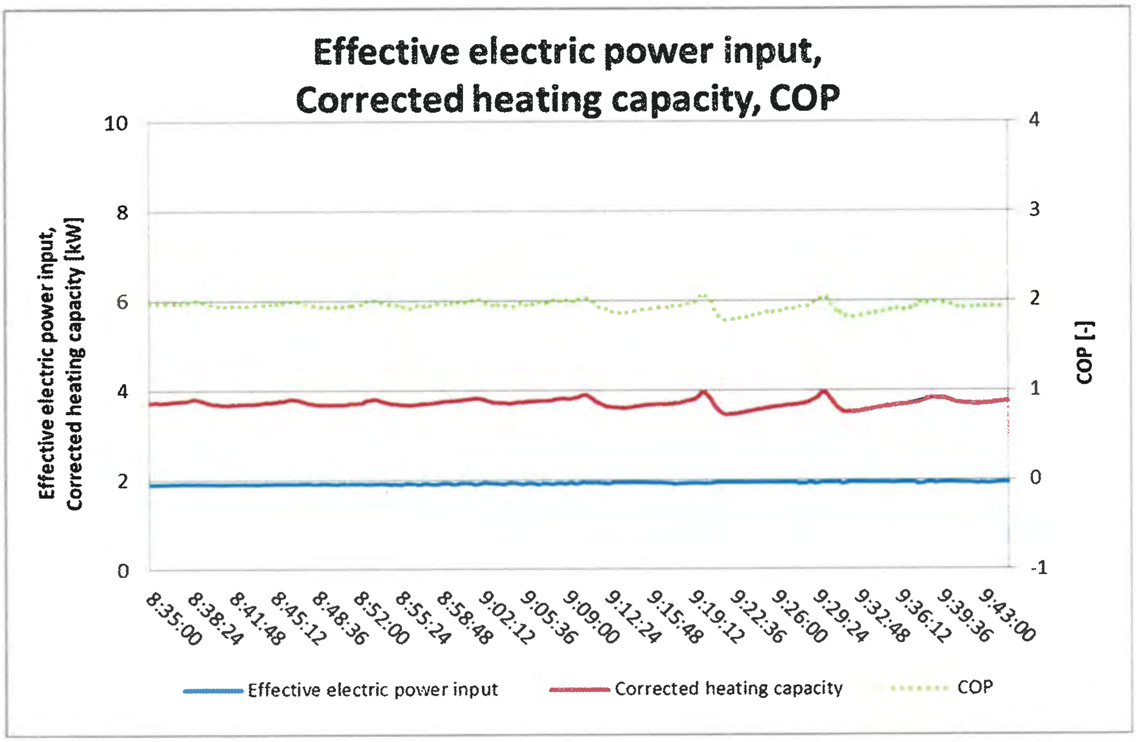
Heat pump **Airmax³ 7GT:** A12/W36.45 (1900 rpm)



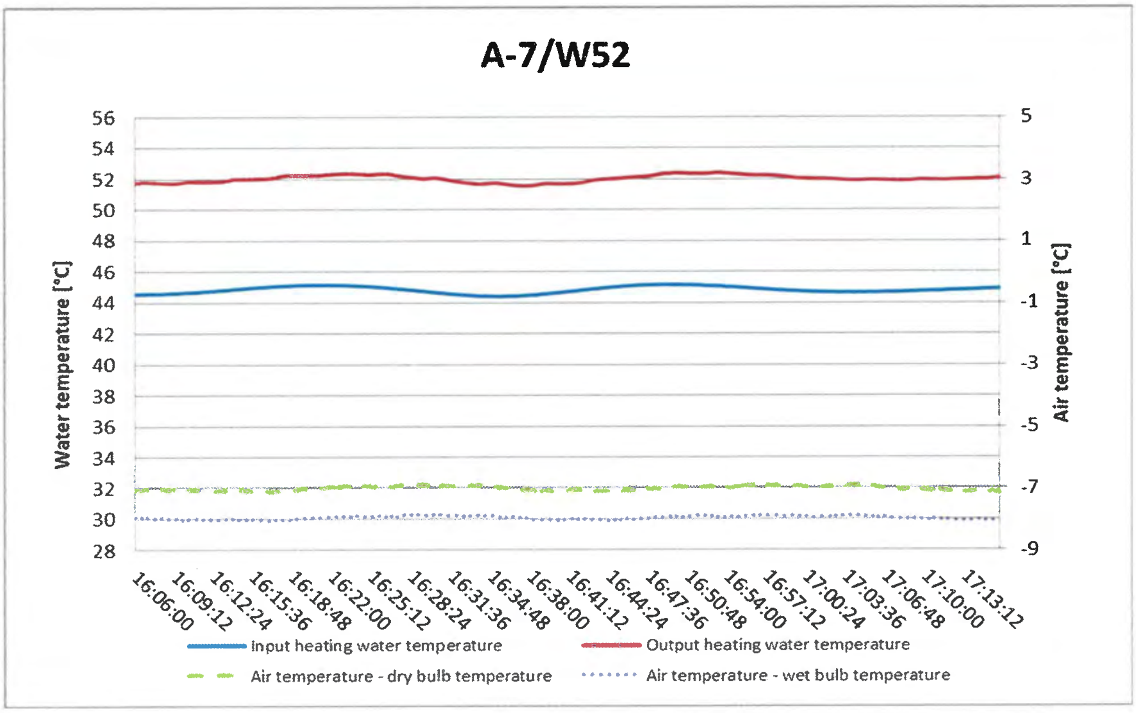


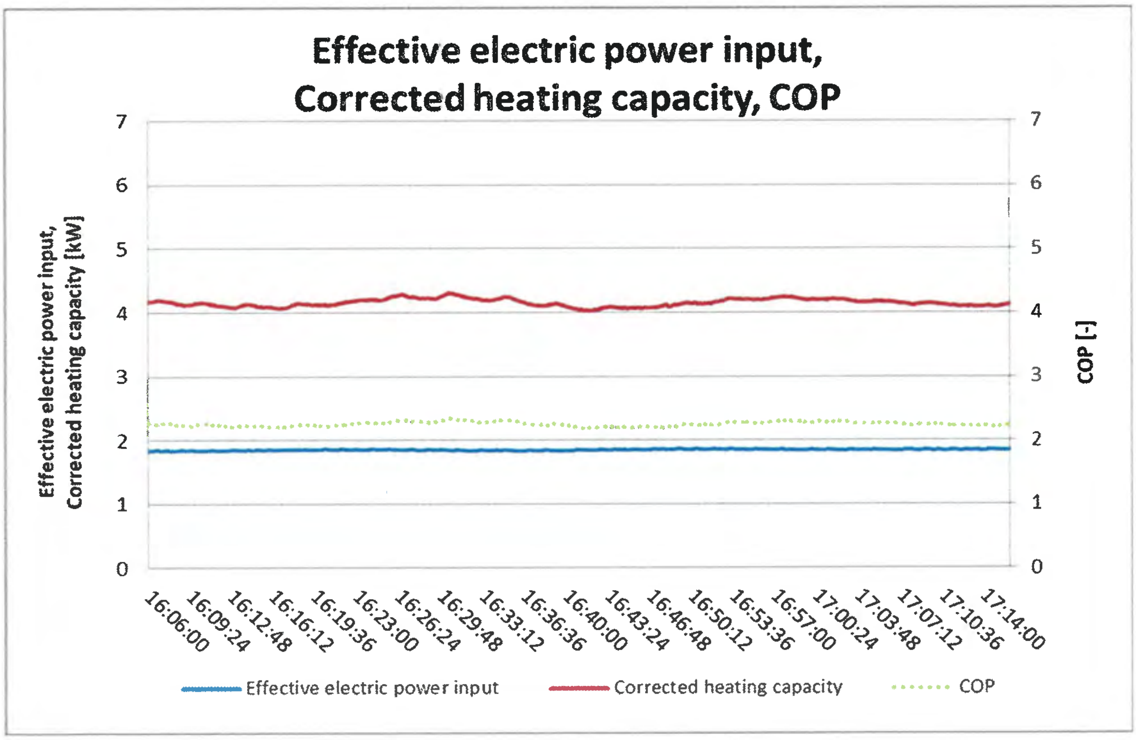
Heat pump **Airmax³ 7GT:** A-10/W55 (4000 rpm)



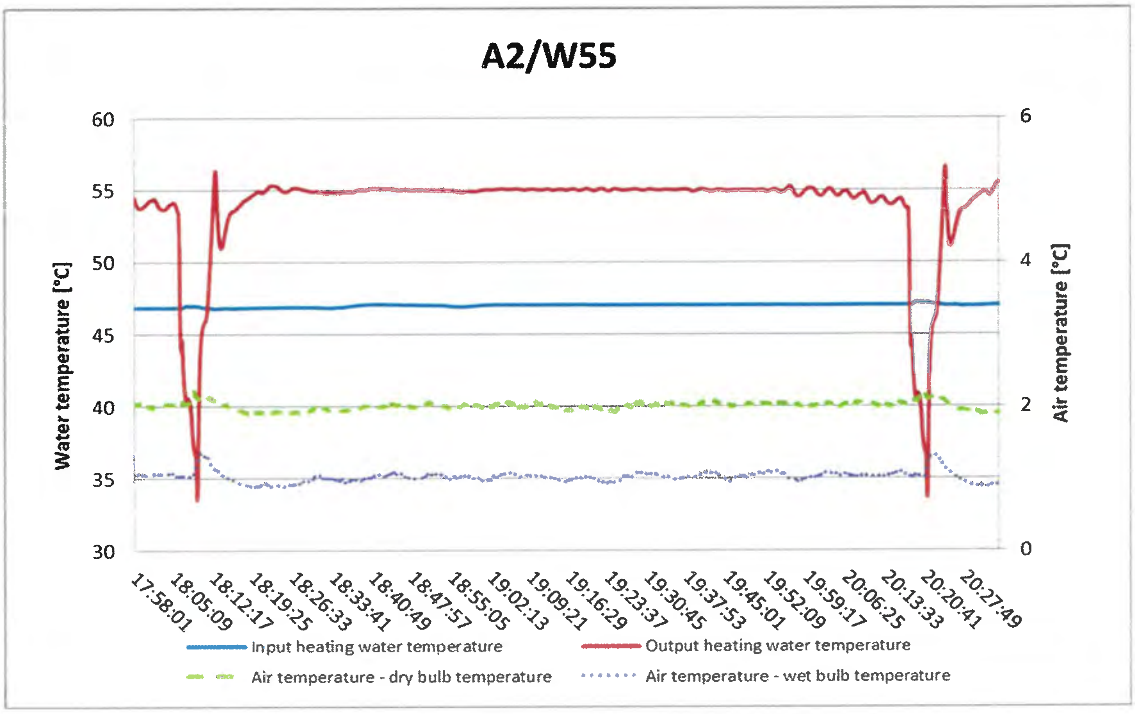


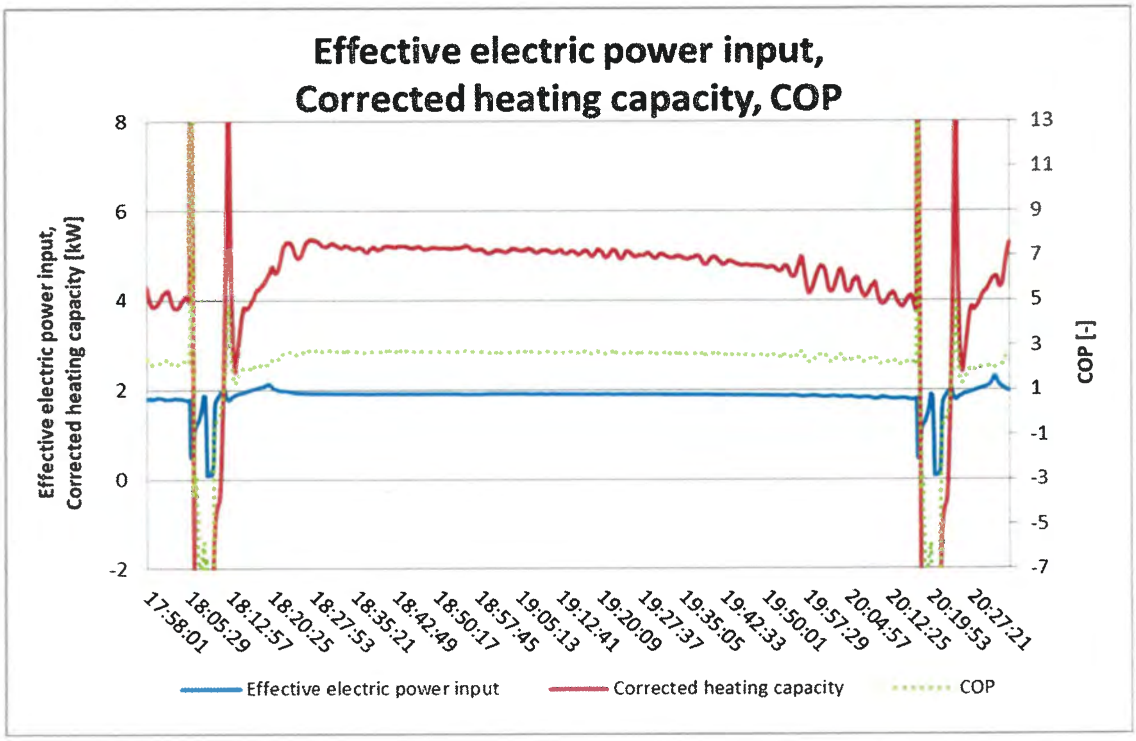
Heat pump **Airmax³ 7GT:** A-7/W52 (4000 rpm)



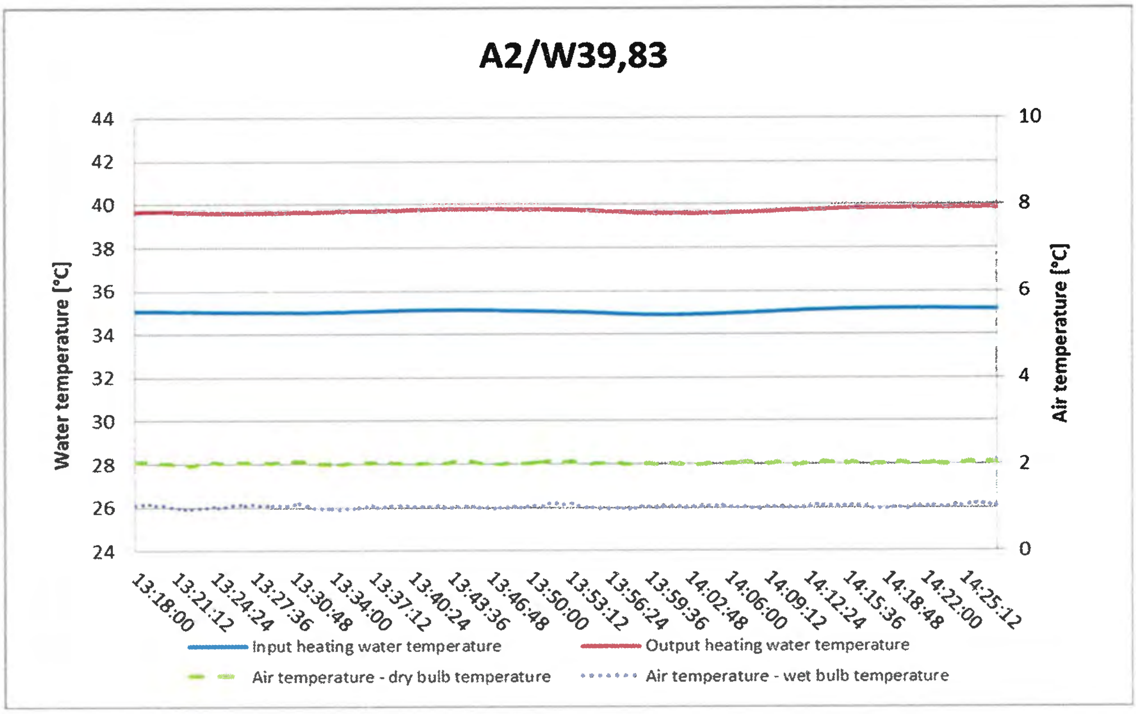


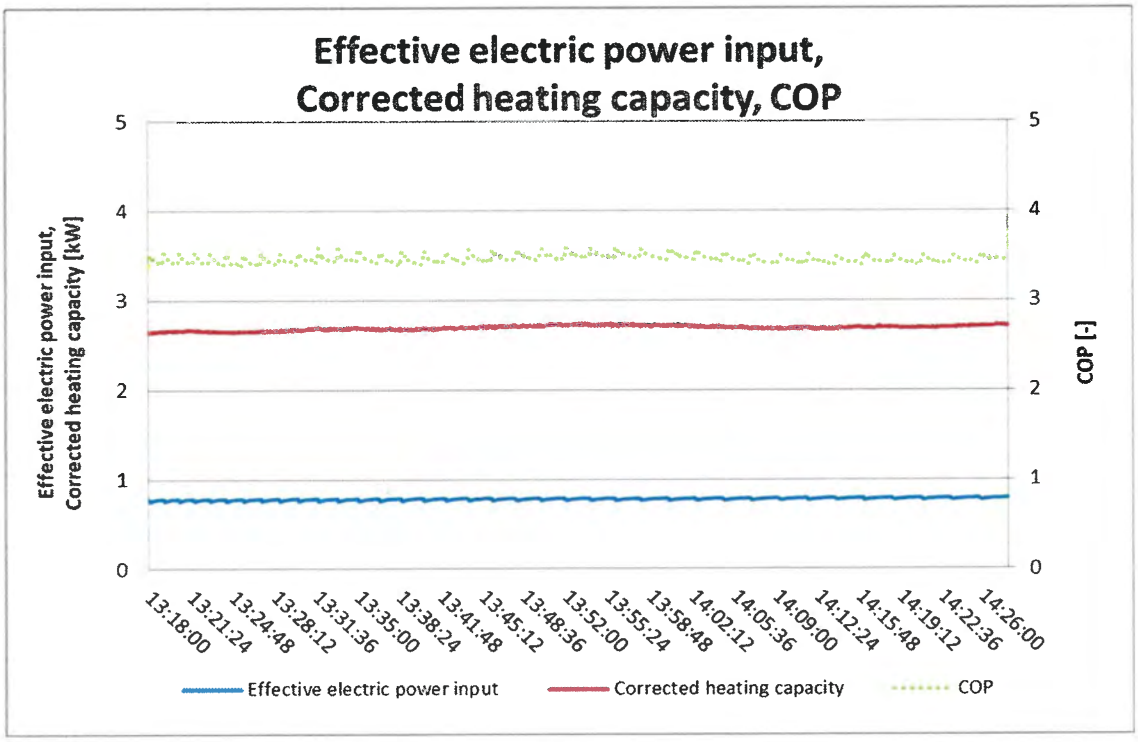
Heat pump **Airmax[3] 7GT:** A2/W55 (4000 rpm)



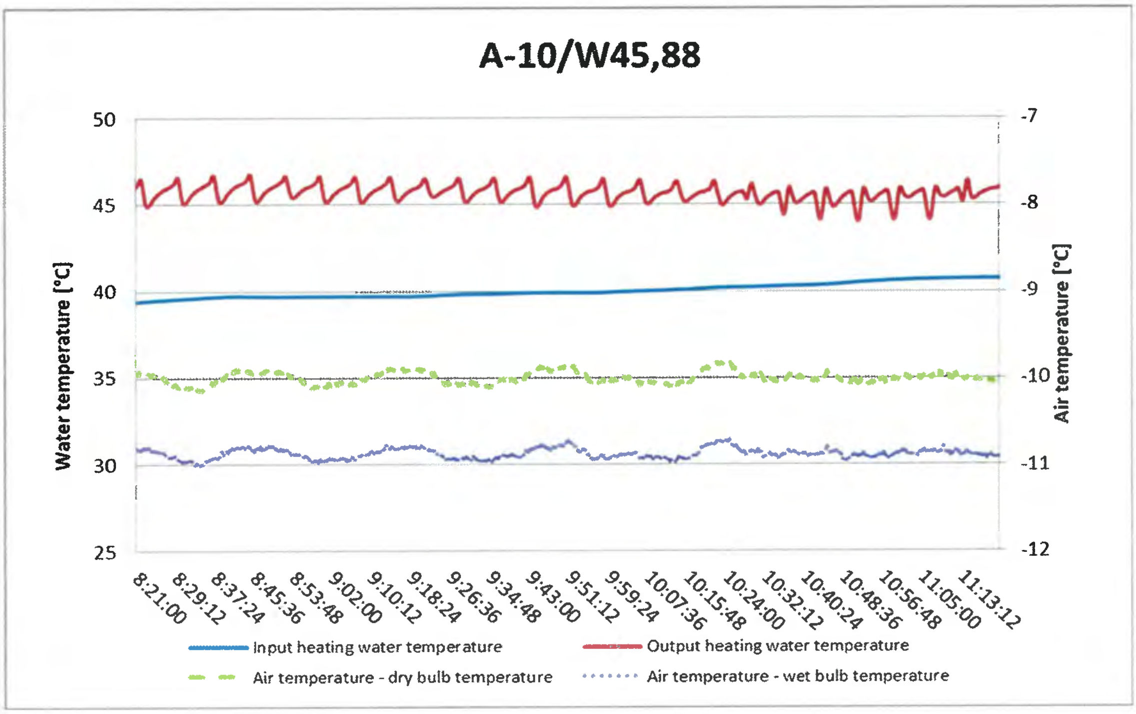


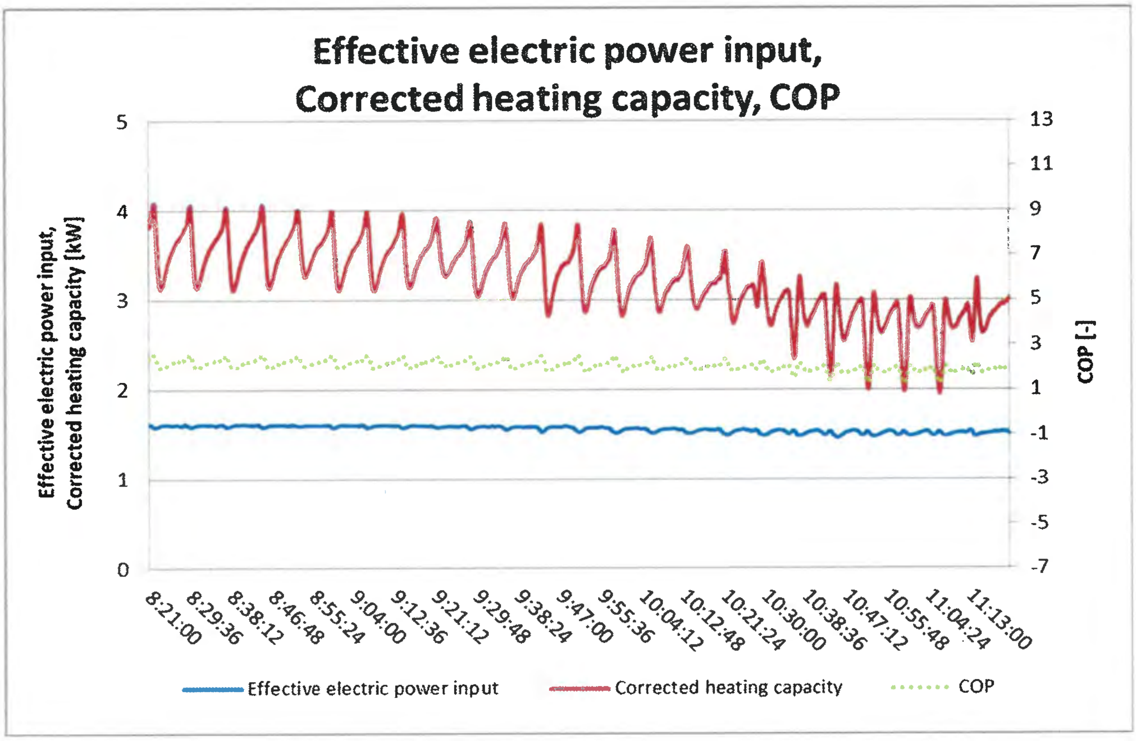
Heat pump **Airmax³ 7GT:** A2/W39.83 (1900 rpm)





Heat pump **Airmax³ 7GT:** A-10/W45.88 (4000 rpm)





VI. A list of other referenced documents

- 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

- Order of 2021-09-14 (Order reg. no. B-74280, received on 2021-09-17)
- Contract B-74280/31
- Amendments to Contract B-74280.D1 of 2021-11-29, B-74280.D2 of 2022-01-25, B-74280.D3 of 2022-01-27
- Background of the task 31-10718
- Record measurement file: 31-10718 Galmet (EHPA, LVD+EMC - inverter).zip

Test Report compiled by Ing. Dominik Šedivý

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

Test Report approved by:

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

-End of test report-

Strojírenský zkušební ústav, s.p. (Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe)
Brno, Republika Czeska
Engineering Test Institute, Public Enterprise, Brno, Czech Republic

CERTYFIKAT Z TESTÓW

Numer **O-B-00125-22**

Klient	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce POLAND
Produkt	Pompa ciepła zewnętrzna powietrze/woda – monoblok
Oznaczenie typu / Nazwa handlowa	**Airmax^3 5GT** **Airmax^3 7GT** **Airmax^3 12GT** **Airmax^3 14GT**
Metody prób	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
Podstawa wydania świadectwa	Protokoły z prób: 31-10718/T z dnia 2022-01-31 31-10718/H z dnia 2022-01-26 Dokumenty techniczne zasłane przez firmę "Galmet Sp. z o.o." Sp. K.
Zastosowania temperaturowe	**NISKA TEMPERATURA** (Temperatura referencyjna wody 35 °C)
Referencyjny okres grzewczy	**„A" = average / „W" = warmer / „C" = colder** (Referencyjne warunki obliczeniowe dla ogrzewania $T_{designh}$ = -10 °C / +2 °C / -22 °C)

Specyfikacja warunków:

Obroty sprężarki	**Zmienne**	Przepływ objętościowy wody grzewczej (wewnętrzny wymiennik ciepła)	**Zmienne**
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	**Zmienne**	Przepływ objętościowy substancji źródłowej (zewnętrzny wymiennik ciepła)	**–**
Funkcje	**Rewersyjna**		

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Česká republika
Engineering Test Institute, public enterprise, Hudcova 424/56b, 621 00 Brno, Czech Republic
www.szutest.cz

Wyniki:

Aplikacja dla niskiej temperatury
(Temperatura referencyjna wody 35 °C)

Nazwy modeli			Airmax³ 5GT	Airmax³ 7GT	Airmax³ 12GT	Airmax³ 14GT
Jednostki zewnętrzne			Airmax³ 5GT	Airmax³ 7GT	Airmax³ 12GT	Airmax³ 14GT
Jednostki wewnętrzne			Airmax³ 5GT (Nie testowano)	Airmax³ 7GT (Testowano)	Airmax³ 12GT (Nie testowano)	Airmax³ 14GT (Nie testowano)
Ogrzewanie przy pełnym obciążeniu	$P_{designh}$ [kW]	A	4.25	5.02	7.22	8.33
		W	4.05	4.68	6.74	7.65
		C	5.01	5.81	8.55	9.75
Temperatura biwalencji	$T_{bivalent}$ [°C]	A	-7	-7	-7	-7
		W	2	2	2	2
		C	-10	-10	-10	-10
Sezonowy współczynnik efektywności	SCOP [–]	A	4.47	4.47	4.73	4.74
		W	5.57	5.65 (Nie testowano)	5.97	6.00
		C	3.78	3.80 (Nie testowano)	4.01	4.02
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	η_s [%]	A	175.9	175.7	186.1	186.5
		W	219.7	222.9 (Nie testowano)	235.7	236.9
		C	148.0	149.1 (Nie testowano)	157.6	157.8

(*Testowano*) Ta próba była testowana w laboratorium badawczym.

(*Nie testowano*) Dane techniczne tego typu zostały podane przez producenta zgodnie ze specyfikacją linii modelowej i nie były testowane w laboratorium badawczym.

SZU niniejszym certyfikatem z testów potwierdza, że przeprowadził próby przedmiotowego produktu z podanymi powyżej wynikami. SZU jest akredytowanym laboratorium badawczym nr 1045.1.

Brno, 2022-02-17

Milan Holomek

Kierownik zakładu badawczego urządzeń cieplnych i ekologicznych

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

– KONIEC CERTYFIKATU Z TESTÓW –

Strojírenský zkušební ústav, s.p. (Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe)
Brno, Republika Czeska
Engineering Test Institute, Public Enterprise, Brno, Czech Republic

CERTYFIKAT Z TESTÓW

Numer **O-B-00126-22**

Klient	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce POLAND
Produkt	Pompa ciepła zewnętrzna powietrze/woda – monoblok
Oznaczenie typu / Nazwa handlowa	**Airmax^3 5GT** **Airmax^3 7GT** **Airmax^3 12GT** **Airmax^3 14GT**
Metody prób	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
Podstawa wydania świadectwa	Protokoły z prób: 31-10718/T z dnia 2022-01-31 31-10718/H z dnia 2022-01-26 Dokumenty techniczne zasłane przez firmę "Galmet Sp. z o.o." Sp. K.
Zastosowania temperaturowe	**ŚREDNIA TEMPERATURA** (Temperatura referencyjna wody 55 °C)
Referencyjny okres grzewczy	**„A“ = average / „W“ = warmer / „C“ = colder** (Referencyjne warunki obliczeniowe dla ogrzewania $T_{designh}$ = -10 °C / +2 °C / -22 °C)

Specyfikacja warunków:

Obroty sprężarki	**Zmienne**	Przepływ objętościowy wody grzewczej (wewnętrzny wymiennik ciepła)	**Zmienne**
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	**Zmienne**	Przepływ objętościowy substancji źródłowej (zewnętrzny wymiennik ciepła)	–
Funkcje	**Rewersyjna**		

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Česká republika
Engineering Test Institute, public enterprise, Hudcova 424/56b, 621 00 Brno, Czech Republic
www.szutest.cz

Wyniki:

Aplikacja dla średniej temperatury

(Temperatura referencyjna wody 55 °C)

Nazwy modeli			Airmax³ 5GT	Airmax³ 7GT	Airmax³ 12GT	Airmax³ 14GT
Jednostki zewnętrzne			Airmax³ 5GT	Airmax³ 7GT	Airmax³ 12GT	Airmax³ 14GT
Jednostki wewnętrzne			Airmax³ 5GT (Nie testowano)	Airmax³ 7GT (Testowano)	Airmax³ 12GT (Nie testowano)	Airmax³ 14GT (Nie testowano)
Ogrzewanie przy pełnym obciążeniu	$P_{designh}$ [kW]	A	4.09	4.69	6.83	7.66
		W	3.91	4.41	6.45	7.22
		C	4.68	4.72	7.40	8.13
Temperatura biwalencji	$T_{bivalent}$ [°C]	A	-7	-7	-7	-7
		W	2	2	2	2
		C	-10	-10	-10	-10
Sezonowy współczynnik efektywności	SCOP [–]	A	3.31	3.33	3.71	3.72
		W	3.97	4.03 (Nie testowano)	4.38	4.39
		C	2.89	2.91 (Nie testowano)	3.25	3.27
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	η_s [%]	A	129.3	130.2	145.2	145.8
		W	156.0	158.2 (Nie testowano)	172.1	172.6
		C	112.6	113.4 (Nie testowano)	126.9	127.9

(*Testowano*) Ta próba była testowana w laboratorium badawczym.

(*Nie testowano*) Dane techniczne tego typu zostały podane przez producenta zgodnie ze specyfikacją linii modelowej i nie były testowane w laboratorium badawczym.

SZU niniejszym certyfikatem z testów potwierdza, że przeprowadził próby przedmiotowego produktu z podanymi powyżej wynikami. SZU jest akredytowanym laboratorium badawczym nr 1045.1.

Brno, 2022-02-17

Milan Holomek

Kierownik zakładu badawczego urządzeń cieplnych i ekologicznych

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

– KONIEC CERTYFIKATU Z TESTÓW –

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Česká republika
Engineering Test Institute, public enterprise, Hudcova 424/56b, 621 00 Brno, Czech Republic
www.szutest.cz

Strojírenský zkušební ústav, s.p. (Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe)
Brno, Republika Czeska
Engineering Test Institute, Public Enterprise, Brno, Czech Republic

CERTYFIKAT Z TESTÓW

Numer **O-B-00124-22-rev. 1**

Klient	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce POLAND
Produkt	Pompa ciepła zewnętrzna powietrze/woda – monoblok
Oznaczenie typu / Nazwa handlowa	**Airmax^3 5GT** **Airmax^3 7GT** **Airmax^3 12GT** **Airmax^3 14GT**
Metody prób	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 12102-1:2018, EHPA Testing regulation – Testing of Air/Water Heat Pumps, version 2.4a
Podstawa wydania świadectwa	Protokoły z prób: 31-10718/T z dnia 2022-01-31 31-10718/H z dnia 2022-01-26 Dokumenty techniczne zasłane przez firmę "Galmet Sp. z o.o." Sp. K.
Zastosowania temperaturowe	**NISKA TEMPERATURA,** (Temperatura referencyjna wody 35 °C) **ŚREDNIA TEMPERATURA** (Temperatura referencyjna wody 55 °C)

Specyfikacja warunków:

Obroty sprężarki	**Zmienne**	Przepływ objętościowy wody grzewczej (wewnętrzny wymiennik ciepła)	**Zmienne**
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	**Zmienne**	Przepływ objętościowy substancji źródłowej (zewnętrzny wymiennik ciepła)	–
Funkcje	**Rewersyjna**		

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Česká republika
Engineering Test Institute, public enterprise, Hudcova 424/56b, 621 00 Brno, Czech Republic
www.szutest.cz

Wyniki:

Nazwy modeli			**Airmax^3 5GT**	**Airmax^3 7GT**	**Airmax^3 12GT**	**Airmax^3 14GT**
Jednostki zewnętrzne			**Airmax^3 5GT**	**Airmax^3 7GT**	**Airmax^3 12GT**	**Airmax^3 14GT**
Jednostki wewnętrzne			**Airmax^3 5GT**	**Airmax^3 7GT**	**Airmax^3 12GT**	**Airmax^3 14GT**
Warunki temperaturowe*			(Nie testowano)	(Testowano)	(Nie testowano)	(Nie testowano)
A7/W35	Skorygowana moc grzewcza	[kW]	3.94	4.76	6.10	7.40
	Efektywny pobór mocy elektrycznej	[kW]	0.78	0.95	1.17	1.44
	Współczynnik efektywności	[–]	5.05	5.03	5.20	5.15
	Nastawienie regulacji	[rpm]	2400	2900	2400	2900
A7/W55	Skorygowana moc grzewcza	[kW]	3.50	4.23	5.50	6.90
	Efektywny pobór mocy elektrycznej	[kW]	1.15	1.41	1.66	2.12
	Współczynnik efektywności	[–]	3.05	3.03	3.30	3.25
	Nastawienie regulacji	[rpm]	2400	2900	2400	2900
A2/W35	Skorygowana moc grzewcza	[kW]	2.50	2.94	3.96	4.68
	Efektywny pobór mocy elektrycznej	[kW]	0.61	0.73	0.91	1.09
	Współczynnik efektywności	[–]	4.10	4.04	4.35	4.30
	Nastawienie regulacji	[rpm]	1800	2100	1800	2100
Poziom mocy akustycznej przy warunku A7/W55* (przy 1900 rpm):						
L_{WA}	Jednostka zewnętrzna	[dB(A)]	58.9 ± 1.5	59.8 ± 1.5	61.0 ± 1.5	61.5 ± 1.5
	Jednostka wewnętrzna	[dB(A)]	31.9 ± 1.5	31.9 ± 1.5	31.9 ± 1.5	31.9 ± 1.5
Klasa dokładności	Jednostka zewnętrzna		Techniczna (Engineering) (2)			
	Jednostka wewnętrzna		Techniczna (Engineering) (2)			

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

"A" powietrze, "7" temperatura powietrza na wlocie (suchy termometr) w °C, "W" woda, "55" temperatura wody grzewczej na wylocie w °C.

(Testowano) Ta próbka do testów była testowana w laboratorium badawczym.

(Nie testowano) Dane techniczne tego typu zostały podane przez producenta zgodnie ze specyfikacją linii modelowej i nie były testowane w laboratorium badawczym.

SZU niniejszym certyfikatem z testów potwierdza, że przeprowadził próby przedmiotowego produktu z podanymi powyżej wynikami. SZU jest akredytowanym laboratorium badawczym nr 1045.1.

Brno, 2022-02-17

Milan Holomek

Kierownik zakładu badawczego urządzeń cieplnych i ekologicznych

– KONIEC CERTYFIKATU Z TESTÓW –

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Česká republika
Engineering Test Institute, public enterprise, Hudcova 424/56b, 621 00 Brno, Czech Republic
www.szutest.cz

Strojírenský zkušební ústav, s.p., Brno, Česká republika
Engineering Test Institute, Public Enterprise, Brno, Czech Republic

TEST CERTIFICATE

Number **O-B-00121-22**

Customer	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce POLAND
Product	Outdoor Air/Water Heat Pump – monobloc
Type designation / Trade mark	**Airmax^3 7GT**
Test methods	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, ČSN EN 12102-1:2018
Basis of certificate	Test reports: 31-10718/T of 2022-01-31 31-10718/H of 2022-01-26 Technical documents of "Galmet Sp. z o.o." Sp. K.
Reference heating season	**„A“ = average** (Reference design temperature $T_{designh}$ = -10 °C)

Results:

LOW TEMPERATURE (Reference water temperature 35 °C) — **MEDIUM TEMPERATURE** (Reference water temperature 55 °C)

LOW TEMPERATURE		MEDIUM TEMPERATURE
5.02	**$P_{designh}$ [kW]** … Full load heating	**4.69**
4.47	**SCOP [–]** … Seasonal coefficient of performance	**3.33**

Outdoor temperature T_j [°C]	Heating declared capacity P_{dh} [kW]	Coefficient of performance at the declared capacity COP_d [–]	Outdoor temperature T_j [°C]	Heating declared capacity P_{dh} [kW]	Coefficient of performance at the declared capacity COP_d [–]
T_j = -7	4.441	3.101	T_j = -7	4.153	2.251
T_j = +2	2.820	4.411	T_j = +2	2.647	3.255
T_j = +7	3.293	5.678	T_j = +7	3.146	4.251
T_j = +12	3.854	6.948	T_j = +12	3.718	5.497
T_j = TOL = -10	3.975	2.758	T_j = TOL = -10	3.708	1.937
T_j = $T_{bivalent}$ = -7	4.441	3.101	T_j = $T_{bivalent}$ = -7	4.153	2.251

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ

LOW TEMPERATURE (Reference water temperature 35 °C)				**MEDIUM TEMPERATURE** (Reference water temperature 55 °C)
	Power consumption in modes other than „active mode“:			
16.5	Off mode	P_{OFF}	[W]	**16.5**
16.6	Thermostat off mode	P_{TO}	[W]	**16.6**
16.5	Standby mode	P_{SB}	[W]	**16.5**
0	Crankcase heater mode	P_{CK}	[W]	**0**
	Annual electricity consumption for heating according to:			
2321	ČSN EN 14825:2020	Q_{HE}	[kWh]	**2912**
	Seasonal Space heating energy efficiency			
175.7	ČSN EN 14825:2020	η_s	[%]	**130.2**
	Liquid flow rate in outdoor heating exchanger:			
–	Source liquid	Min/Max	[m^3/h]	**–**
	Liquid flow rate in indoor heating exchanger:			
0.5/2.5	Heating water	Min/Max	[m^3/h]	**0.5/2.5**

Sound power level at condition A7W55* (at 1900 RPM):

– Outdoor unit –	L_{WA}	59.8 ± 1.5	dB(A)	Accuracy class 2 (Engineering)
– Indoor unit –	L_{WA}	31.9 ± 1.5	dB(A)	Accuracy class 2 (Engineering)

(*) Comment to abbreviated marking:
„A“ air, „7“ inlet temperature (dry-bulb temperature) in °C, „W“ water, „35“ outlet temperature in °C.

Specification of conditions:

Compressor speed control	**Variable**	Heating water volume flow rate (indoor heat exchanger)	**Variable**
Outlet water temperature (indoor heat exchanger)	**Variable**	Source liquid volume flow rate (outdoor heat exchanger)	**–**
Function	**Reversible**		

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

Brno, 2022-01-31

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

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

– END OF TEST CERTIFICATE –

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Česká republika
Engineering Test Institute, public enterprise, Hudcova 424/56b, 621 00 Brno, Czech Republic
www.szutest.cz

Marcin Kotlicki
Tłumacz przysięgły języka angielskiego
Wpisany do rejestru tłumaczy przysięgłych Ministerstwa Sprawiedliwości
pod numerem TP/32/12

Tłumaczenie przysięgłe z języka angielskiego

[logo]
Strojírenský zkušební ústav, s.p., Brno, Česká republika
Instytut Badań Inżynieryjnych, Przedsiębiorstwo Państwowe, Brno, Republika Czeska

ŚWIADECTWO BADAŃ
Numer **O-B-00121-22**

Klient	„Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce POLSKA
Produkt	Zewnętrzna pompa ciepła powietrze/woda – monoblok
Oznaczenie typu/Znak towarowy	**Airmax³ 7GT**
Metody badań	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14825:2020, Przepisy EHPA dotyczące badań - Testowanie pomp ciepła powietrze/woda, wersja 2.4a, ČSN EN 12102-1:2018
Podstawa wydania świadectwa	Sprawozdania z badań: 31-10718/T z dnia 2022-01-31 31-10718/H z dnia 2022-01-26 Dokumenty techniczne przedstawione przez „Galmet Sp. z o.o." Sp. K.
Referencyjny sezon grzewczy	„A" = umiarkowany (referencyjna temperatura projektowa T_{projh}=-10 °C)

Wyniki:

NISKA TEMPERATURA (Referencyjna temperatura wody 35°C)

ŚREDNIA TEMPERATURA (Referencyjna temperatura wody 55°C)

5,02	P_{projh} [kW] ... Tryb grzewczy przy pełnym obciążeniu	**4,69**
4,47	SCOP [-] ... Sezonowy współczynnik efektywności	**3,33**

Temperatura zewnętrzna T_j [°C]	Deklarowana wydajność grzewcza P_{dh} [kW]	Współczynnik efektywności przy deklarowanej wydajności COP_d [-]	Temperatura zewnętrzna T_j [°C]	Deklarowana wydajność grzewcza P_{dh} [kW]	Współczynnik efektywności przy deklarowanej wydajności COP_d [-]
T_j = -7	4.441	3.101	T_j = -7	4.153	2.251
T_j = +2	2.820	4.411	T_j = +2	2.647	3.255
T_j = +7	3.293	5.678	T_j = +7	3.146	4.251
T_j = +12	3.854	6.948	T_j = +12	3.718	5.497
T_j = TOL = -10	3.975	2.758	T_j = TOL = -10	3.708	1.937
T_j = T_{dwuw} = -7	4.441	3.101	T_j = T_{dwuw} = -7	4.153	2.251

 [hologram]

[pieczątka z logo i słowami „Strojírenský zkušební ústav, s.p., CZ1" w otoku]

[logo]

NISKA TEMPERATURA (referencyjna temperatura wody 35°C)				ŚREDNIA TEMPERATURA (referencyjna temperatura wody 55°C)
	Zużycie mocy w trybach innych niż „tryb aktywny"			
16,5	Tryb wyłączenia	P_{OFF}	[W]	16,5
16,6	Tryb wyłączenia termostatu	P_{TO}	[W]	16,6
16,5	Tryb czuwania	P_{SB}	[W]	16,5
0	Tryb włączonej grzałki karteru	P_{CK}	[W]	0
	Roczne zużycie energii elektrycznej na ogrzewanie zgodnie z			
2321	ČSN EN 14825:2020	Q_{HE}	[kWh]	2912
	Sezonowa efektywność energetyczna ogrzewania pomieszczeń			
175,7	ČSN EN 14825:2020	η_s	[%]	130,2
	Natężenie przepływu cieczy w zewnętrznym wymienniku ciepła			
-	Ciecz źródłowa	min/max	[m³/h]	-
	Natężenie przepływu cieczy w zewnętrznym wymienniku ciepła			
0,5/2,5	Woda grzewcza	min/max	[m³/h]	0,5/2,5

Poziom mocy akustycznej w warunkach A7W55* (przy 1900 obr/min):

-jednostka zewnętrzna-	L_{WA}	59,8 ± 1,5	dB(A)	Klasa dokładności 2 (inżynieryjna)
-jednostka wewnętrzna-	L_{WA}	31,9 ± 1,5	dB(A)	Klasa dokładności 2 (inżynieryjna)

(*) Uwaga dotycząca skróconego oznaczenia:
„A" powietrze, „7" temperatura wlotowa (suchego termometru) w °C, „W" woda, „35" temperatura wylotowa w °C

Specyfikacja warunków:

Sterowanie prędkością sprężarki	**Zmienne**	Przepływ objętościowy wody grzewczej (zewnętrzny wymiennik ciepła)	**Zmienny**
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	**Zmienna**	Objętość przepływu cieczy źródłowej (wewnętrzny wymiennik ciepła)	-
Praca	**Odwracalna**		

Instytut Badań Inżynieryjnych, Przedsiębiorstwo Państwowe, poprzez wydanie niniejszego Świadectwa Badania potwierdza, że na podstawie badania danego produktu uzyskano wyniki podane powyżej. Instytut Badań Inżynieryjnych, Przedsiębiorstwo Państwowe, jest akredytowanym Laboratorium Badawczym nr 1045.1.
Brno, 2022-01-31

[nieczytelny podpis]
Milan Holomek
Kierownik Stanowiska Badań Urządzeń Grzewczych i Ekologicznych

[pieczątka z logo i słowami „Strojírenský zkušební ústav, s.p., CZ1" w otoku]

- KONIEC ŚWIADECTWA BADAŃ -

Strojírenský zkušební ústav, s.p. Hudcova 424/56b, 621 00 Brno, Česká republika
Instytut Badań Inżynieryjnych, Przedsiębiorstwo Państwowe, Hudcova 424/56b, 621 00 Brno, Republika Czeska
www.szutest.cz

Niniejszym potwierdzam zgodność powyższego tłumaczenia z przedłożonym mi skanem dokumentu w języku angielskim.
Poznań, dnia 7 maja 2024 r.
Tłumacz przysięgły języka angielskiego Marcin Kotlicki
Nr TP/32/12
ul. Rataje 162/13, 61-168 Poznań
nr rep 475/2024

MARCIN KOTLICKI TŁUMACZ PRZYSIĘGŁY JĘZYKA ANGIELSKIEGO NR TP/32/12

OŚWIADCZENIE

Producent " Galmet Sp. z o.o." Sp.K oświadcza, iż pompy ciepła

1) Airmax3 5GT 09-270501
Oznaczenie/typ/identyfikator modelu

2) Airmax3 7GT 09-270701
Oznaczenie/typ/identyfikator modelu

3) Airmax3 12GT 09-271203
Oznaczenie/typ/identyfikator modelu

4) Airmax3 14GT 09-271403
Oznaczenie/typ/identyfikator modelu

5)
Oznaczenie/typ/identyfikator modelu

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

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

Głubczyce, 17.04.2024
Miejscowość, data

Galmet Sp. z o.o. Sp. K.
48-100 Głubczyce ul. Raciborska 36
inż. Marek Balicz
Product Manager
produkcji pomp ciepła
Podpis osoby upoważnionej