Testing Laboratory 1045.1
Accredited by the Czech Accreditation Institute pursuant to
ČSN EN ISO/IEC 17025:2005
Strojírenský zkušební ústav, s.p. Testing Laboratory, Hudcova 424/56b, 621 00 Brno
Workplace Brno, Hudcova 424/56b, 621 00 Brno, Czech Republic

L 1045.1

TEST REPORT
39-11227/T

Product:	Air/Water Heat Pump – monobloc
Type designation	**Airmax^2 21GT**
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 date issue:	2018-01-05
Distribution list:	1 copy to the Engineering Test Institute 1 copy to the Customer

The tests were conducted on the basis:
- Order B-59756 of 2017-06-27 (Order reg. no. B-59756 delivered on 2017-06-28)
- Contract B-59756/39
- Amendment No. 1 to Contract B-59756/39

I. Description of tested product

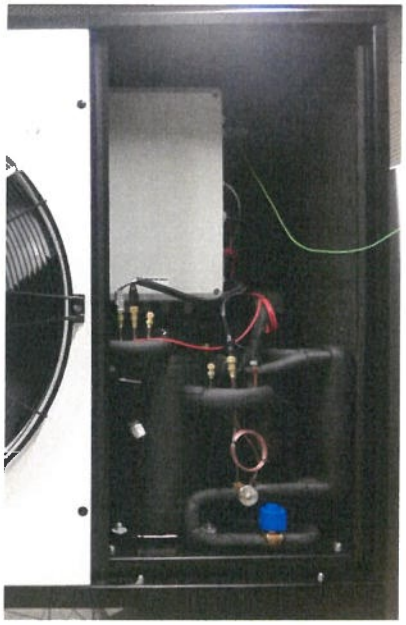
The Heat pump **Airmax^2 21GT** from the company ***"Galmet Sp. z o.o." Sp. K.*** is structurally adapted to operate in air/water system. Device is designed as monobloc. Refrigerant R-410A is used with charge 5.50 kg. Power supply is three-phase. Heat pump is able to work in heating/cooling mode.

Main components of the unit **Airmax^2 21GT**:

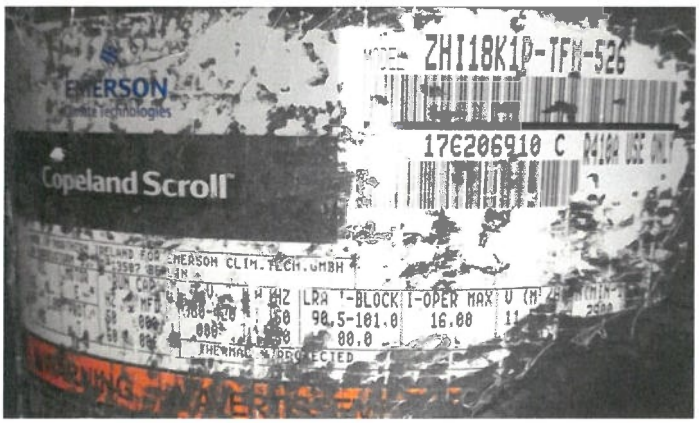
- Cuboid shape with dimensions 1470 × 700 × 1400 mm (W × D × H)
- Frame and casing made of varnished steel
- Cuboid evaporator (4-row), dimensions 960 × 84 × 1090 mm (L × D × H), spacing 2.1 mm, with surface treatment
- Electric expansion valve Carel E2V35
- Thermostatic expansion valve (for EVI) Alco controls TX3-Z35
- Solenoid valve (for EVI) Sanhua China MQ-AO3226
- Axial fan with motor Ziehl-Abegg FN080-ZII.DG.V5P4, ø800
- Refrigerant R-410A (charge: 5.50 kg)
- Filterdehydrator Sanhua, view glass Sanhua
- Plate condenser with heat insulation, dimensions 120 × 190 × 560 mm (W × D × H)
- EVI with heat insulation, dimensions 90 × 50 × 320 mm (W × D × H)
- Water pump Grundfoss UPML GEO 25-105
- 4-way reversing valve Sanhua SHF-35B-67-02-E
- 2× Pressure transducer Carel
- 2× Pressure switch Emerson
- Temperature sensors on refrigerant pipe, outside on casing and others for external devices
- Electric backup heater 7 kW
- Compressor Emerson Copeland Scroll ZHI18K1P-TFM-526

Photos:

Heat pump **Airmax^2 21GT**
– unit with cover –



Heat pump **Airmax^2 21GT**
– unit without cover (detail) –



Heat pump **Airmax^2 21GT**
– unit label –

Heat pump **Airmax^2 21GT**
– compressor label –

II. Sample tested

- Number of samples: 1
- Name of samples: Heat pump **Airmax² 21GT**
- Date of submission or collection: 2017-12-07 (2017-11-20)
- Reg. number: 0213.17.17724.000 (0213.17.17692.000)
- Serial number: 17P001407

The visual inspection, testing and verification were carried out by Ing. Tomáš Fiala at the test station of SZU.

III. Measuring and testing equipment

The testing was conducted using measurement and testing equipment with valid calibration.

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.	Flow meter Krohne Optiflux	022370/4	03/2020	6015-KL-P0163-16
3.	Barometer	022370/7	04/2019	3373/2014
4.	Differential pressure gauge	022370/8	08/2018	160137
5.	Temperature-humidity meter HC2-IC305	022370/10	07/2019	6036-KL-V0248-14
6.	Temperature-humidity meter HC2-IC305	022370/11	07/2019	6036-KL-V0247-14
7.	Thermometers	022370/13	04/2020	170052

IV. Test results

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÷4:2014** **ČSN EN 14825:2016** **EHPA Testing regulation** – Testing of Air/Water Heat Pumps, ver. 2.3
Sample tested	Heat pump **Airmax² 21GT**
Measuring equipment used	See chapter III.

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

a) Rating conditions:

Measurement results:

Test number		1	2	3
Assessment condition		**Rating condition**		
Specification of the assessment condition (*)		**A7/W35**	**A2/W35**	**A7/W55**
Date of testing		**2017-11-21**	**2017-11-22**	**2017-11-22**
Transient test procedure	YES / NO	NO	YES	NO
Average defrost time of 1 cycle	[min]	-	4.3	-
Average time of 1 cycle	[min]	-	45.1	-
Calculation time	[min]	70.0	135.4	70.0
Output heating water – temperature calculation	[°C]	35.00	33.88	55.01
Input heating water – temperature calculation	[°C]	29.98	30.28	46.90
Output heating water temperature	[°C]	35.00	35.06	55.01
Input heating water temperature	[°C]	29.98	30.73	46.90
Air temperature - dry bulb temperature	[°C]	7.01	1.96	7.01
Air temperature - wet bulb temperature	[°C]	6.02	0.98	6.02
Relative humidity	[%]	87.04	84.09	86.99
Barometric pressure	[kPa]	98.132	98.165	98.163
Ambient temperature	[°C]	7.01	1.96	7.01
Secondary circuit pressure difference	[kPa]	1.180	1.368	5.414
Efficiency of the secondary liquid pump	[-]	0.076	0.080	0.107
Volume flow rate of heating water	$[m^3 \cdot h^{-1}]$	3.6253	3.6165	2.2905
Density of heating water	$[kg \cdot m^{-3}]$	994.0	994.3	985.8
Specific heat capacity of heating water	$[kJ \cdot kg^{-1} \cdot K^{-1}]$	4.180	4.180	4.180
Voltage	[V]	400.08	399.45	399.51
Total current	[A]	29.17	28.28	36.59
Overall power input	[kW]	4.601	4.360	6.791
Partial power input of secondary liquid pump	[W]	15.57	17.18	32.23
Heating capacity - heating water	[kW]	20.997	15.048	21.248
Corrected heating capacity - heating water	**[kW]**	**20.981**	**15.031**	**21.216**
Uncertainty of corrected heating capacity	[kW]	± 0.299	± 0.297	± 0.189
Effective electric power input	**[kW]**	**4.586**	**4.342**	**6.759**
COP	**[-]**	**4.575**	**3.461**	**3.139**
Uncertainty of COP	[-]	± 0.065	± 0.069	± 0.028
Control settings	**[ ]**	-	-	-
Circulation pump settings – heating water	[%]	55	55	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)

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 **Airmax^2 21GT**
Design	Air / Water – monobloc

Conditions specification according to ČSN EN 14825:2016	Temperature application	**Low** (reference water temperature 35 °C)
	Reference heating season	**A, W, C**
	Outlet water temperature - indoor heat exchanger	Variable
	Compressor speed control	Fixed
	Water flow rate – primary circuit	-
	Water flow rate – secondary circuit	Variable

Seasonal space heating energy efficiency	Heating	Average	**η_s / A**	**154.2**	%
		Warmer	η_s / W	194.5 (not tested)	%
		Colder	η_s / C	130.1 (not tested)	%
Seasonal efficiency according to ČSN EN 14825:2016	Heating	Average	**SCOP / A**	**3.93**	-
		Warmer	SCOP / W	4.94 (not tested)	-
		Colder	SCOP / C	3.33 (not tested)	-

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

Full heating load	Cooling		$P_{designc}$	-	kW
	Heating	Average	**$P_{designh}$**	**14.12**	kW
		Warmer	**$P_{designh}$**	**14.27**	kW
		Colder	**$P_{designh}$**	**15.58**	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	-20	°C
		Warmer	TOL	-20	°C
		Colder	TOL	-20	°C
Seasonal power consumption according to ČSN EN 14825:2016	Cooling		Q_{CE}	-	kWh
	Heating	Average	Q_{HE}/A	7421	kWh
		Warmer	Q_{HE}/W	3863 (not tested)	kWh
		Colder	Q_{HE}/C	11539 (not tested)	kWh

Modes other than „active mode"	Off mode	P_{OFF}	9.8	W
	Thermostat off mode	P_{TO}	10.0	W
	Standby mode	P_{SB}	9.8	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 14825:2016:

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}	0.0100	[kW]
P_{SB}	0.0098	[kW]
P_{CK}	0.0000	[kW]
P_{OFF}	0.0098	[kW]
$P_{designh}$	14.12	[kW]
$SCOP_{ON}$	3.93	[-]

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]

$Q_H = 14.12 \cdot 2066 = 29170$ [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]

$Q_{HE} = 29170 / 3.93 + 178 \cdot 0.01 + 0 \cdot 0.0098 + 178 \cdot 0 + 0 \cdot 0.0098 = 7421$ [kWh]

7.2 General formula for calculation of reference SCOP

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

$SCOP = 29170 / 7421 = 3.93$ [-]

7.1 Calculation of the seasonal space heating efficiency η_s

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

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

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

$\eta_s (A) = (1 / 2.5) \cdot 3.93 - 0.03 =$ **1.542** [-]

Data for SCOP calculation (Heat pump **Airmax^2 21GT**)
- 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]	[%]	[kW]	[kW]	[-]	[-]	[-]	[-]	[kW]
A	-7	34.00	88.46	12.49	12.490	2.944	0.900	1.00	2.944	-
B	2	32.47	53.85	7.60	15.016	3.734	0.998	0.51	3.725	0.0100
C	7	30.80	34.62	4.89	20.357	4.949	0.998	0.24	4.911	0.0100
D	12	28.51	15.38	2.17	22.322	5.828	0.997	0.10	5.690	0.0100
TOL (E)	-10	35.00	100.00	14.12	10.789	2.524	0.900	1.31	2.524	-
Tbiv (F)	-7	34.00	88.46	12.49	12.490	2.944	0.900	1.00	2.944	-

Adaption of water temperature – according to ČSN EN 14825:2016, Annex D
- Low temperature application (reference water temperature 35 °C)
- Reference season "A" – average
- Condition D
- Variable water flow rate - secondary circuit

$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (t_{outlet,\ capacity\ test} - t_{inlet,\ capacity\ test}) \cdot CR$ [°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	22.322	[kW]
Declared capacity $_{standard\ rating\ condition\ A7/W35}$	-	[kW]
Part load	2.17	[kW]

Calculation of water temperature
$t_{outlet,\ capacity\ test,\ variable\ flow} = 24 + 5 - 2.17 / 22.32 \cdot 5 =$ **28.51** [°C]

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax² 21GT**)

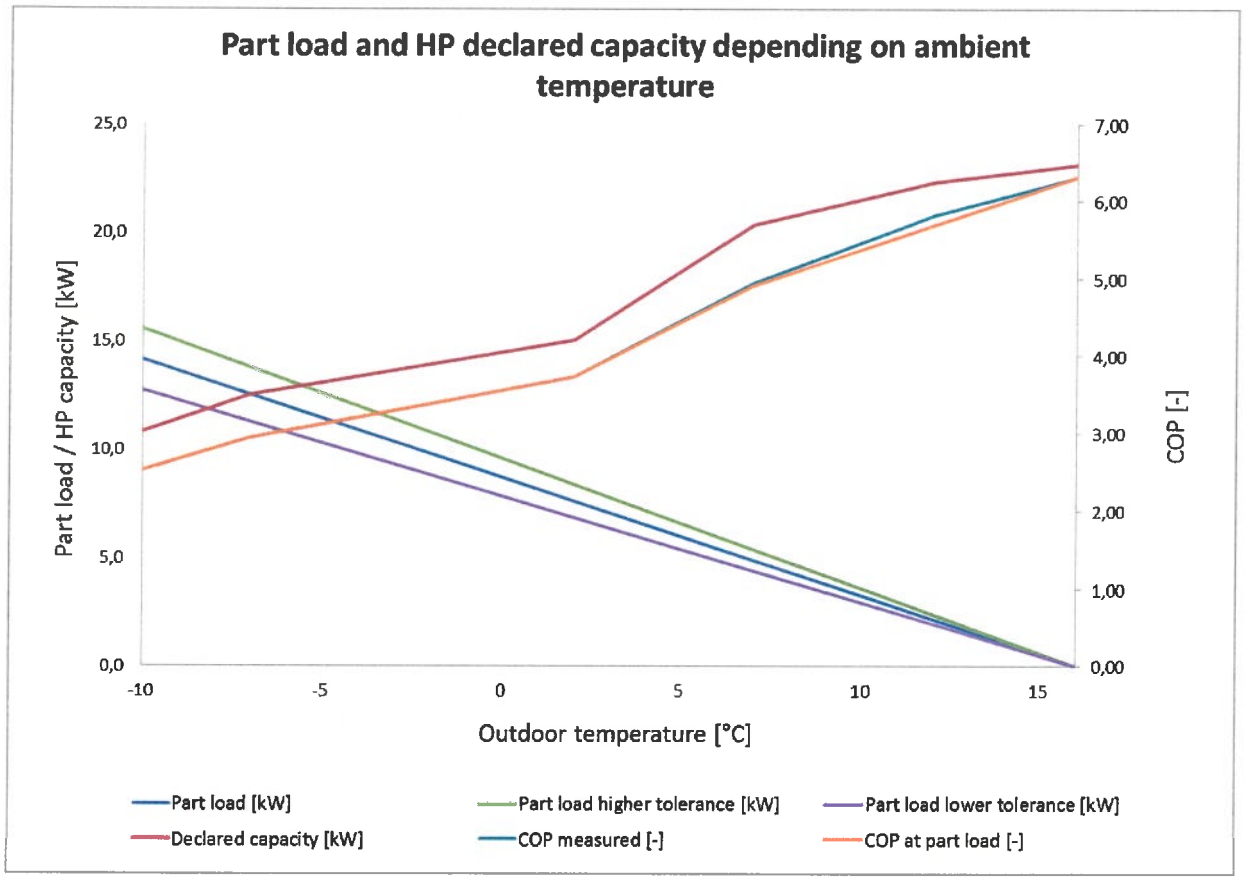
- Low temperature application (reference water temperature 35 °C)
- Reference heating season "A" – average

	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	T_j	h_j		$P_{h(Tj)}$			$elbu_{(Tj)}$	$h_j \times elbu_{(Tj)}$		$h_j \times P_{h(Tj)}$		$h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	
	[-]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[-]	[kWh]	[kWh]	[kWh]	[kWh]
TOL(E)	**21**	**-10**	**1**	**100.00**	**14.12**	**10.79**	**10.79**	**3.33**	**3.33**	**2.52**	**14**	**8**	**11**	**4**
	22	-9	25	96.15	13.58	11.36	11.36	2.22	55.51	2.66	339	162	284	107
	23	-8	23	92.31	13.03	11.92	11.92	1.11	25.53	2.80	300	123	274	98
A, Tbiv(F)	**24**	**-7**	**24**	**88.46**	**12.49**	**12.49**	**12.49**	**0.00**	**0.00**	**2.94**	**300**	**102**	**300**	**102**
	25	-6	27	84.62	11.95	12.77	11.95	0.00	0.00	3.03	323	106	323	106
	26	-5	68	80.77	11.40	13.05	11.40	0.00	0.00	3.12	775	249	775	249
	27	-4	91	76.92	10.86	13.33	10.86	0.00	0.00	3.20	988	308	988	308
	28	-3	89	73.08	10.32	13.61	10.32	0.00	0.00	3.29	918	279	918	279
	29	-2	165	69.23	9.77	13.89	9.77	0.00	0.00	3.38	1613	477	1613	477
	30	-1	173	65.38	9.23	14.17	9.23	0.00	0.00	3.46	1597	461	1597	461
	31	0	240	61.54	8.69	14.45	8.69	0.00	0.00	3.55	2085	587	2085	587
	32	1	280	57.69	8.15	14.74	8.15	0.00	0.00	3.64	2281	627	2281	627
B	**33**	**2**	**320**	**53.85**	**7.60**	**15.02**	**7.60**	**0.00**	**0.00**	**3.72**	**2433**	**653**	**2433**	**653**
	34	3	357	50.00	7.06	16.08	7.06	0.00	0.00	3.96	2520	636	2520	636
	35	4	356	46.15	6.52	17.15	6.52	0.00	0.00	4.20	2320	552	2320	552
	36	5	303	42.31	5.97	18.22	5.97	0.00	0.00	4.44	1810	408	1810	408
	37	6	330	38.46	5.43	19.29	5.43	0.00	0.00	4.67	1792	383	1792	383
C	**38**	**7**	**326**	**34.62**	**4.89**	**20.36**	**4.89**	**0.00**	**0.00**	**4.91**	**1593**	**324**	**1593**	**324**
	39	8	348	30.77	4.34	20.75	4.34	0.00	0.00	5.07	1512	298	1512	298
	40	9	335	26.92	3.80	21.14	3.80	0.00	0.00	5.22	1273	244	1273	244
	41	10	315	23.08	3.26	21.54	3.26	0.00	0.00	5.38	1026	191	1026	191
	42	11	215	19.23	2.72	21.93	2.72	0.00	0.00	5.53	584	105	584	105
D	**43**	**12**	**169**	**15.38**	**2.17**	**22.32**	**2.17**	**0.00**	**0.00**	**5.69**	**367**	**65**	**367**	**65**
	44	13	151	11.54	1.63	22.71	1.63	0.00	0.00	5.85	246	42	246	42
	45	14	105	7.69	1.09	23.11	1.09	0.00	0.00	6.00	114	19	114	19
	46	15	74	3.85	0.54	23.50	0.54	0.00	0.00	6.16	40	7	40	7
		Σ	4910							Σ	29165	7418	29080	7334

SCOPon	3.93	SCOPnet	3.97
		SCOP	**3.93**

Power diagram - Heat pump **Airmax^2 21GT**

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



Test results for single part load conditions (Heat pump **Airmax^2 21GT**)

Measurement results:

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		**A, Tbiv (F)**	**B**	**C**
Specification of the assessment condition (*)		**A-7/W34**	**A2/W32.47**	**A7/W30.8**
Date of testing		**2017-11-23**	**2017-11-24**	**2017-12-07**
Transient test procedure	YES / NO	YES	YES	NO
Average defrost time of 1 cycle	[min]	4.7	4.4	-
Average time of 1 cycle	[min]	79.7	44.6	-
Calculation time	[min]	79.7	133.9	70.0
Output heating water – temperature calculation	[°C]	33.30	31.30	30.84
Input heating water – temperature calculation	[°C]	28.87	27.14	25.80
Output heating water temperature	[°C]	34.05	32.49	30.84
Input heating water temperature	[°C]	29.07	27.53	25.80
Air temperature - dry bulb temperature	[°C]	-7.03	1.96	7.01
Air temperature - wet bulb temperature	[°C]	-8.03	0.97	6.02
Relative humidity	[%]	74.96	84.03	87.05
Barometric pressure	[kPa]	98.437	98.620	98.766
Ambient temperature	[°C]	-7.03	1.96	7.01
Secondary circuit pressure difference	[kPa]	3.424	2.895	2.157
Efficiency of the secondary liquid pump	[-]	0.094	0.097	0.091
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	2.4492	3.1244	3.5017
Density of heating water	[$kg \cdot m^{-3}$]	994.5	995.1	995.3
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.180	4.180	4.180
Voltage	[V]	398.70	399.81	399.58
Total current	[A]	27.95	27.31	27.73
Overall power input	[kW]	4.267	4.048	4.137
Partial power input of secondary liquid pump	[W]	24.68	25.98	22.97
Heating capacity - heating water	[kW]	12.515	15.042	20.380
Corrected heating capacity - heating water	**[kW]**	**12.490**	**15.016**	**20.357**
Uncertainty of corrected heating capacity	[kW]	± 0.202	± 0.257	± 0.289
Effective electric power input	**[kW]**	**4.242**	**4.022**	**4.114**
COP	**[-]**	**2.944**	**3.734**	**4.949**
Uncertainty of COP	[-]	± 0.048	± 0.064	± 0.071
Control settings	**[ ]**	-	-	-
Circulation pump settings – heating water	[%]	42	50	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)

Test results for single part load conditions (Heat pump **Airmax^2 21GT**)

Measurement results:

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		**D**	**TOL (E)**
Specification of the assessment condition (*)		**A12/W28.51**	**A-10/W35**
Date of testing		**2017-12-11**	**2017-12-08**
Transient test procedure	YES / NO	NO	YES
Average defrost time of 1 cycle	[min]	-	4.5
Average time of 1 cycle	[min]	-	102.6
Calculation time	[min]	70.0	102.6
Output heating water – temperature calculation	[°C]	28.54	34.25
Input heating water – temperature calculation	[°C]	23.50	29.72
Output heating water temperature	[°C]	28.54	34.97
Input heating water temperature	[°C]	23.50	29.95
Air temperature - dry bulb temperature	[°C]	12.04	-10.01
Air temperature - wet bulb temperature	[°C]	10.70	-11.04
Relative humidity	[%]	85.47	69.00
Barometric pressure	[kPa]	96.100	97.945
Ambient temperature	[°C]	12.04	-10.01
Secondary circuit pressure difference	[kPa]	0.849	2.670
Efficiency of the secondary liquid pump	[-]	0.070	0.082
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	3.8294	2.0393
Density of heating water	[$kg \cdot m^{-3}$]	995.9	994.2
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.180	4.180
Voltage	[V]	400.38	399.69
Total current	[A]	26.98	28.23
Overall power input	[kW]	3.843	4.292
Partial power input of secondary liquid pump	[W]	12.94	17.71
Heating capacity - heating water	[kW]	22.335	10.806
Corrected heating capacity - heating water	**[kW]**	**22.322**	**10.789**
Uncertainty of corrected heating capacity	[kW]	± 0.316	± 0.168
Effective electric power input	**[kW]**	**3.830**	**4.274**
COP	**[-]**	**5.828**	**2.524**
Uncertainty of COP	[-]	± 0.083	± 0.039
Control settings	**[ ]**	-	-
Circulation pump settings – heating water	[%]	58	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 (Heat pump **Airmax^2 21GT**)

Measurement results:

Test number		9	10	11
Temperature level		Low temperature application (reference water temperature 35 °C)		
Reference heating season		"W" = warmer ($T_{designh}$ = +2 °C)	"C" = colder ($T_{designh}$ = -22 °C)	
Assessment condition		**B, TOL (E), Tbiv (F)**	**C**	**Tbiv (F)**
Specification of the assessment condition (*)		**A2/W35**	**A7/W29.08**	**A-10/W30.75**
Date of testing		**2017-12-14**	**2017-12-13**	**2017-12-13**
Transient test procedure	YES / NO	YES	NO	YES
Average defrost time of 1 cycle	[min]	4.5	-	4.3
Average time of 1 cycle	[min]	45.5	-	77.3
Calculation time	[min]	136.5	70.0	154.7
Output heating water – temperature calculation	[°C]	33.72	29.07	29.81
Input heating water – temperature calculation	[°C]	29.48	24.09	25.45
Output heating water temperature	[°C]	35.11	29.07	30.68
Input heating water temperature	[°C]	30.00	24.09	25.72
Air temperature - dry bulb temperature	[°C]	1.98	7.02	-10.01
Air temperature - wet bulb temperature	[°C]	0.98	6.02	-11.01
Relative humidity	[%]	84.05	86.99	69.79
Barometric pressure	[kPa]	96.872	97.447	98.695
Ambient temperature	[°C]	1.98	7.02	-10.01
Secondary circuit pressure difference	[kPa]	0.719	6.442	5.696
Efficiency of the secondary liquid pump	[-]	0.061	0.129	0.106
Volume flow rate of heating water	$[m^3 \cdot h^{-1}]$	2.9029	3.4930	2.0980
Density of heating water	$[kg \cdot m^{-3}]$	994.3	995.8	995.5
Specific heat capacity of heating water	$[kJ \cdot kg^{-1} \cdot K^{-1}]$	4.180	4.180	4.180
Voltage	[V]	399.83	400.39	399.95
Total current	[A]	27.86	27.24	27.15
Overall power input	[kW]	4.206	3.923	3.933
Partial power input of secondary liquid pump	[W]	7.84	48.38	30.89
Heating capacity - heating water	[kW]	14.282	20.077	10.689
Corrected heating capacity - heating water	**[kW]**	**14.275**	**20.029**	**10.658**
Uncertainty of corrected heating capacity	[kW]	± 0.239	± 0.288	± 0.173
Effective electric power input	**[kW]**	**4.198**	**3.875**	**3.902**
COP	**[-]**	**3.400**	**5.169**	**2.732**
Uncertainty of COP	[-]	± 0.057	± 0.075	± 0.044
Control settings	**[ ]**	-	-	-
Circulation pump settings – heating water	[%]	45	57	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)

c) Seasonal performance tests ond 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 **Airmax^2 21GT**			
Design				Air / Water – monobloc			
Conditions specification according to ČSN EN 14825:2016	Temperature application			**Medium** (reference water temperature 55 °C)			
	Reference heating season			**A, W, C**			
	Outlet water temperature - indoor heat exchanger			Variable			
	Compressor speed control			Fixed			
	Water flow rate – primary circuit			-			
	Water flow rate – secondary circuit			Variable			
Seasonal space heating energy efficiency	Heating	Average	η_s / A	**118.8**		%	
		Warmer	η_s / W	139.3	(not tested)	%	
		Colder	η_s / C	97.6	(not tested)	%	
Seasonal efficiency according to ČSN EN 14825:2016	Heating	Average	**SCOP / A**	**3.04**		-	
		Warmer	SCOP / W	3.56	(not tested)	-	
		Colder	SCOP / C	2.52	(not tested)	-	
Function	Cooling			Yes			
	Heating	Yes	Reference heating season	Average	Yes		
				Warmer (if designated)	Yes		
				Colder (if designated)	Yes		
Full heating load	Cooling		$P_{designc}$	-		kW	
	Heating	Average	**$P_{designh}$**	**14.49**		kW	
		Warmer	**$P_{designh}$**	**14.63**		kW	
		Colder	**$P_{designh}$**	**15.13**		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	-20		°C	
		Warmer	TOL	-20		°C	
		Colder	TOL	-16		°C	
Seasonal power consumption according to ČSN EN 14825:2016	Cooling		Q_{CE}	-		kWh	
	Heating	Average	Q_{HE}/A	9834		kWh	
		Warmer	Q_{HE}/W	5495	(not tested)	kWh	
		Colder	Q_{HE}/C	14829	(not tested)	kWh	
Modes other than „active mode"	Off mode		P_{OFF}	9.8		W	
	Thermostat off mode		P_{TO}	9.7		W	
	Standby mode		P_{SB}	9.8		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 14825:2016:

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}	0.0097	[kW]
P_{SB}	0.0098	[kW]
P_{CK}	0.0000	[kW]
P_{OFF}	0.0098	[kW]
$P_{designh}$	14.49	[kW]
$SCOP_{ON}$	3.04	[-]

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]

$Q_H = 14.49 \cdot 2066 = 29938$ [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]

$Q_{HE} = 29938 / 3.04 + 178 \cdot 0.0097 + 0 \cdot 0.0098 + 178 \cdot 0 + 0 \cdot 0.0098 = 9834$ [kWh]

7.2 General formula for calculation of reference SCOP

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

$SCOP = 29938 / 9834 = 3.04$ [-]

7.1 Calculation of the seasonal space heating efficiency η_s

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

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

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

$\eta_s (A) = (1 / 2.5) \cdot 3.04 - 0.03 =$ **1.188** [-]

Data for SCOP calculation (Heat pump **Airmax^2 21GT**)
- 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]	[%]	[kW]	[kW]	[-]	[-]	[-]	[-]	[kW]
A	-7	52.00	88.46	12.82	12.819	2.171	0.900	1.00	2.171	-
B	2	45.69	53.85	7.80	14.468	2.806	0.998	0.54	2.802	0.0097
C	7	42.04	34.62	5.02	20.496	4.060	0.998	0.24	4.036	0.0097
D	12	37.18	15.38	2.23	21.856	5.046	0.998	0.10	4.949	0.0097
TOL (E)	-10	55.00	100.00	14.49	10.932	1.793	0.900	1.33	1.793	-
Tbiv (F)	-7	52.00	88.46	12.82	12.819	2.171	0.900	1.00	2.171	-

Adaption of water temperature – according to ČSN EN 14825:2016. Annex D

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

$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (t_{outlet,\ capacity\ test} - t_{inlet,\ capacity\ test}) \cdot CRu$ [°C]
$t_{outlet,\ average} = t_{inlet,\ capacity\ test} + (\Delta t) \cdot CRu$ [°C]
$t_{outlet,\ average} = t_{outlet,\ capacity\ test} - \Delta t + \Delta t \cdot CRu$ [°C]
$t_{outlet,\ capacity\ test} = t_{outlet,\ average} + \Delta t - \Delta t \cdot CRu$ [°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	21.856	[kW]
Declared capacity $_{standard\ rating\ condition\ A7/W55}$	-	[kW]
Part load	2.23	[kW]

Calculation of water temperature:
$t_{outlet,\ capacity\ test,\ variable\ flow} = 30 + 8 - 2.23 / 21.85 \cdot 8 =$ **37.18** [°C]

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax² 21GT**)

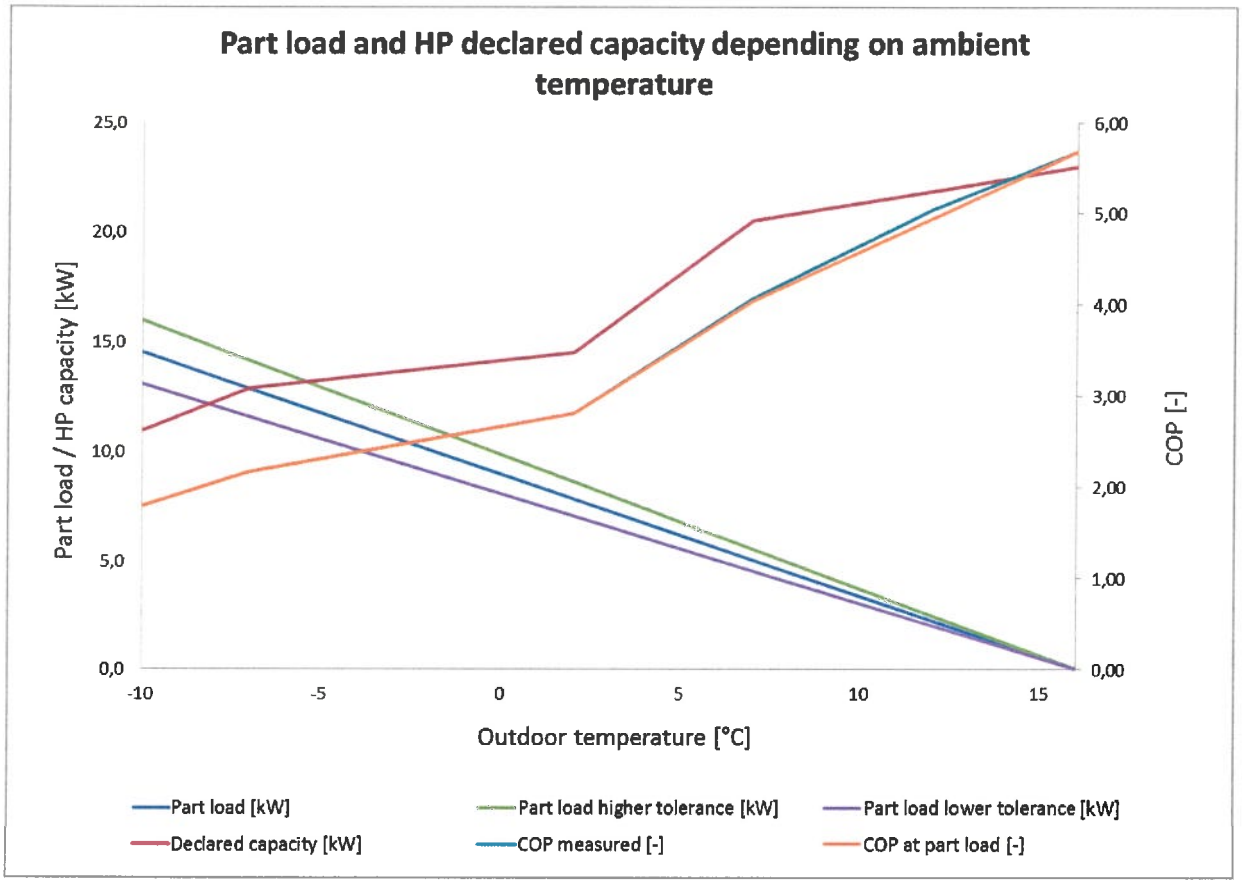
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season "A" – average

	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	T_j	h_j		$P_{h(Tj)}$			$elbu_{(Tj)}$	$h_j \times elbu_{(Tj)}$		$h_j \times P_{h(Tj)}$		$h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	
	[-]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[-]	[kWh]	[kWh]	[kWh]	[kWh]
TOL(E)	**21**	**-10**	**1**	**100.00**	**14.49**	**10.93**	**10.93**	**3.56**	**3.56**	**1.79**	**14**	**10**	**11**	**6**
	22	-9	25	96.15	13.93	11.56	11.56	2.37	59.31	1.92	348	210	289	151
	23	-8	23	92.31	13.38	12.19	12.19	1.19	27.28	2.05	308	164	280	137
A, Tbiv(F)	**24**	**-7**	**24**	**88.46**	**12.82**	**12.82**	**12.82**	**0.00**	**0.00**	**2.17**	**308**	**142**	**308**	**142**
	25	-6	27	84.62	12.26	13.00	12.26	0.00	0.00	2.24	331	148	331	148
	26	-5	68	80.77	11.70	13.19	11.70	0.00	0.00	2.31	796	344	796	344
	27	-4	91	76.92	11.15	13.37	11.15	0.00	0.00	2.38	1014	426	1014	426
	28	-3	89	73.08	10.59	13.55	10.59	0.00	0.00	2.45	942	384	942	384
	29	-2	165	69.23	10.03	13.74	10.03	0.00	0.00	2.52	1655	656	1655	656
	30	-1	173	65.38	9.47	13.92	9.47	0.00	0.00	2.59	1639	633	1639	633
	31	0	240	61.54	8.92	14.10	8.92	0.00	0.00	2.66	2140	804	2140	804
	32	1	280	57.69	8.36	14.28	8.36	0.00	0.00	2.73	2341	857	2341	857
B	**33**	**2**	**320**	**53.85**	**7.80**	**14.47**	**7.80**	**0.00**	**0.00**	**2.80**	**2497**	**891**	**2497**	**891**
	34	3	357	50.00	7.25	15.67	7.25	0.00	0.00	3.05	2587	849	2587	849
	35	4	356	46.15	6.69	16.88	6.69	0.00	0.00	3.30	2381	723	2381	723
	36	5	303	42.31	6.13	18.08	6.13	0.00	0.00	3.54	1858	524	1858	524
	37	6	330	38.46	5.57	19.29	5.57	0.00	0.00	3.79	1839	485	1839	485
C	**38**	**7**	**326**	**34.62**	**5.02**	**20.50**	**5.02**	**0.00**	**0.00**	**4.04**	**1635**	**405**	**1635**	**405**
	39	8	348	30.77	4.46	20.77	4.46	0.00	0.00	4.22	1552	368	1552	368
	40	9	335	26.92	3.90	21.04	3.90	0.00	0.00	4.40	1307	297	1307	297
	41	10	315	23.08	3.34	21.31	3.34	0.00	0.00	4.58	1053	230	1053	230
	42	11	215	19.23	2.79	21.58	2.79	0.00	0.00	4.77	599	126	599	126
D	**43**	**12**	**169**	**15.38**	**2.23**	**21.86**	**2.23**	**0.00**	**0.00**	**4.95**	**377**	**76**	**377**	**76**
	44	13	151	11.54	1.67	22.13	1.67	0.00	0.00	5.13	252	49	252	49
	45	14	105	7.69	1.11	22.40	1.11	0.00	0.00	5.31	117	22	117	22
	46	15	74	3.85	0.56	22.67	0.56	0.00	0.00	5.50	41	8	41	8
		Σ	4910							Σ	29933	9831	29842	9740

SCOPon	3.04	SCOPnet	3.06
		SCOP	**3.04**

Power diagram - Heat pump **Airmax^2 21GT**

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



Test results for single part load conditions (Heat pump **Airmax^2 21GT**)

Measurement results:

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		**A, Tbiv (F)****	**B****	**C**
Specification of the assessment condition (*)		**A-7/W52**	**A2/W45.69**	**A7/W42.04**
Date of testing		**2017-11-27**	**2017-12-12**	**2017-12-13**
Transient test procedure	YES / NO	YES	YES	NO
Average defrost time of 1 cycle	[min]	4.7	4.4	-
Average time of 1 cycle	[min]	98.4	47.2	-
Calculation time	[min]	98.4	141.7	70.0
Output heating water – temperature calculation	[°C]	50.86	43.99	41.97
Input heating water – temperature calculation	[°C]	43.87	37.44	33.98
Output heating water temperature	[°C]	51.83	45.59	41.97
Input heating water temperature	[°C]	43.98	37.67	33.98
Air temperature - dry bulb temperature	[°C]	-7.01	1.98	7.01
Air temperature - wet bulb temperature	[°C]	-8.01	1.00	6.02
Relative humidity	[%]	75.00	84.24	87.03
Barometric pressure	[kPa]	98.968	97.468	97.877
Ambient temperature	[°C]	-7.01	1.98	7.01
Secondary circuit pressure difference	[kPa]	3.233	3.991	5.591
Efficiency of the secondary liquid pump	[-]	0.080	0.091	0.107
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	1.5679	1.8727	2.2354
Density of heating water	[$kg \cdot m^{-3}$]	987.6	990.6	991.4
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.180	4.180	4.173
Voltage	[V]	398.37	398.82	399.70
Total current	[A]	33.58	30.92	30.63
Overall power input	[kW]	5.921	5.178	5.081
Partial power input of secondary liquid pump	[W]	17.14	22.45	32.40
Heating capacity - heating water	[kW]	12.836	14.490	20.528
Corrected heating capacity - heating water	**[kW]**	**12.819**	**14.468**	**20.496**
Uncertainty of corrected heating capacity	[kW]	± 0.129	± 0.154	± 0.185
Effective electric power input	**[kW]**	**5.904**	**5.156**	**5.048**
COP	**[-]**	**2.171**	**2.806**	**4.060**
Uncertainty of COP	[-]	± 0.022	± 0.030	± 0.037
Control settings	**[ ]**	-	-	-
Circulation pump settings – heating water	[%]	30	33	42

(*) *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)
(**) *Because of high capacity decreases actual values are not in tolerances given by standard.*

Test results for single part load conditions (Heat pump **Airmax² 21GT**)

Measurement results:

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		**D**	**TOL (E)****
Specification of the assessment condition (*)		**A12/W37.18**	**A-10/W55**
Date of testing		**2017-12-11**	**2017-12-08**
Transient test procedure	YES / NO	NO	YES
Average defrost time of 1 cycle	[min]	-	4.9
Average time of 1 cycle	[min]	-	-
Calculation time	[min]	70.0	180.0
Output heating water – temperature calculation	[°C]	36.91	54.49
Input heating water – temperature calculation	[°C]	29.00	46.92
Output heating water temperature	[°C]	36.91	55.01
Input heating water temperature	[°C]	29.00	46.99
Air temperature - dry bulb temperature	[°C]	12.00	-10.00
Air temperature - wet bulb temperature	[°C]	10.67	-11.04
Relative humidity	[%]	85.54	69.00
Barometric pressure	[kPa]	96.146	97.798
Ambient temperature	[°C]	12.00	-10.00
Secondary circuit pressure difference	[kPa]	6.099	2.456
Efficiency of the secondary liquid pump	[-]	0.113	0.069
Volume flow rate of heating water	$[m^3 \cdot h^{-1}]$	2.4019	1.2548
Density of heating water	$[kg \cdot m^{-3}]$	993.3	986.0
Specific heat capacity of heating water	$[kJ \cdot kg^{-1} \cdot K^{-1}]$	4.180	4.180
Voltage	[V]	399.67	398.89
Total current	[A]	28.36	34.25
Overall power input	[kW]	4.367	6.108
Partial power input of secondary liquid pump	[W]	36.10	12.28
Heating capacity - heating water	[kW]	21.892	10.945
Corrected heating capacity - heating water	**[kW]**	**21.856**	**10.932**
Uncertainty of corrected heating capacity	[kW]	± 0.199	± 0.103
Effective electric power input	**[kW]**	**4.331**	**6.096**
COP	**[-]**	**5.046**	**1.793**
Uncertainty of COP	[-]	± 0.046	± 0.017
Control settings	**[ ]**	-	-
Circulation pump settings – heating water	[%]	43	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)
(**) Because of high capacity decreases actual values are not in tolerances given by standard.

Test results for single part load conditions (Heat pump **Airmax² 21GT**)

Measurement results:

Test number		17	18	19
Temperature level		Medium temperature application (reference water temperature 55 °C)		
Reference heating season		"W" = warmer ($T_{designh}$ = +2 °C)	"C" = colder ($T_{designh}$ = -22 °C)	
Assessment condition		**B, TOL (E), Tbiv (F)****	**C**	**Tbiv (F)****
Specification of the assessment condition (*)		**A2/W55**	**A7/W38.61**	**A-10/W45.88**
Date of testing		**2017-12-12**	**2017-12-15**	**2017-12-13**
Transient test procedure	YES / NO	YES	NO	ANO
Average defrost time of 1 cycle	[min]	5.0	-	3.9
Average time of 1 cycle	[min]	62.2	-	48.0
Calculation time	[min]	124.4	70.0	144.0
Output heating water – temperature calculation	[°C]	53.52	38.56	44.14
Input heating water – temperature calculation	[°C]	46.73	30.58	37.39
Output heating water temperature	[°C]	55.03	38.56	45.85
Input heating water temperature	[°C]	46.98	30.58	37.81
Air temperature - dry bulb temperature	[°C]	2.00	7.00	-10.01
Air temperature - wet bulb temperature	[°C]	1.02	6.01	-11.01
Relative humidity	[%]	84.24	87.12	69.87
Barometric pressure	[kPa]	97.952	96.634	98.287
Ambient temperature	[°C]	2.00	7.00	-10.01
Secondary circuit pressure difference	[kPa]	4.557	5.070	1.901
Efficiency of the secondary liquid pump	[-]	0.094	0.104	0.064
Volume flow rate of heating water	$[m^3 \cdot h^{-1}]$	1.8279	2.2401	1.3320
Density of heating water	$[kg \cdot m^{-3}]$	986.4	992.7	990.5
Specific heat capacity of heating water	$[kJ \cdot kg^{-1} \cdot K^{-1}]$	4.180	4.180	4.180
Voltage	[V]	398.80	399.79	399.79
Total current	[A]	34.82	29.52	30.35
Overall power input	[kW]	6.272	4.731	4.988
Partial power input of secondary liquid pump	[W]	24.07	30.36	10.90
Heating capacity - heating water	[kW]	14.658	20.595	10.364
Corrected heating capacity - heating water	**[kW]**	**14.634**	**20.565**	**10.354**
Uncertainty of corrected heating capacity	[kW]	± 0.150	± 0.186	± 0.110
Effective electric power input	**[kW]**	**6.248**	**4.701**	**4.977**
COP	**[-]**	**2.342**	**4.374**	**2.080**
Uncertainty of COP	[-]	± 0.024	± 0.040	± 0.022
Control settings	**[ ]**	-	-	-
Circulation pump settings – heating water	[%]	33	40	25

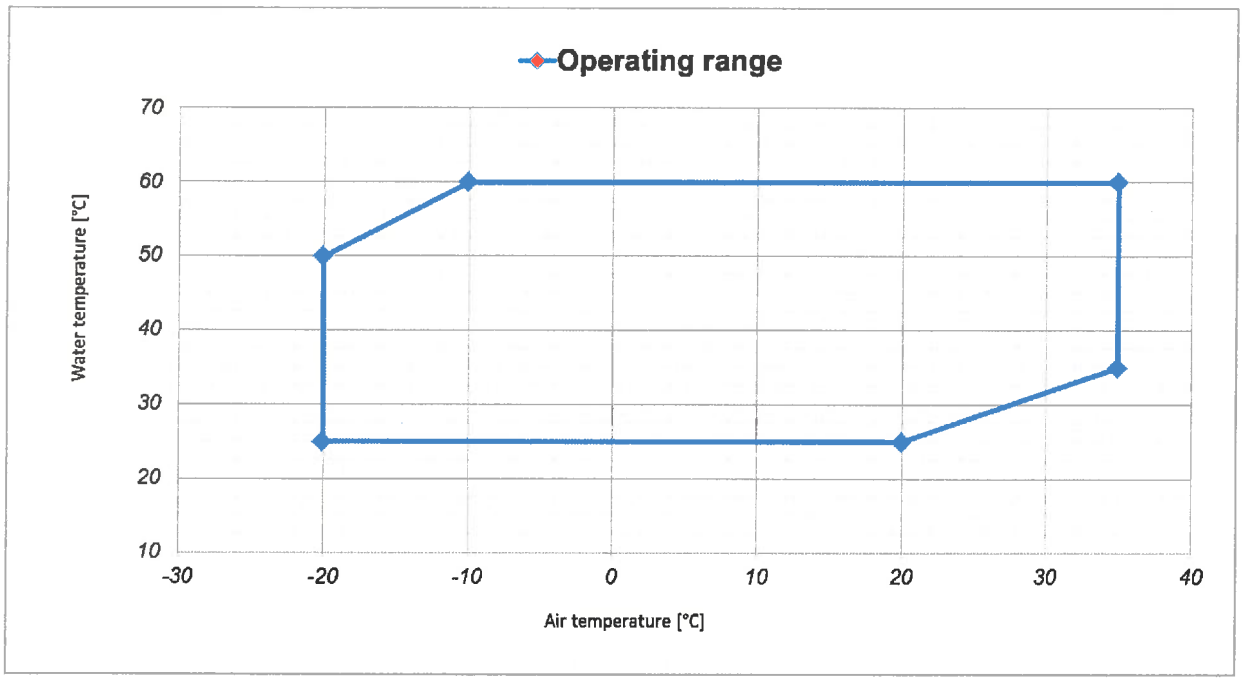
(*) Comment to abbreviated marking: e.g. A7/W35
A (air) 7 (input air, dry-bulb temperature in °C) / W (water), 35 (output heating water temperature in °C)
(**) Because of high capacity decreases actual values are not in tolerances given by standard.

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

Testing method	**ČSN EN 14511-4:2014** Art. 4.2, 4.3, 4.4, 4.5, 4.6, 4.7; **EHPA Testing regulation** – Testing of Air/Water Heat Pumps, ver. 2.3
Sample tested	Heat pump **Airmax² 21GT**
Measuring equipment used	See chapter III.

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

1) Temperature operating range



Heat pump air/water, heating	Input air dry bulb temperature [°C]		Output heating water temperature [°C]		Water flow rate in condenser [m³/h]	Note
1.	A	35	W	60	Maximum	Minimum water flow rate: **1.255 m³·h⁻¹** Maximum water flow rate: **4.500 m³·h⁻¹**
2.	A	-20	W	25	Minimum	
3.	A	-20	W	50	Maximum	

Heat pump **Airmax² 21GT** is fully operational in the temperature operating range.

Starting test

Test according to Article 4.2.1 of ČSN EN 14511-4:2014

Operational requirements conditions					
Type	**Inlet temperature at outdoor heat exchanger (°C)**	**Outlet temperature at indoor heat exchanger (°C)**	**Water flow rate or brine-to-water and water-to-water units**	**Voltage (V)**	**Test result**
All types	Upper limit of use	Upper limit of use	maximum	Rated voltage	+
All types	Lower limit of use	Lower limit of use	minimum	Rated voltage	+

Evaluation:
+... The unit has started and has been operating for at least 30 min (the lower limit of use) and has been operating for at least 60 min (the upper limit of use), without breaking off by 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) Test at maximum operating conditions (cooling mode)

Test according to Article 4.2.2 of ČSN EN 14511-4:2014

Maximum operating conditions				
Type	**Inlet temperature at outdoor heat exchanger (°C)**	**Outlet temperature at indoor heat exchanger (°C)**	**Voltage (V)**	**Test result**
Control cabinet air conditioner	Upper limit of use	35	Rated voltage	0
All other types	Upper limit of use	Upper limit of use	Rated voltage	x

Evaluation:
+... The unit has not been damaged; the motor operates without interruption for the first hour without tripping of the motor overload protective devices; after the shut-down period of 5 min. the unit shall restart automatically no more than 5 min. after restarting of the compressor; the unit motor shall operate again continuously for the rest of the second hour 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.

3) Freeze-up test

Air-cooled unit

Required operating conditions	Test result	Note
Test according to Article 4.2.3.1 ČSN EN 14511-4:2014	0	

Evaluation:
+... After the unit has been operated for 6 hours and after the last freeze up cycle has been completed. 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.

Water-cooled units

Required operating conditions	Test result	Note
Test according to Article 4.2.3.2 ČSN EN 14511-4:2014	x	

Evaluation:
+... After the unit has been operated for 6 hours, the following requirements shall be fulfilled:
- air flow through the unit shall not have dropped by more than 5 %;
- the water temperature difference through the unit shall not have dropped by more than 30 %;
- the saturated temperature corresponding to the pressure measured at the suction of the compressor shall not have decreased by more than 2 K.

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

4) 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 14511-4:2014 Art. 4.3	+	Pressure safety contact device

5) Shutting off the heat transfer medium flows

Required operating conditions	Test result	Note
Test for section a) Art. 4.4 ČSN EN 14511-4:2014	+	Frequent defrosting
Test for section b) Art. 4.4 ČSN EN 14511-4:2014	+	Flow switch
Test for section c) Art. 4.4 ČSN EN 14511-4:2014	0	
Test according to the table 4 Art. 4.4. ČSN EN 14511-4:2014	+	Flow switch

Evaluation:
+... The unit shall suffer no damage and shall remain capable of operating after restoration of the flow rates.
-... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

6) Complete power supply failure

Required operating conditions	Test result	Note
Test according to Article 4.5 of ČSN EN 14511-4:2014	+	

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.

7) Condensate draining and enclosure sweat test

Required operating conditions	Test result	Note
Test according to Article 4.6 of ČSN EN 14511-4:2014	+	Bottom free drain

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.

8) Defrosting

Required operating conditions	Test result	Note
Test according to Article 4.7 of ČSN EN 14511-4:2014	+	

Evaluation:
+... At least three successive frosting/defrosting cycles shall be repeated without running in progressively deteriorating average performances. There shall not be growth of ice in and around the drip tray.
-... The unit did not fulfill test requirements.
0... The requirement does not apply to the product concerned.
x... Test was not required.

V. Test results – Out of accredited tests

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

Testing method:	**ČSN EN 14511-2÷4:2014**; **ČSN EN 14825:2016**; **EHPA Testing regulation** – Testing of Air/Water Heat Pumps, version 2.3.
Sample tested	Heat pump **Airmax² 21GT**

a) SCOP calculation – Low temperature application (reference water temperature 35 °C)
– Reference heating season "W" – warmer

Data for SCOP calculation (Heat pump **Airmax² 21GT**)

	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	14.27	14.275	3.400	0.900	1.00	3.400	-
C	7	33.82	64.29	9.18	21.000	4.790	0.998	0.42	4.775	0.0100
D	12	30.09	28.57	4.08	22.410	5.430	0.998	0.18	5.372	0.0100
TOL (E)	2	35.00	100.00	14.27	14.275	3.400	0.900	1.00	3.400	-
Tbiv (F)	2	35.00	100.00	14.27	14.275	3.400	0.900	1.00	3.400	-

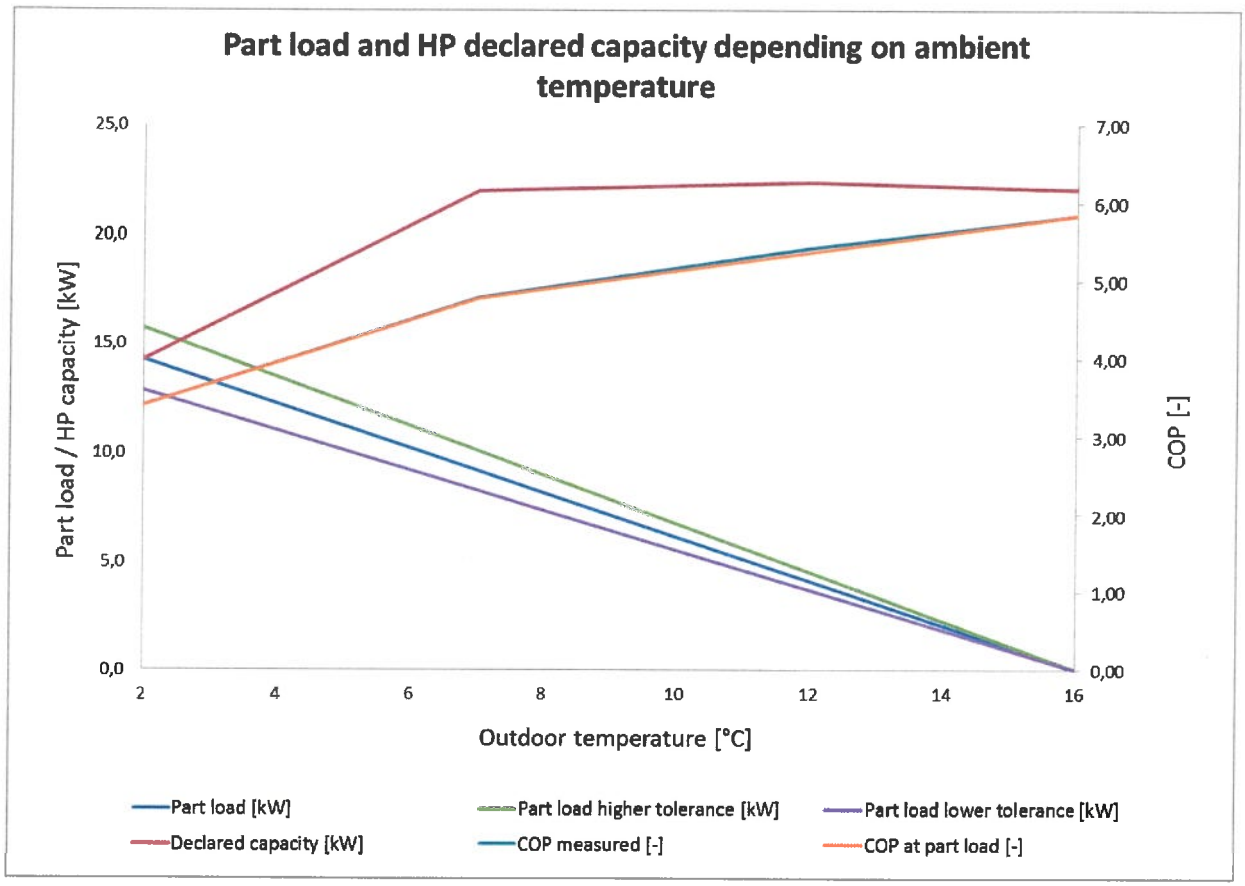
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax² 21GT**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season "W" – warmer

	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		$P_{h(Tj)}$			$elbu_{(Tj)}$	$h_j \times elbu_{(Tj)}$		$h_j \times P_{h(Tj)}$		$h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	
	[-]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[-]	[kWh]	[kWh]	[kWh]	[kWh]
B, TOL (E), Tbiv (F)	**33**	**2**	**3**	**100.00**	**14.27**	**14.27**	**14.27**	**0.00**	**0.00**	**3.40**	**43**	**13**	**43**	**13**
	34	3	22	92.86	13.26	15.62	13.26	0.00	0.00	3.68	292	79	292	79
	35	4	63	85.71	12.24	16.96	12.24	0.00	0.00	3.95	771	195	771	195
	36	5	63	78.57	11.22	18.31	11.22	0.00	0.00	4.23	707	167	707	167
	37	6	175	71.43	10.20	19.65	10.20	0.00	0.00	4.50	1784	396	1784	396
C	**38**	**7**	**162**	**64.29**	**9.18**	**21.00**	**9.18**	**0.00**	**0.00**	**4.78**	**1487**	**311**	**1487**	**311**
	39	8	259	57.14	8.16	21.28	8.16	0.00	0.00	4.90	2113	432	2113	432
	40	9	360	50.00	7.14	21.56	7.14	0.00	0.00	5.01	2569	512	2569	512
	41	10	428	42.86	6.12	21.85	6.12	0.00	0.00	5.13	2618	510	2618	510
	42	11	430	35.71	5.10	22.13	5.10	0.00	0.00	5.25	2192	417	2192	417
D	**43**	**12**	**503**	**28.57**	**4.08**	**22.41**	**4.08**	**0.00**	**0.00**	**5.37**	**2051**	**382**	**2051**	**382**
	44	13	444	21.43	3.06	22.69	3.06	0.00	0.00	5.49	1358	247	1358	247
	45	14	384	14.29	2.04	22.97	2.04	0.00	0.00	5.61	783	140	783	140
	46	15	294	7.14	1.02	23.26	1.02	0.00	0.00	5.73	300	52	300	52
		Σ	3590							Σ	19068	3855	19068	3855

SCOPon	4.95	SCOPnet	4.95
		SCOP	**4.94**

Power diagram - Heat pump **Airmax^2 21GT**

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



b) SCOP calculation – Low temperature application (reference water temperature 35 °C)
– Reference heating season "C" – colder

Data for SCOP calculation (Heat pump **Airmax² 21GT**)

	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	-7	31.20	60.53	9.43	12.400	3.010	0.998	0.76	3.008	0.0100
B	2	30.09	36.84	5.74	15.050	3.810	0.997	0.38	3.794	0.0100
C	7	29.08	23.68	3.69	20.029	5.169	0.997	0.18	5.110	0.0100
D	12	28.63	10.53	1.64	22.320	5.820	0.997	0.07	5.635	0.0100
TOL (E)	-20	34.14	94.74	14.76	10.500	1.950	0.900	1.41	1.950	-
Tbiv (F)	-10	30.75	68.42	10.66	10.658	2.732	0.900	1.00	2.732	-
G	-15	32.00	81.58	12.71	10.579	2.341	0.900	1.20	2.341	-

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax² 21GT**)

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

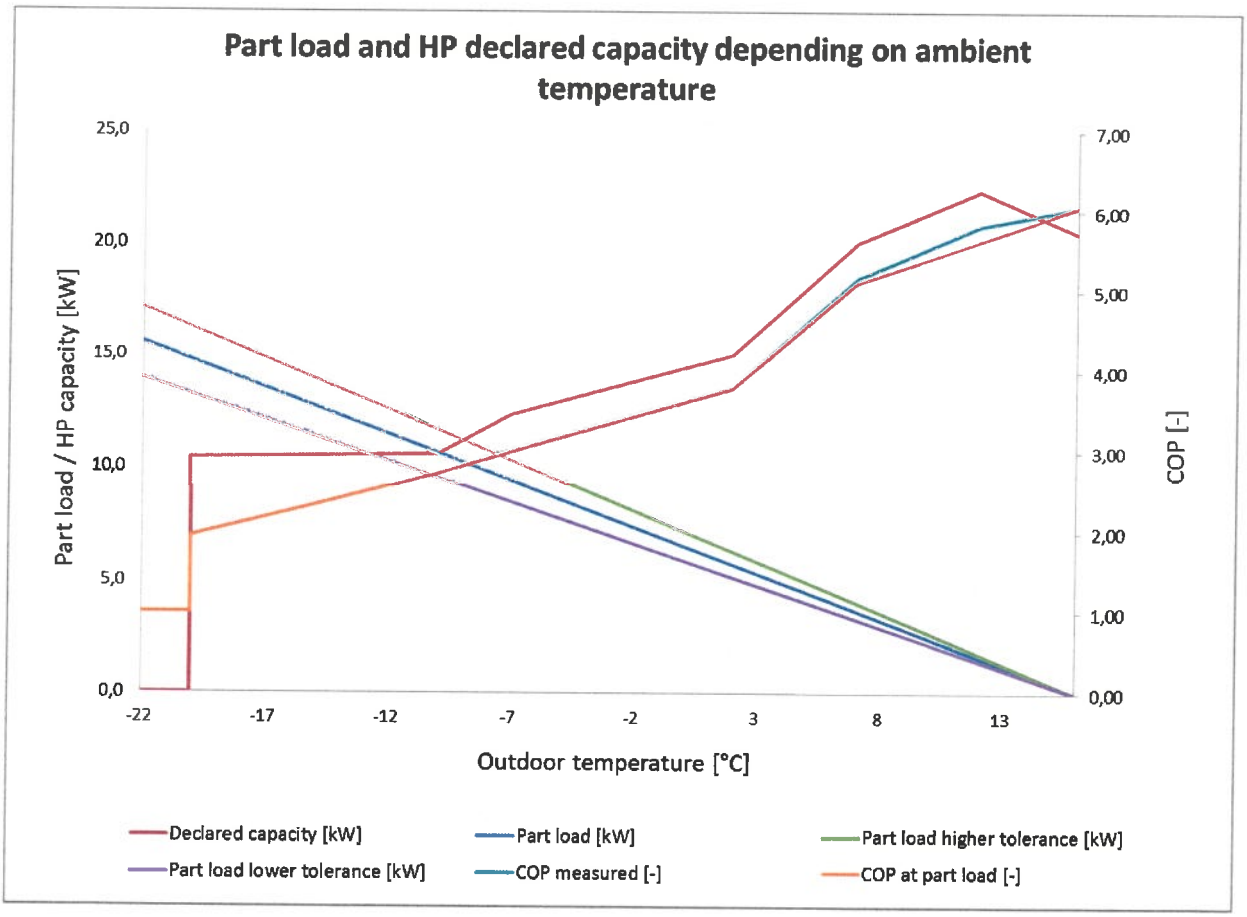
	Bin j [-]	Outdoor temp. (dry bulb) T_j [°C]	Hours h_j [h]	Part load ratio [%]	Heat load $P_{h(Tj)}$ [kW]	Capacity of HP [kW]	Heat load covered by heat pump [kW]	Resistive heat elbu(Tj) $elbu_{(Tj)}$ [kW]	Annual resistive heat $h_j \times elbu_{(Tj)}$ [kWh]	COPbin(Tj) [-]	Annual heating demand $h_j \times P_{h(Tj)}$ [kWh]	Annual power input including electric back up heating [kWh]	Net annual heating capacity $h_j \times (P_{h(Tj)} - elbu_{(Tj)})$ [kWh]	Net annual power input without electric back up heating [kWh]
	9	-22	1	100.00	15.58	0.00	0.00	15.58	15.58	1.00	16	16	0	0
	10	-21	6	97.37	15.17	0.00	0.00	15.17	91.01	1.00	91	91	0	0
TOL (E)	**11**	**-20**	**13**	**94.74**	**14.76**	**10.50**	**10.50**	**4.26**	**55.35**	**1.95**	**192**	**125**	**137**	**70**
	12	-19	17	92.11	14.35	10.52	10.52	3.83	65.14	2.03	244	153	179	88
	13	-18	19	89.47	13.94	10.53	10.53	3.41	64.72	2.11	265	160	200	95
	14	-17	26	86.84	13.53	10.55	10.55	2.98	77.49	2.18	352	203	274	126
	15	-16	39	84.21	13.12	10.56	10.56	2.55	99.63	2.26	512	282	412	182
G	**16**	**-15**	**41**	**81.58**	**12.71**	**10.58**	**10.58**	**2.13**	**87.29**	**2.34**	**521**	**273**	**434**	**185**
	17	-14	35	78.95	12.30	10.60	10.60	1.70	59.61	2.42	430	213	371	153
	18	-13	52	76.32	11.89	10.61	10.61	1.28	66.42	2.50	618	287	552	221
	19	-12	37	73.68	11.48	10.63	10.63	0.85	31.51	2.58	425	184	393	153
	20	-11	41	71.05	11.07	10.64	10.64	0.43	17.46	2.65	454	182	436	164
Tbiv(F)	**21**	**-10**	**43**	**68.42**	**10.66**	**10.66**	**10.66**	**0.00**	**0.00**	**2.73**	**458**	**168**	**458**	**168**
	22	-9	54	65.79	10.25	11.24	10.25	0.00	0.00	2.82	553	196	553	196
	23	-8	90	63.16	9.84	11.82	9.84	0.00	0.00	2.92	885	304	885	304
A	**24**	**-7**	**125**	**60.53**	**9.43**	**12.40**	**9.43**	**0.00**	**0.00**	**3.01**	**1179**	**392**	**1179**	**392**
	25	-6	169	57.89	9.02	12.69	9.02	0.00	0.00	3.10	1524	492	1524	492
	26	-5	195	55.26	8.61	12.99	8.61	0.00	0.00	3.18	1679	527	1679	527
	27	-4	278	52.63	8.20	13.28	8.20	0.00	0.00	3.27	2279	697	2279	697
	28	-3	306	50.00	7.79	13.58	7.79	0.00	0.00	3.36	2383	710	2383	710
	29	-2	454	47.37	7.38	13.87	7.38	0.00	0.00	3.44	3350	972	3350	972
	30	-1	385	44.74	6.97	14.17	6.97	0.00	0.00	3.53	2683	760	2683	760
	31	0	490	42.11	6.56	14.46	6.56	0.00	0.00	3.62	3214	888	3214	888
	32	1	533	39.47	6.15	14.76	6.15	0.00	0.00	3.71	3277	884	3277	884
B	**33**	**2**	**380**	**36.84**	**5.74**	**15.05**	**5.74**	**0.00**	**0.00**	**3.79**	**2181**	**575**	**2181**	**575**
	34	3	228	34.21	5.33	16.05	5.33	0.00	0.00	4.06	1215	299	1215	299
	35	4	261	31.58	4.92	17.04	4.92	0.00	0.00	4.32	1284	297	1284	297
	36	5	279	28.95	4.51	18.04	4.51	0.00	0.00	4.58	1258	274	1258	274
	37	6	229	26.32	4.10	19.03	4.10	0.00	0.00	4.85	939	194	939	194
C	**38**	**7**	**269**	**23.68**	**3.69**	**20.03**	**3.69**	**0.00**	**0.00**	**5.11**	**992**	**194**	**992**	**194**
	39	8	233	21.05	3.28	20.49	3.28	0.00	0.00	5.22	764	147	764	147
	40	9	230	18.42	2.87	20.95	2.87	0.00	0.00	5.32	660	124	660	124
	41	10	243	15.79	2.46	21.40	2.46	0.00	0.00	5.43	598	110	598	110

	42	11	191	13.16	2.05	21.86	2.05	0.00	0.00	5.53	391	71	391	71
D	**43**	**12**	**146**	**10.53**	**1.64**	**22.32**	**1.64**	**0.00**	**0.00**	**5.63**	**239**	**42**	**239**	**42**
	44	13	150	7.89	1.23	22.78	1.23	0.00	0.00	5.74	184	32	184	32
	45	14	97	5.26	0.82	23.24	0.82	0.00	0.00	5.84	80	14	80	14
	46	15	61	2.63	0.41	23.69	0.41	0.00	0.00	5.95	25	4	25	4
		Σ	6446							Σ	38395	11537	37664	10805

SCOPon	3.33	SCOPnet	3.49
		SCOP	**3.33**

Power diagram - Heat pump **Airmax² 21GT**

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



c) **SCOP calculation** – Medium temperature application (reference water temperature 55 °C)
– Reference heating season "W" – warmer

Data for SCOP calculation (Heat pump **Airmax² 21GT**)

	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	55.00	100.00	14.63	14.634	2.342	0.900	1.00	2.342	-
C	7	50.47	64.29	9.41	21.300	3.100	0.999	0.44	3.094	0.0097
D	12	40.51	28.57	4.18	22.500	4.320	0.998	0.19	4.285	0.0097
TOL (E)	2	55.00	100.00	14.63	14.634	2.342	0.900	1.00	2.342	-
Tbiv (F)	2	55.00	100.00	14.63	14.634	2.342	0.900	1.00	2.342	-

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax² 21GT**)

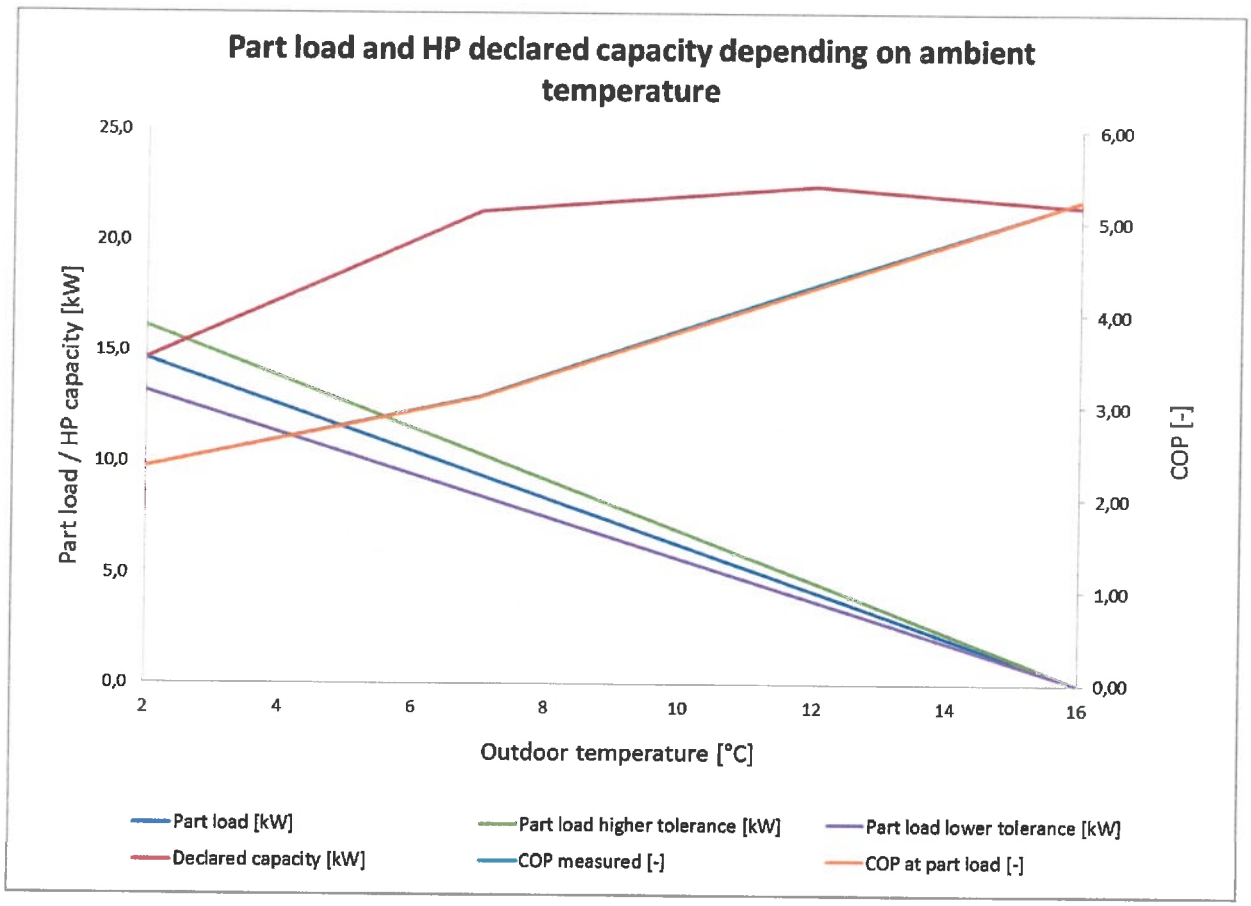
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season "W" – warmer

	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		$P_{h(Tj)}$			$elbu_{(Tj)}$	$h_j \times elbu_{(Tj)}$		$h_j \times P_{h(Tj)}$		$h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	
	[-]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[-]	[kWh]	[kWh]	[kWh]	[kWh]
B, TOL (E), Tbiv (F)	**33**	**2**	**3**	**100.00**	**14.63**	**14.63**	**14.63**	**0.00**	**0.00**	**2.34**	**44**	**19**	**44**	**19**
	34	3	22	92.86	13.59	15.97	13.59	0.00	0.00	2.49	299	120	299	120
	35	4	63	85.71	12.54	17.30	12.54	0.00	0.00	2.64	790	299	790	299
	36	5	63	78.57	11.50	18.63	11.50	0.00	0.00	2.79	724	259	724	259
	37	6	175	71.43	10.45	19.97	10.45	0.00	0.00	2.94	1829	621	1829	621
C	**38**	**7**	**162**	**64.29**	**9.41**	**21.30**	**9.41**	**0.00**	**0.00**	**3.09**	**1524**	**492**	**1524**	**492**
	39	8	259	57.14	8.36	21.54	8.36	0.00	0.00	3.33	2166	650	2166	650
	40	9	360	50.00	7.32	21.78	7.32	0.00	0.00	3.57	2634	738	2634	738
	41	10	428	42.86	6.27	22.02	6.27	0.00	0.00	3.81	2684	705	2684	705
	42	11	430	35.71	5.23	22.26	5.23	0.00	0.00	4.05	2247	555	2247	555
D	**43**	**12**	**503**	**28.57**	**4.18**	**22.50**	**4.18**	**0.00**	**0.00**	**4.29**	**2103**	**491**	**2103**	**491**
	44	13	444	21.43	3.14	22.74	3.14	0.00	0.00	4.52	1392	308	1392	308
	45	14	384	14.29	2.09	22.98	2.09	0.00	0.00	4.76	803	169	803	169
	46	15	294	7.14	1.05	23.22	1.05	0.00	0.00	5.00	307	61	307	61
		Σ	3590							Σ	19548	5487	19548	5487

SCOPon	3.56	SCOPnet	3.56
		SCOP	**3.56**

Power diagram - Heat pump **Airmax^2 21GT**

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



d) **SCOP calculation** – Medium temperature application (reference water temperature 55 °C)
– Reference heating season "C" – colder

Data for SCOP calculation (Heat pump **Airmax^2 21GT**)

	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	-7	46.33	60.53	9.16	12.920	2.190	0.998	0.71	2.189	0.0097
B	2	41.92	36.84	5.58	14.480	2.890	0.998	0.39	2.881	0.0097
C	7	38.61	23.68	3.58	20.565	4.374	0.998	0.17	4.332	0.0097
D	12	35.42	10.53	1.59	21.900	5.150	0.998	0.07	5.004	0.0097
TOL (E)	-16	49.86	84.21	12.74	11.500	1.500	0.900	1.11	1.500	-
Tbiv (F)	-10	45.88	68.42	10.35	10.354	2.080	0.900	1.00	2.080	-
G	-15	49.00	81.58	12.34	11.309	1.597	0.900	1.09	1.597	-

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **Airmax² 21GT**)

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

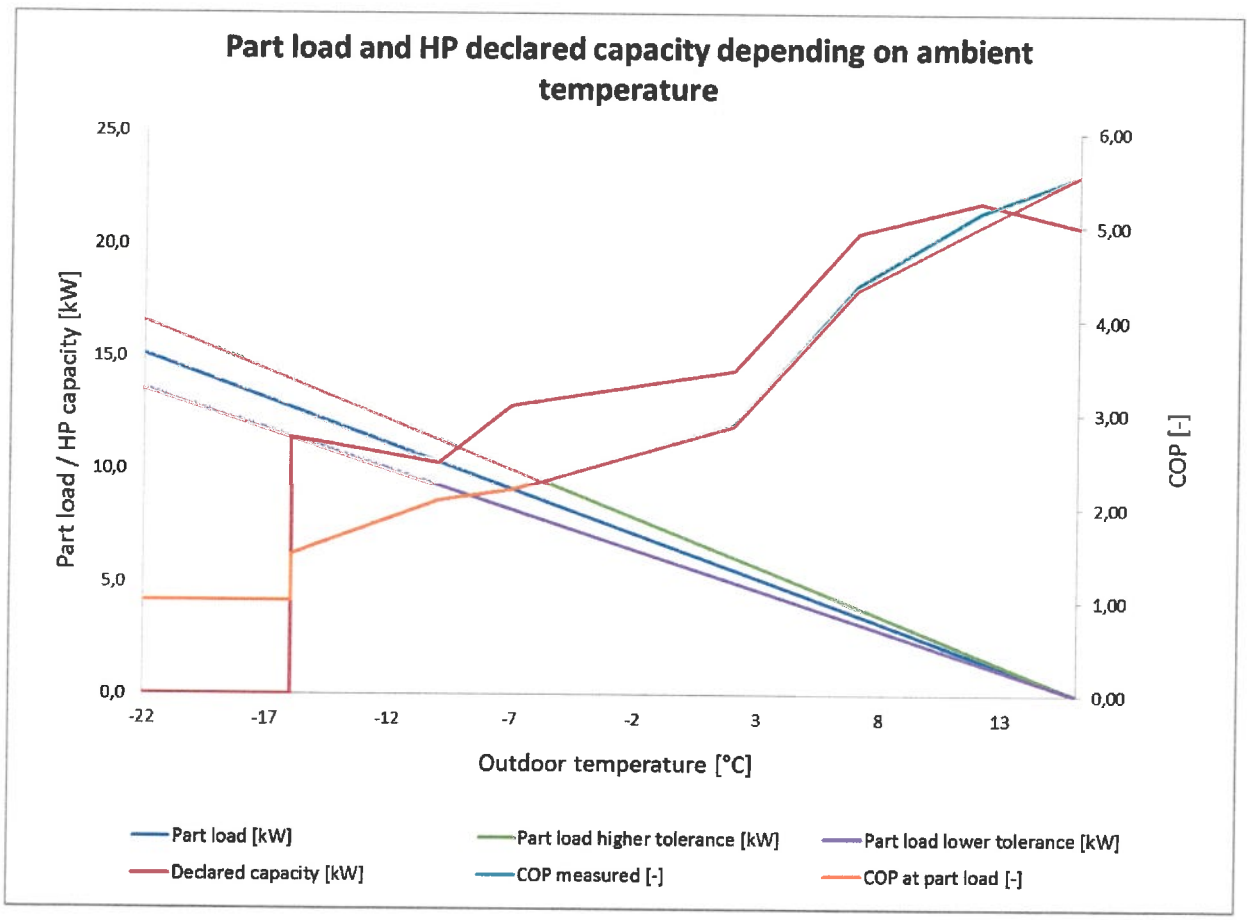
	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu(Tj)	Annual resistive heat	COPbin(Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	T_j	h_j		$P_{h(Tj)}$			$elbu_{(Tj)}$	$h_j \times elbu_{(Tj)}$		$h_j \times P_{h(Tj)}$		$h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	
	[-]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[-]	[kWh]	[kWh]	[kWh]	[kWh]
	9	-22	1	100.00	15.13	0.00	0.00	15.13	15.13	1.00	15	15	0	0
	10	-21	6	97.37	14.73	0.00	0.00	14.73	88.40	1.00	88	88	0	0
	11	-20	13	94.74	14.34	0.00	0.00	14.34	186.36	1.00	186	186	0	0
	12	-19	17	92.11	13.94	0.00	0.00	13.94	236.94	1.00	237	237	0	0
	13	-18	19	89.47	13.54	0.00	0.00	13.54	257.25	1.00	257	257	0	0
	14	-17	26	86.84	13.14	0.00	0.00	13.14	341.67	1.00	342	342	0	0
TOL (E)	**15**	**-16**	**39**	**84.21**	**12.74**	**11.50**	**11.50**	**1.24**	**48.47**	**1.50**	**497**	**347**	**449**	**299**
G	**16**	**-15**	**41**	**81.58**	**12.34**	**11.31**	**11.31**	**1.04**	**42.47**	**1.60**	**506**	**333**	**464**	**290**
	17	-14	35	78.95	11.95	11.12	11.12	0.83	29.00	1.69	418	259	389	230
	18	-13	52	76.32	11.55	10.93	10.93	0.62	32.32	1.79	601	350	568	317
	19	-12	37	73.68	11.15	10.74	10.74	0.41	15.33	1.89	413	226	397	211
	20	-11	41	71.05	10.75	10.54	10.54	0.21	8.49	1.98	441	226	432	218
Tbiv(F)	**21**	**-10**	**43**	**68.42**	**10.35**	**10.35**	**10.35**	**0.00**	**0.00**	**2.08**	**445**	**214**	**445**	**214**
	22	-9	54	65.79	9.96	11.21	9.96	0.00	0.00	2.12	538	254	538	254
	23	-8	90	63.16	9.56	12.06	9.56	0.00	0.00	2.15	860	400	860	400
A	**24**	**-7**	**125**	**60.53**	**9.16**	**12.92**	**9.16**	**0.00**	**0.00**	**2.19**	**1145**	**523**	**1145**	**523**
	25	-6	169	57.89	8.76	13.09	8.76	0.00	0.00	2.27	1481	654	1481	654
	26	-5	195	55.26	8.36	13.27	8.36	0.00	0.00	2.34	1631	696	1631	696
	27	-4	278	52.63	7.96	13.44	7.96	0.00	0.00	2.42	2214	915	2214	915
	28	-3	306	50.00	7.57	13.61	7.57	0.00	0.00	2.50	2315	927	2315	927
	29	-2	454	47.37	7.17	13.79	7.17	0.00	0.00	2.57	3254	1265	3254	1265
	30	-1	385	44.74	6.77	13.96	6.77	0.00	0.00	2.65	2606	983	2606	983
	31	0	490	42.11	6.37	14.13	6.37	0.00	0.00	2.73	3122	1145	3122	1145
	32	1	533	39.47	5.97	14.31	5.97	0.00	0.00	2.80	3184	1135	3184	1135
B	**33**	**2**	**380**	**36.84**	**5.58**	**14.48**	**5.58**	**0.00**	**0.00**	**2.88**	**2119**	**735**	**2119**	**735**
	34	3	228	34.21	5.18	15.70	5.18	0.00	0.00	3.17	1180	372	1180	372
	35	4	261	31.58	4.78	16.91	4.78	0.00	0.00	3.46	1247	360	1247	360
	36	5	279	28.95	4.38	18.13	4.38	0.00	0.00	3.75	1222	326	1222	326
	37	6	229	26.32	3.98	19.35	3.98	0.00	0.00	4.04	912	226	912	226
C	**38**	**7**	**269**	**23.68**	**3.58**	**20.56**	**3.58**	**0.00**	**0.00**	**4.33**	**964**	**223**	**964**	**223**
	39	8	233	21.05	3.19	20.83	3.19	0.00	0.00	4.47	742	166	742	166
	40	9	230	18.42	2.79	21.10	2.79	0.00	0.00	4.60	641	139	641	139
	41	10	243	15.79	2.39	21.37	2.39	0.00	0.00	4.74	581	123	581	123

	42	11	191	13.16	1.99	21.63	1.99	0.00	0.00	4.87	380	78	380	78
D	**43**	**12**	**146**	**10.53**	**1.59**	**21.90**	**1.59**	**0.00**	**0.00**	**5.00**	**233**	**46**	**233**	**46**
	44	13	150	7.89	1.19	22.17	1.19	0.00	0.00	5.14	179	35	179	35
	45	14	97	5.26	0.80	22.43	0.80	0.00	0.00	5.27	77	15	77	15
	46	15	61	2.63	0.40	22.70	0.40	0.00	0.00	5.41	24	4	24	4
		Σ	6446							Σ	37297	14827	35995	13525

SCOPon	2.52	SCOPnet	2.66
		SCOP	**2.52**

Power diagram - Heat pump **Airmax^2 21GT**

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

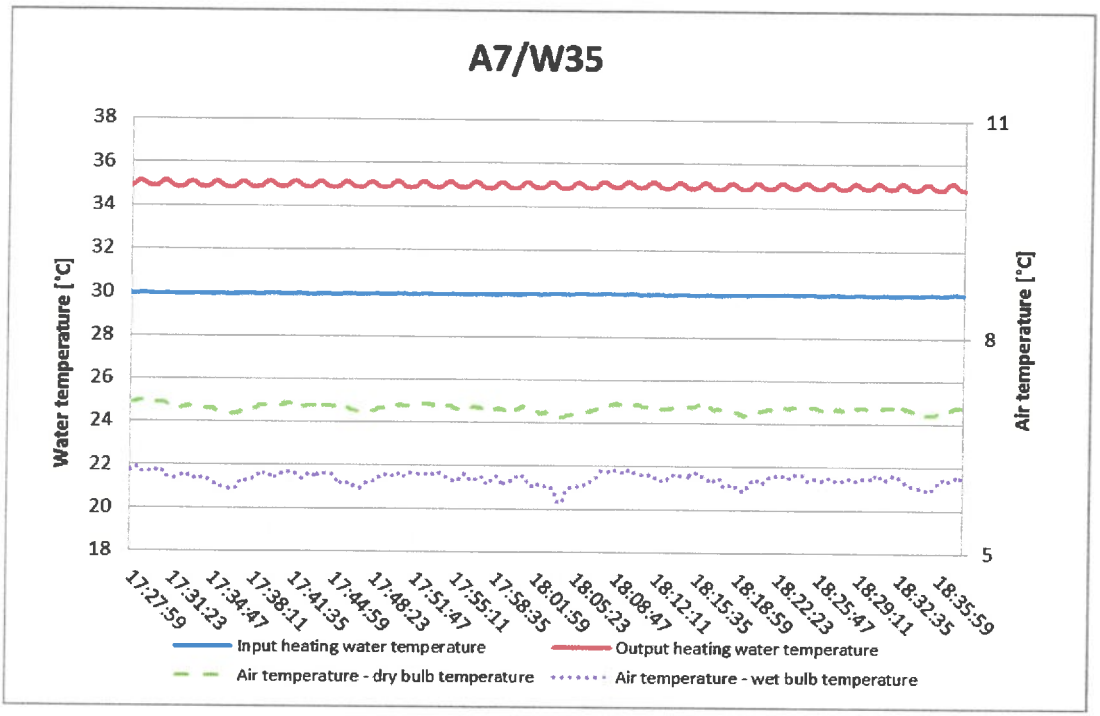


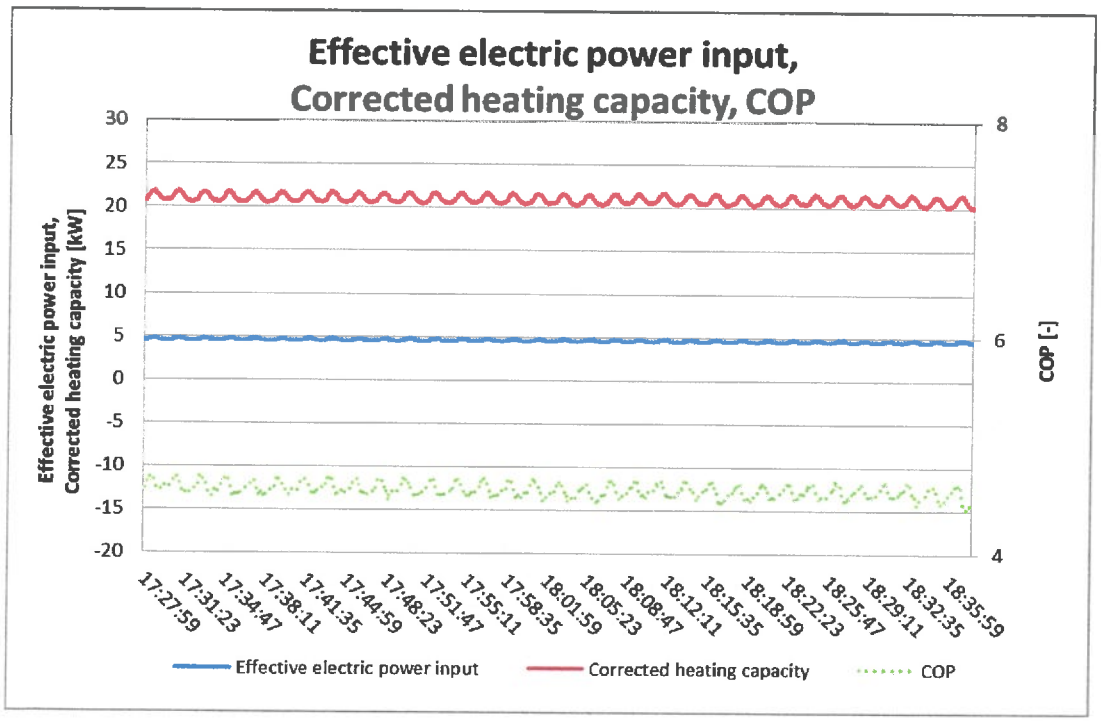
Tested by: Ing. Tomáš Fiala Date: 2017-01-05 Signed:

Reviewed by: Ing. Mario Jankola Date: 2017-01-05 Signed:

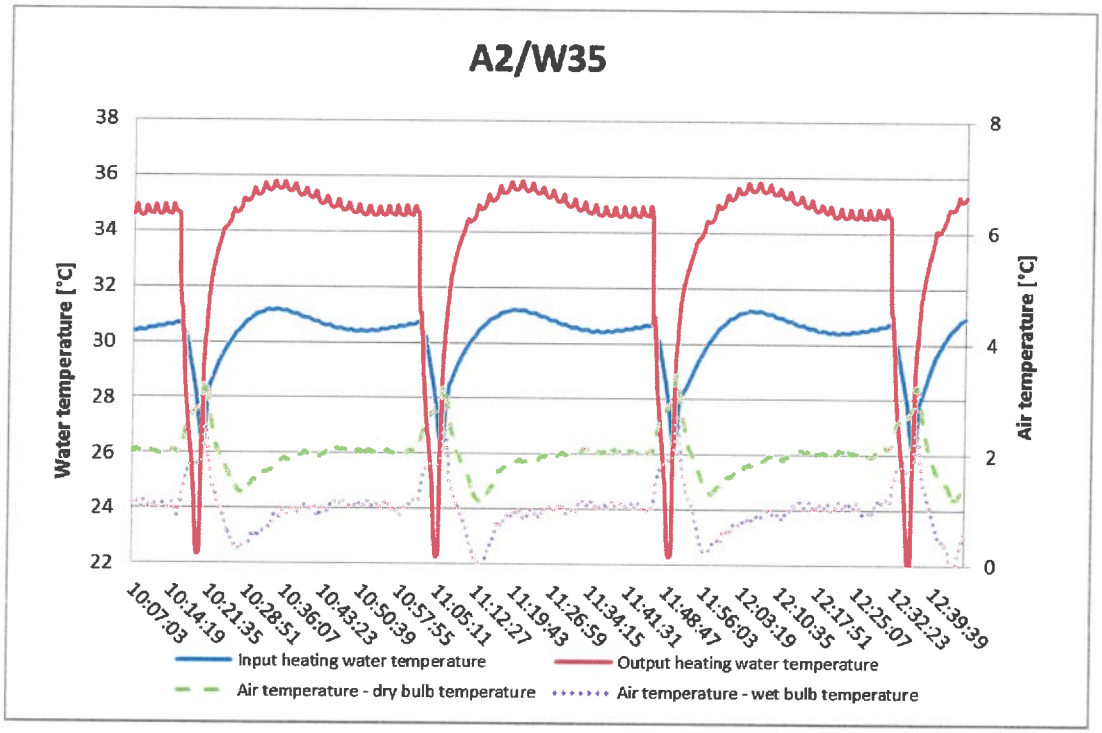
VI. Graphs

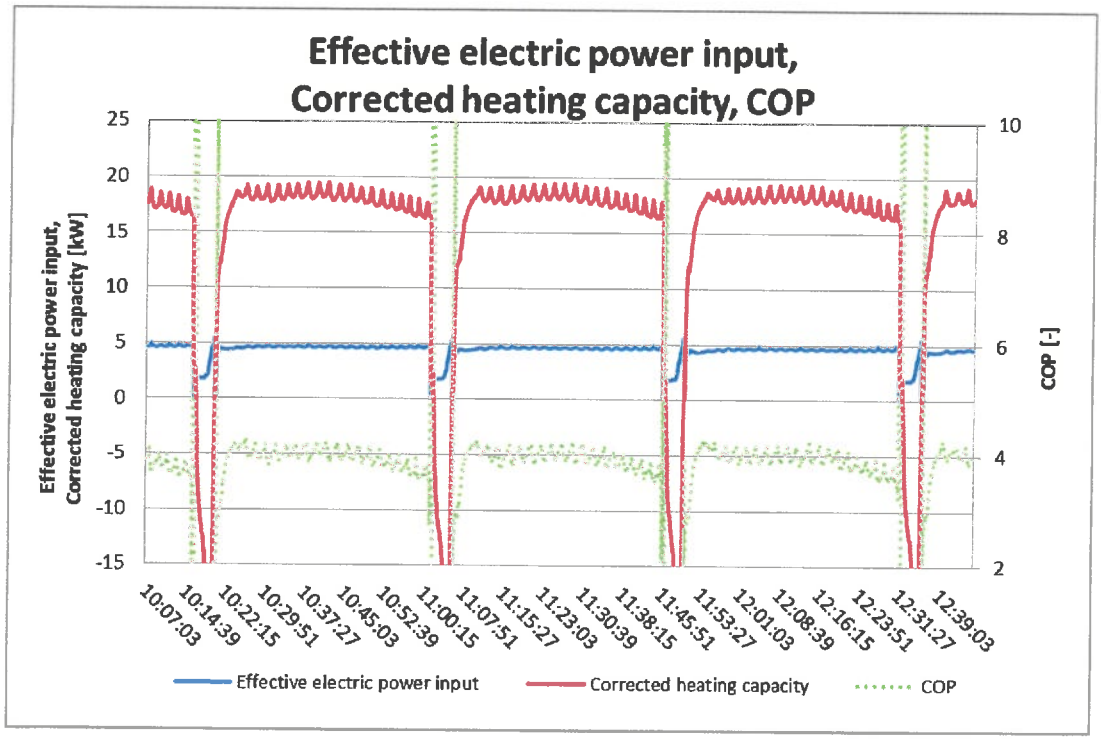
Heat pump **Airmax² 21GT**: A7/W35



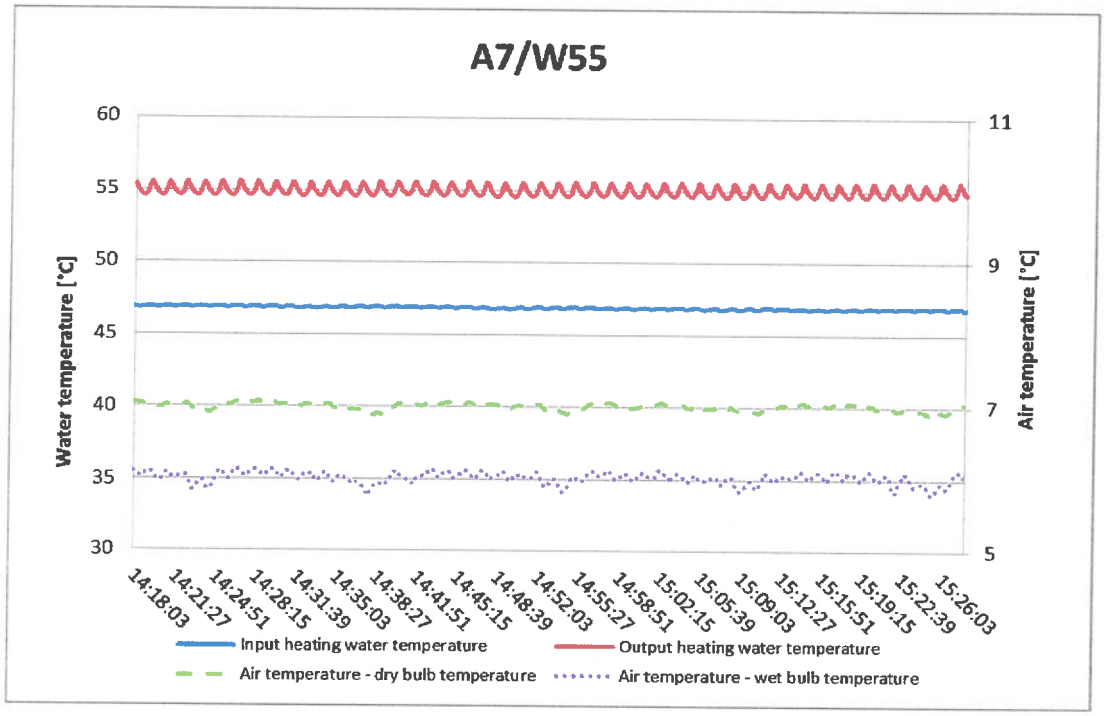


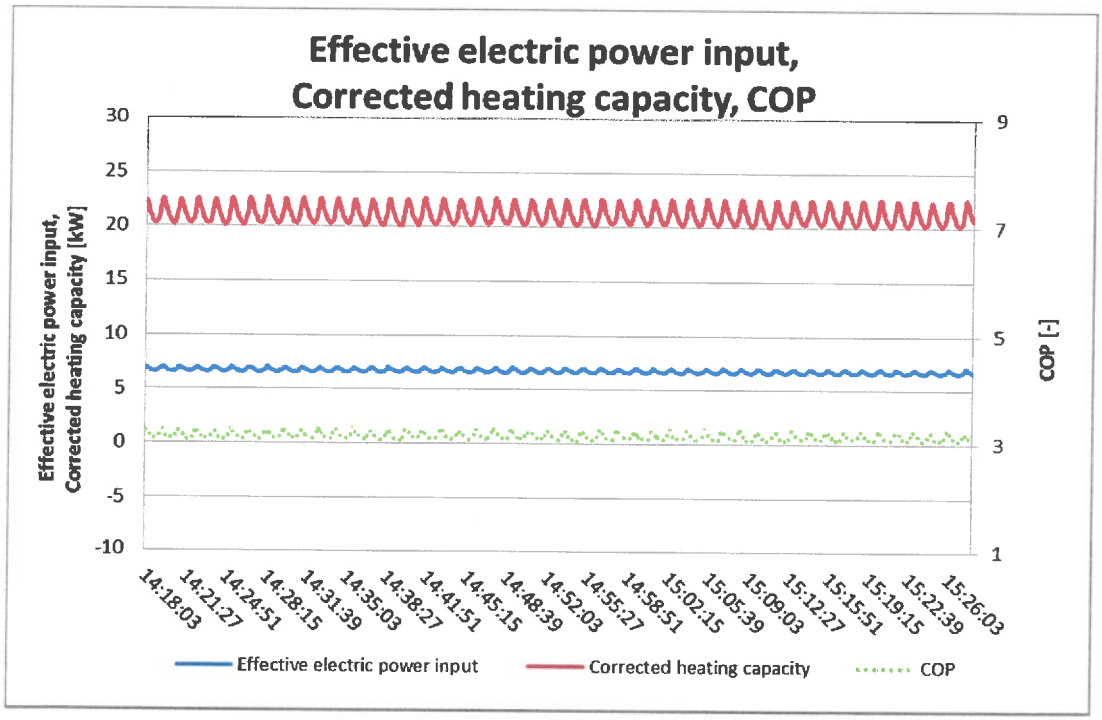
Heat pump **Airmax² 21GT**: A2/W35



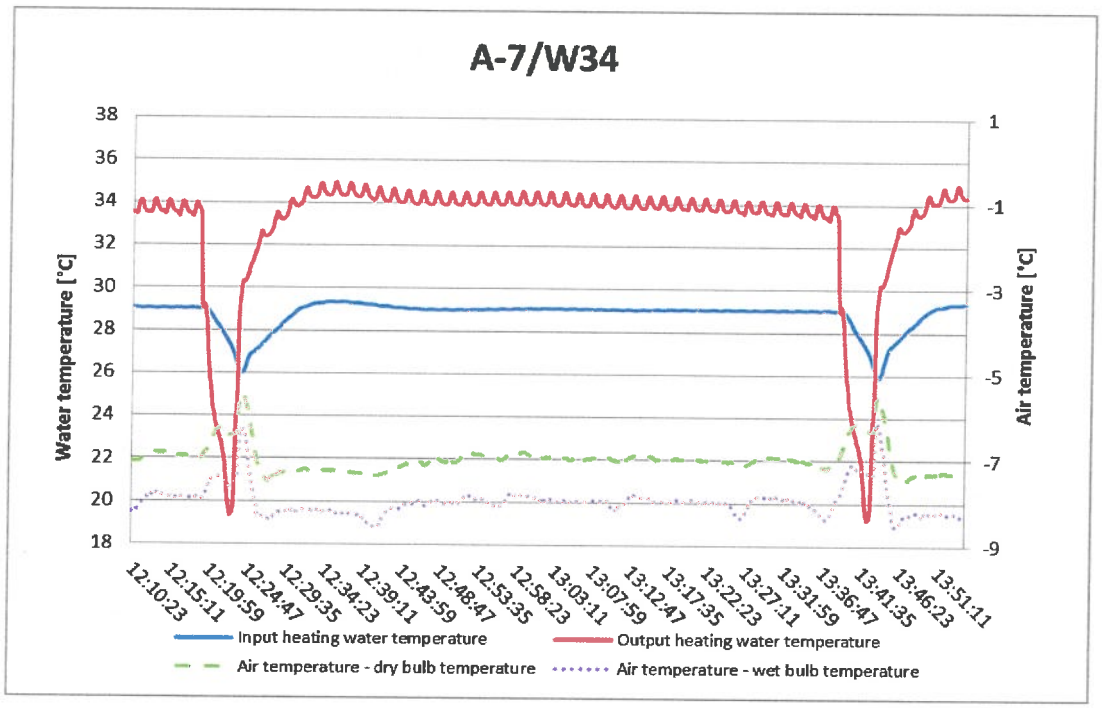


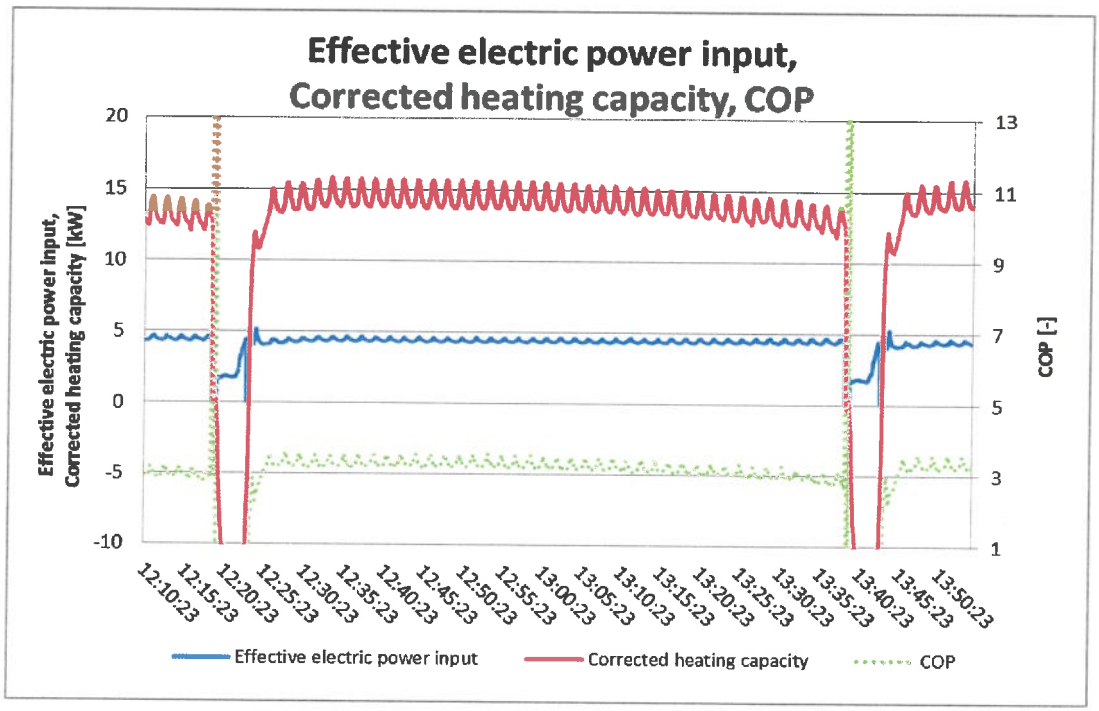
Heat pump **Airmax² 21GT**: A7/W55



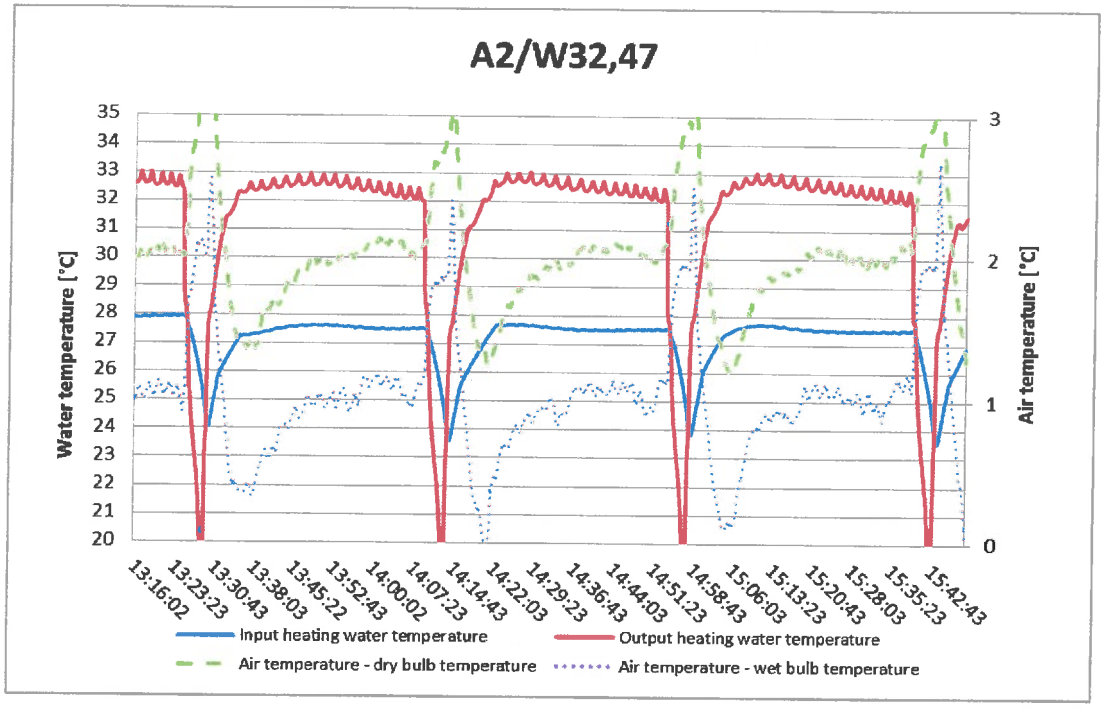


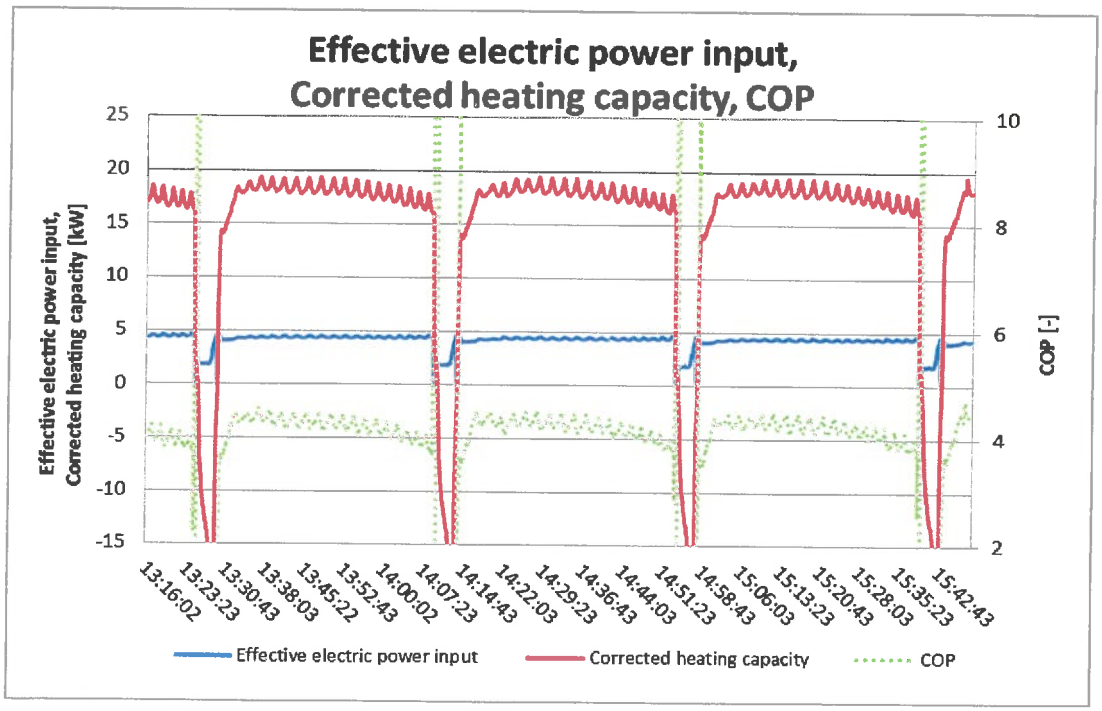
Heat pump **Airmax² 21GT:** A-7/W34



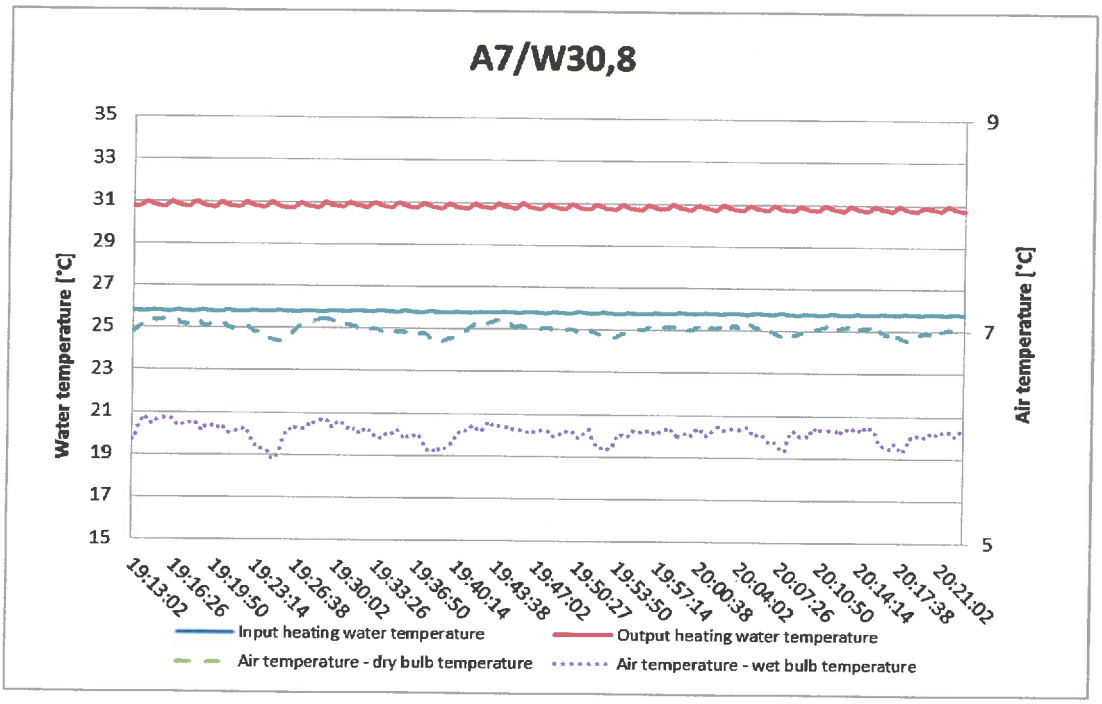


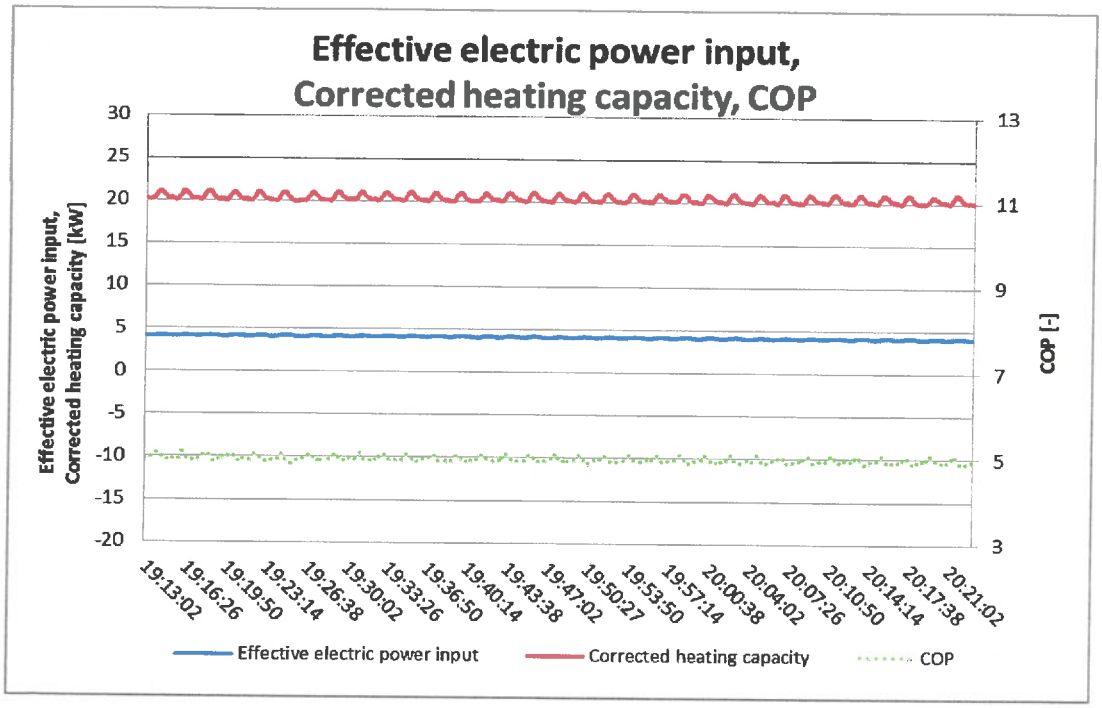
Heat pump **Airmax² 21GT:** A2/W32.47



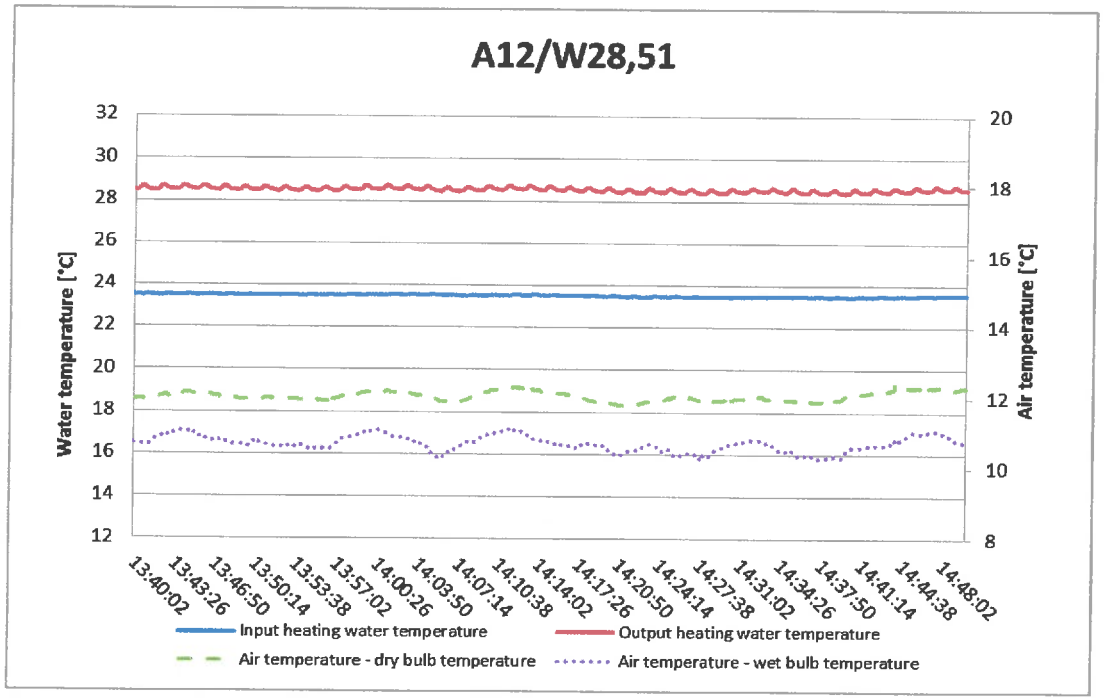


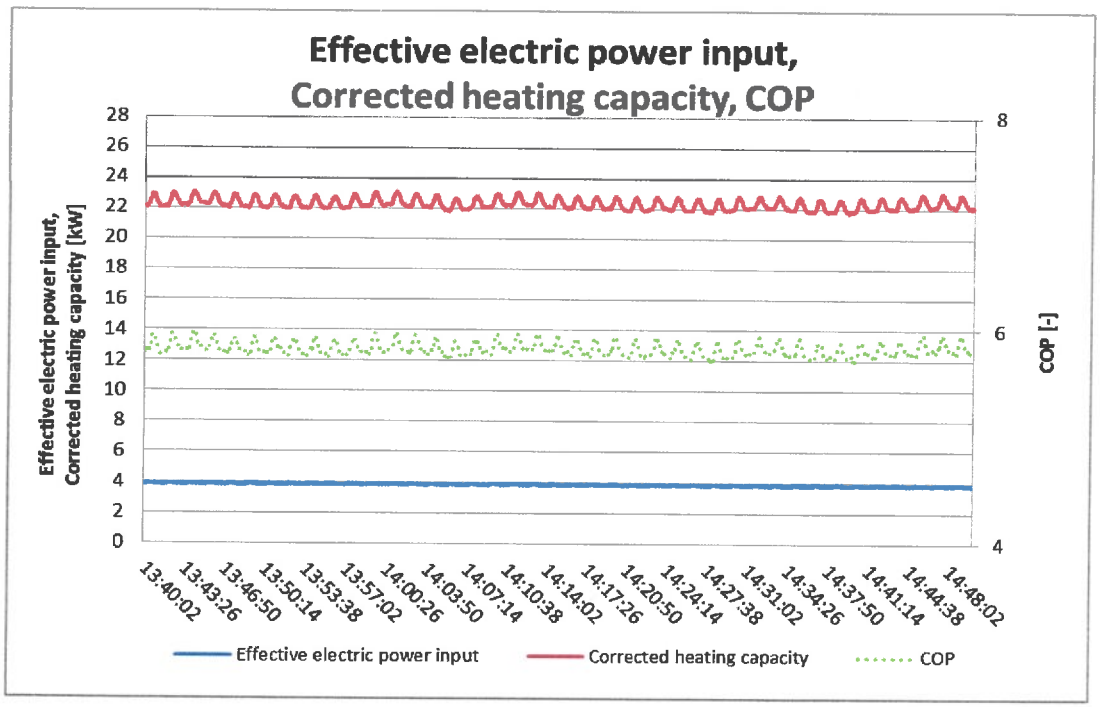
Heat pump **Airmax^2 21GT:** A7/W30.8



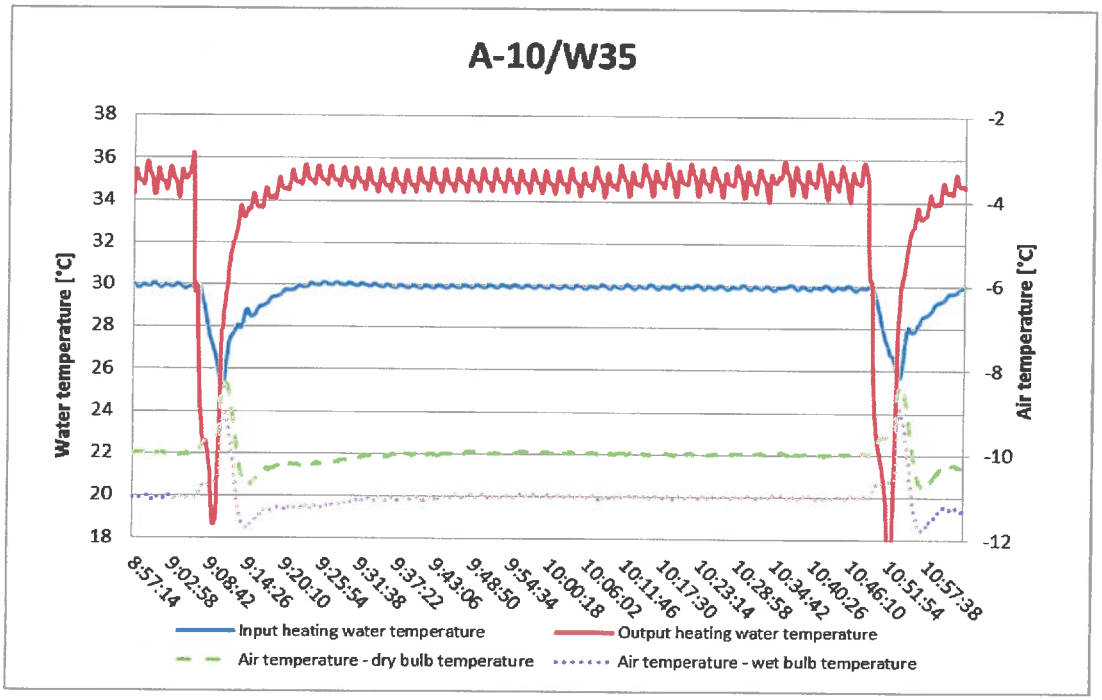


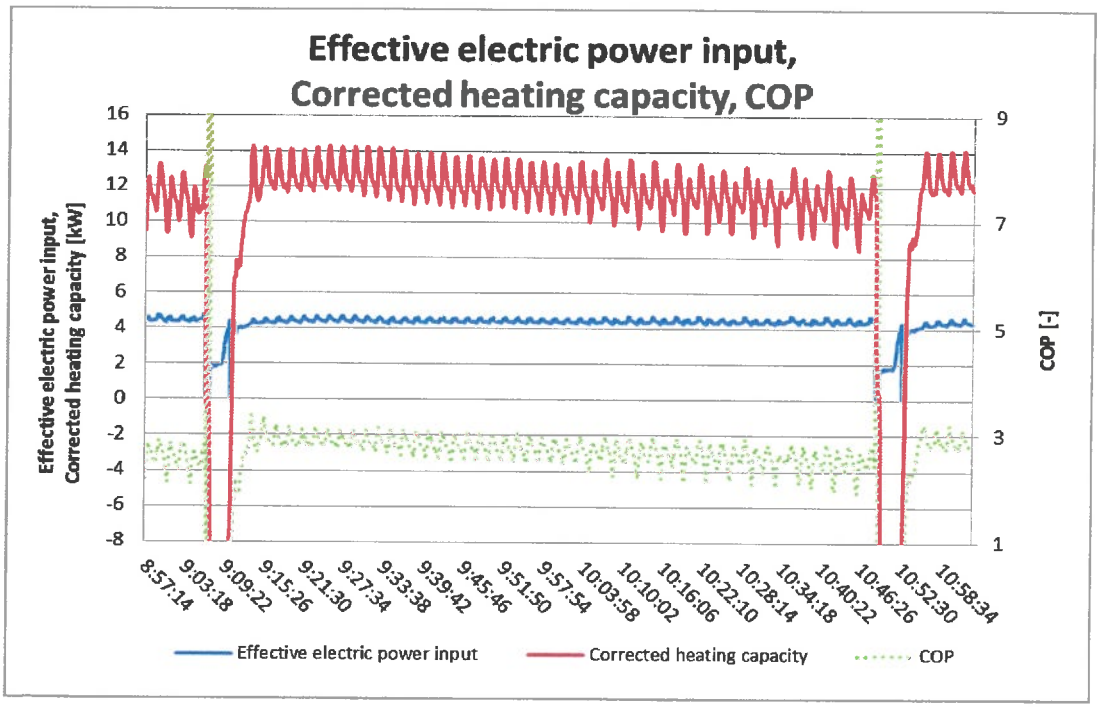
Heat pump **Airmax² 21GT:** A12/W28.51



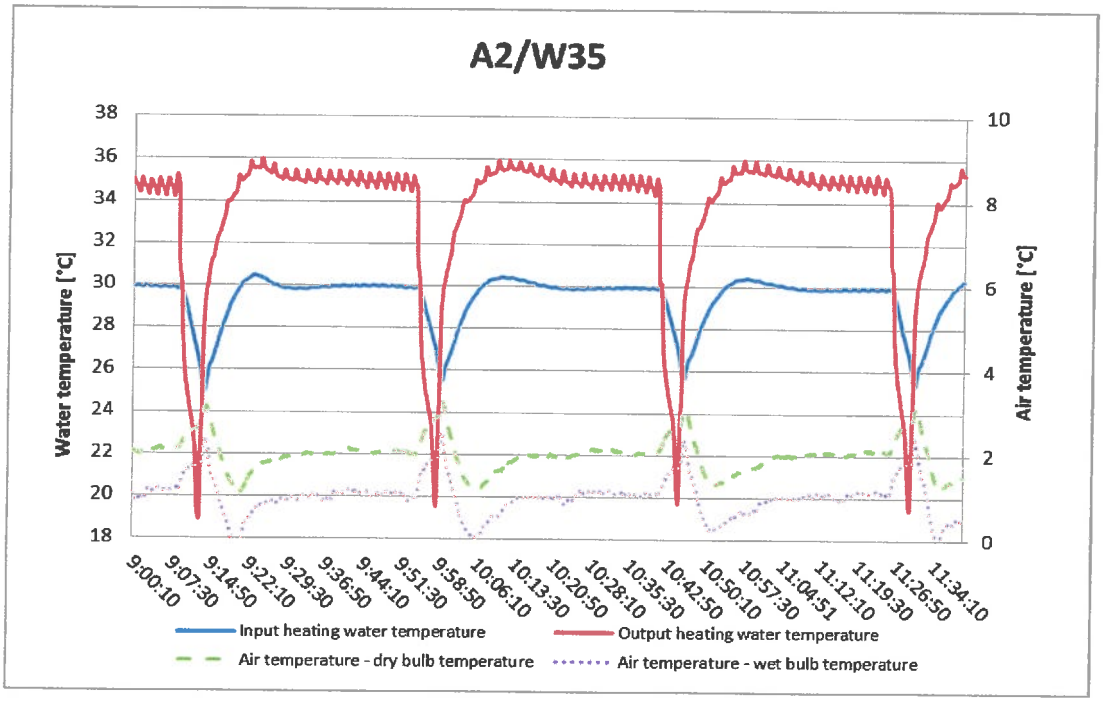


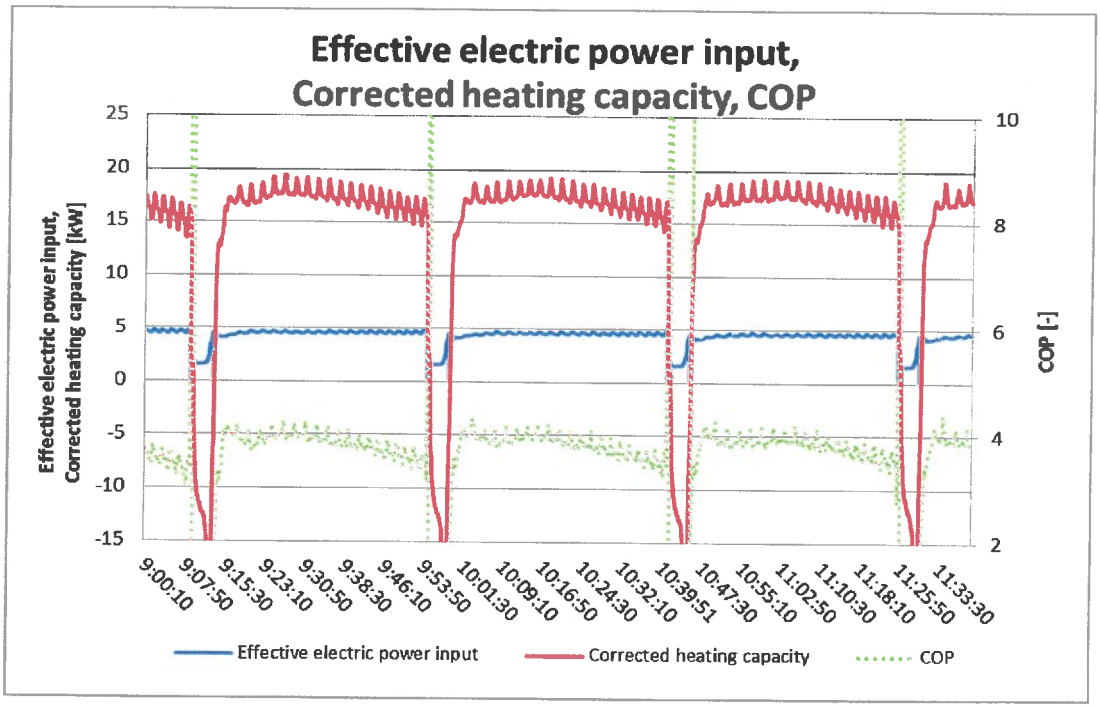
Heat pump **Airmax² 21GT:** A-10/W35



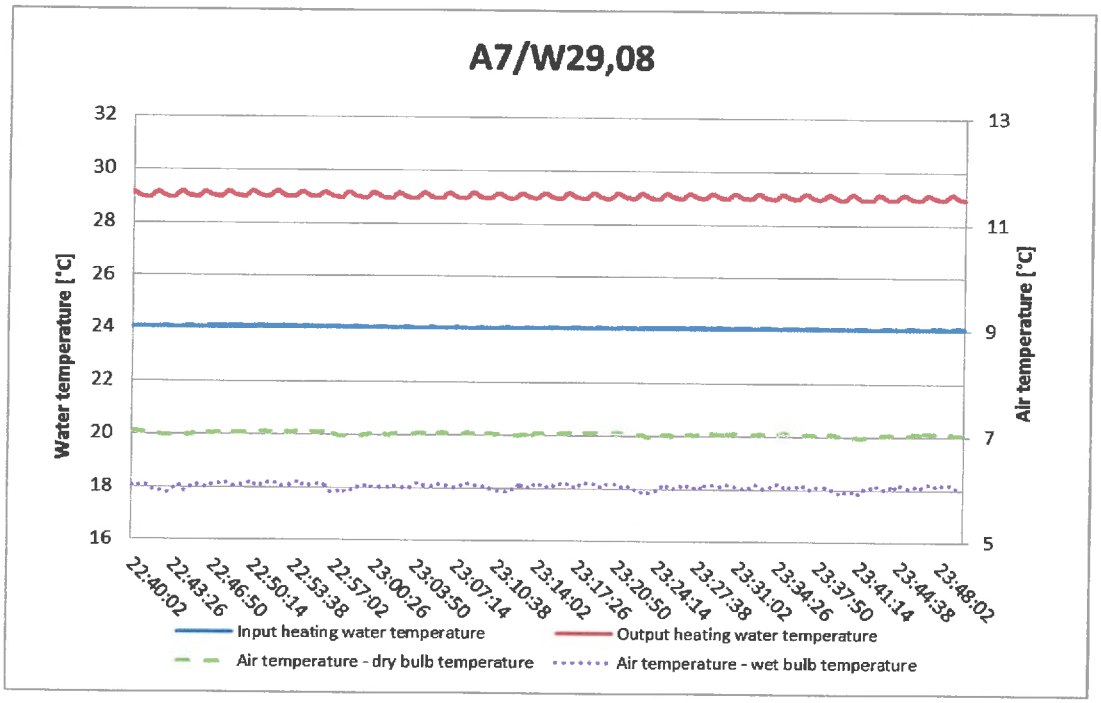


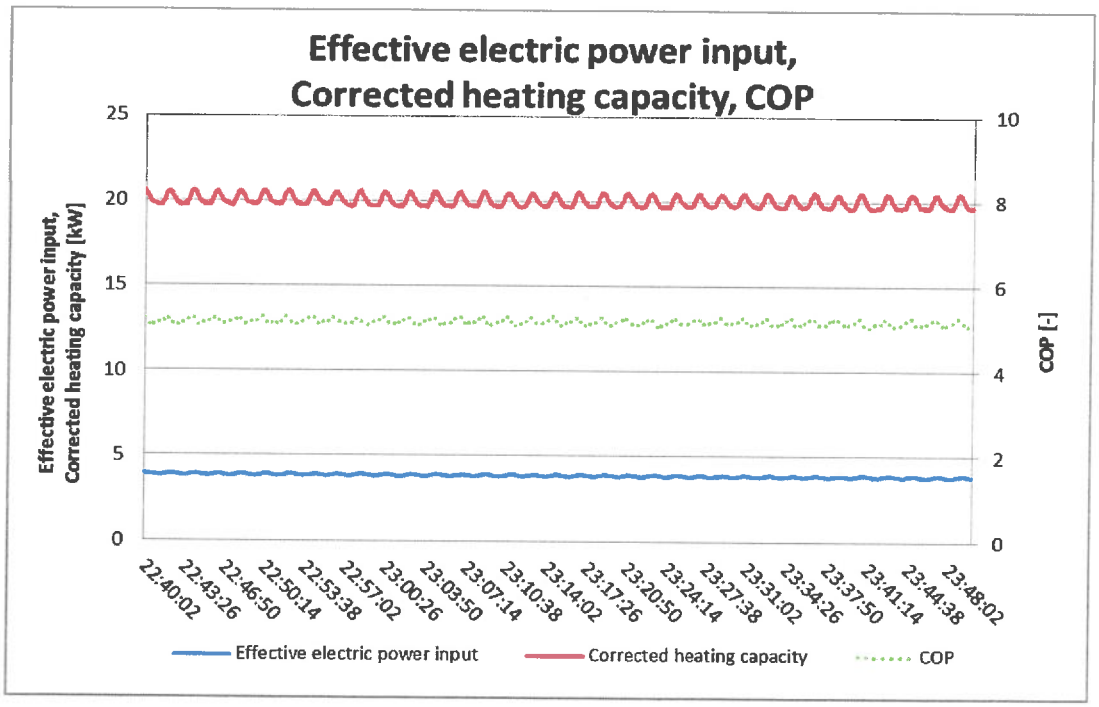
Heat pump **Airmax² 21GT:** A2/W35



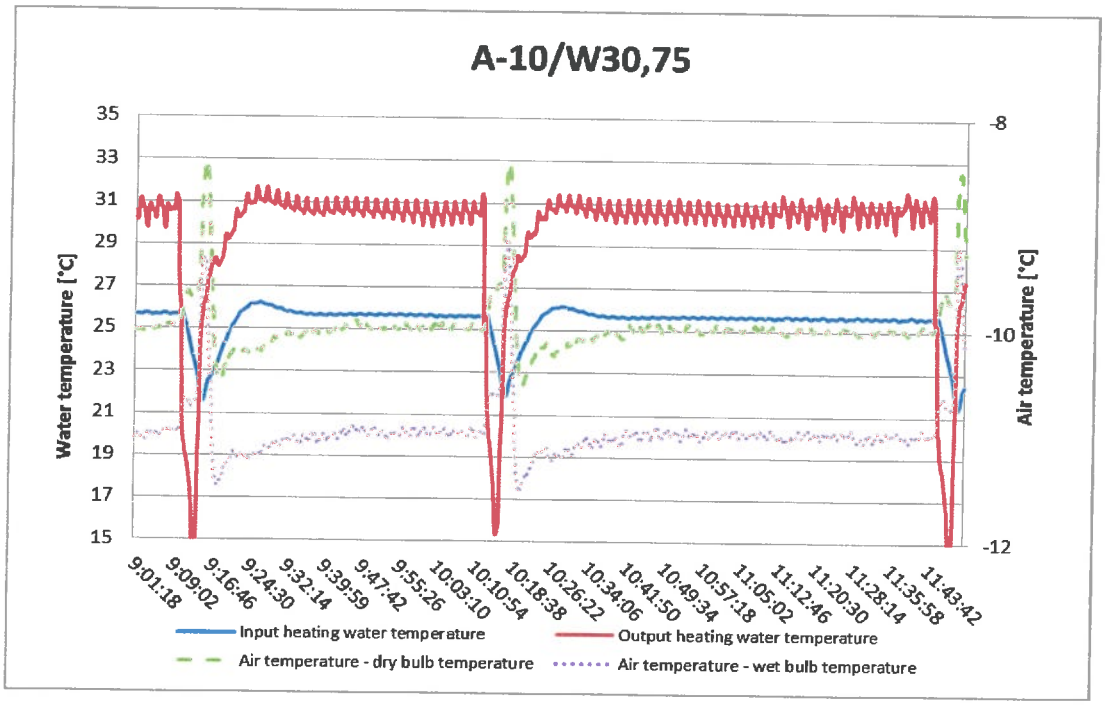


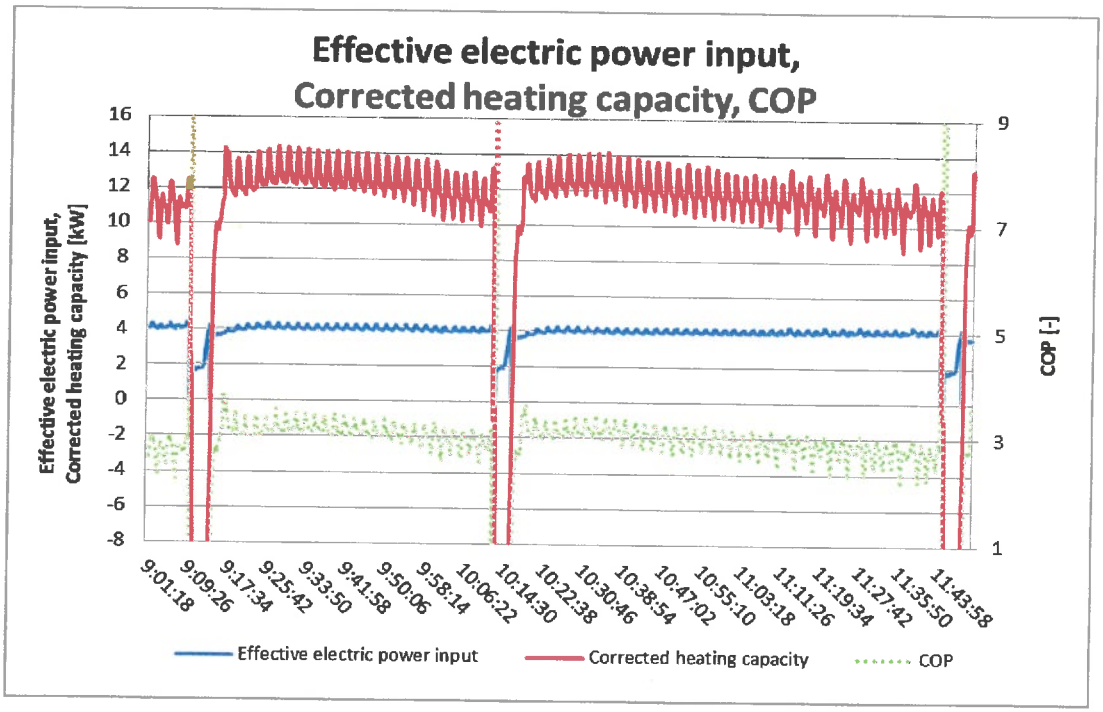
Heat pump **Airmax^2 21GT:** A7/W29.08



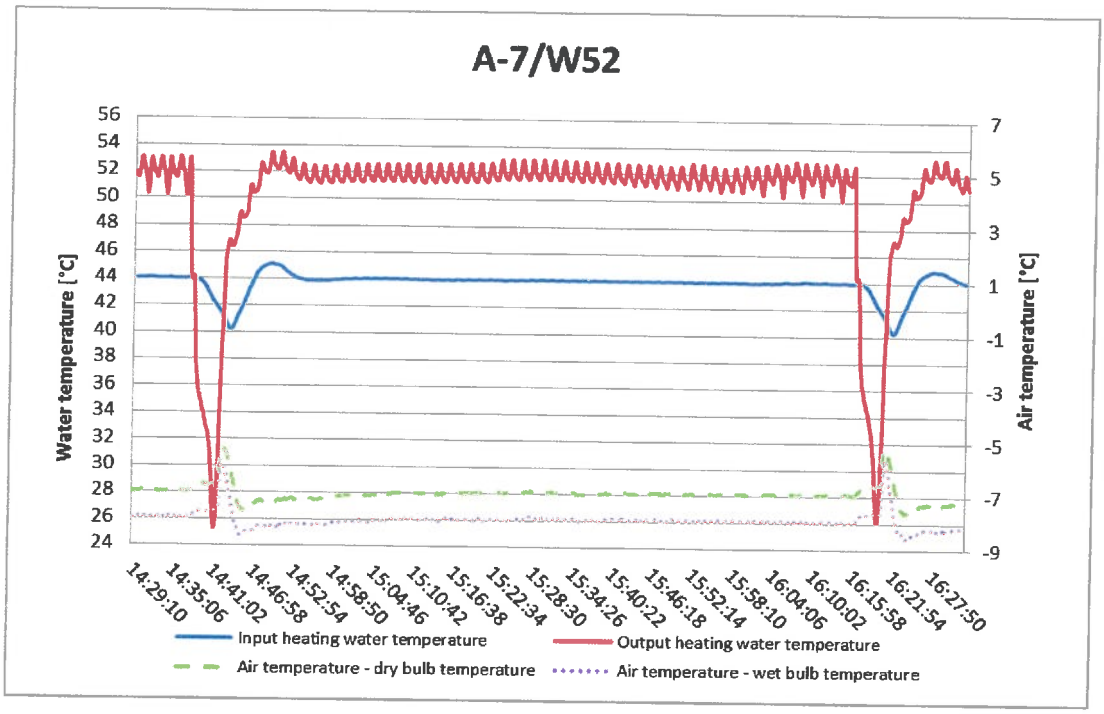


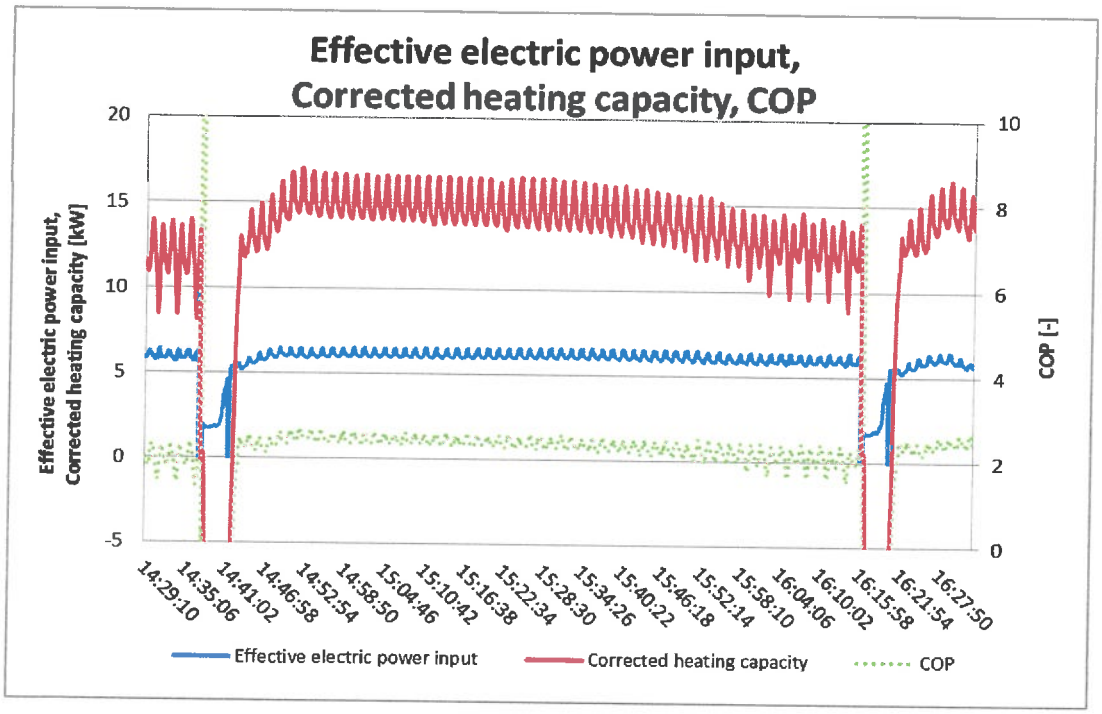
Heat pump **Airmax**^{2} **21GT:** A-10/W30.75



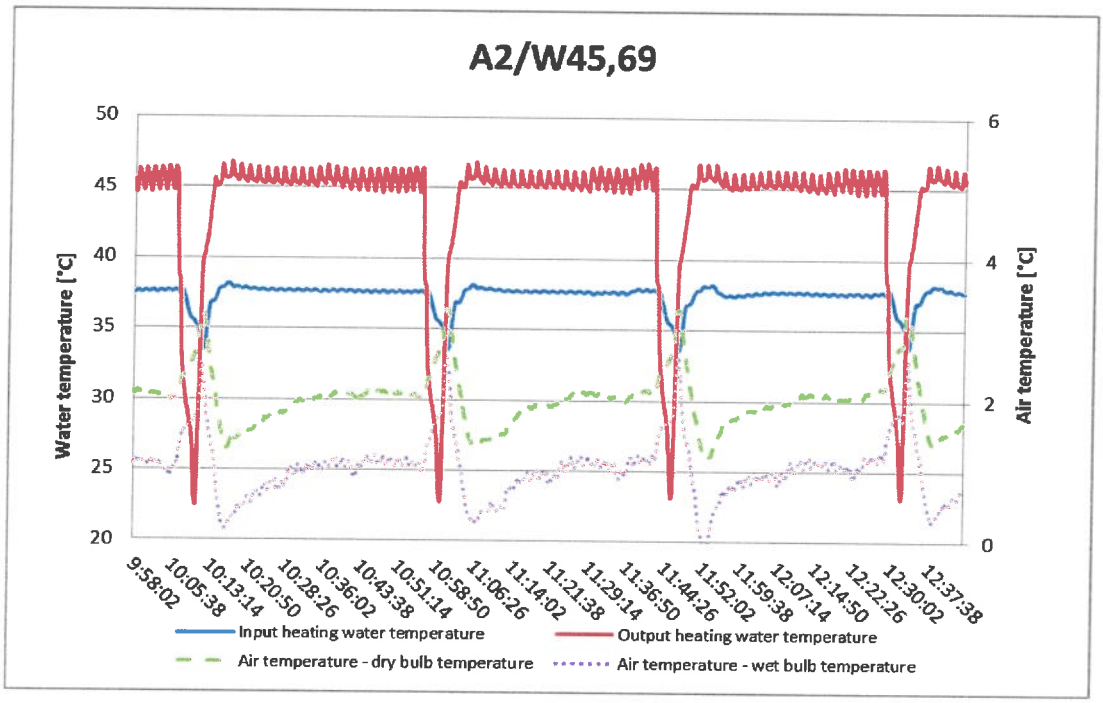


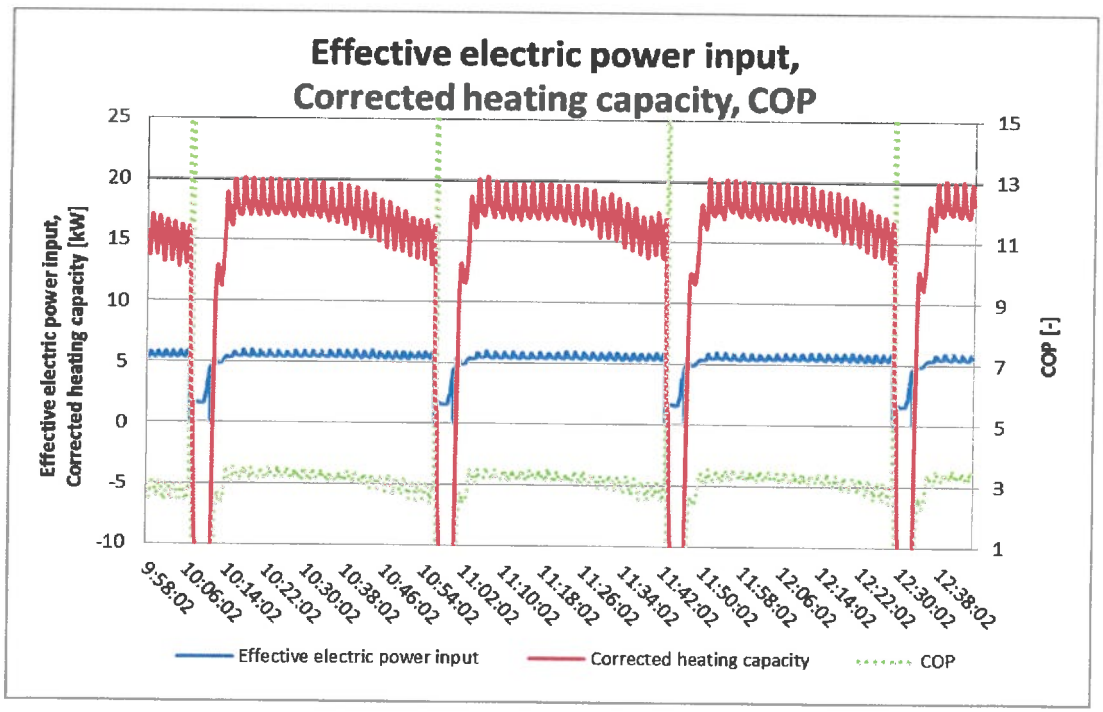
Heat pump **Airmax² 21GT:** A-7/W52



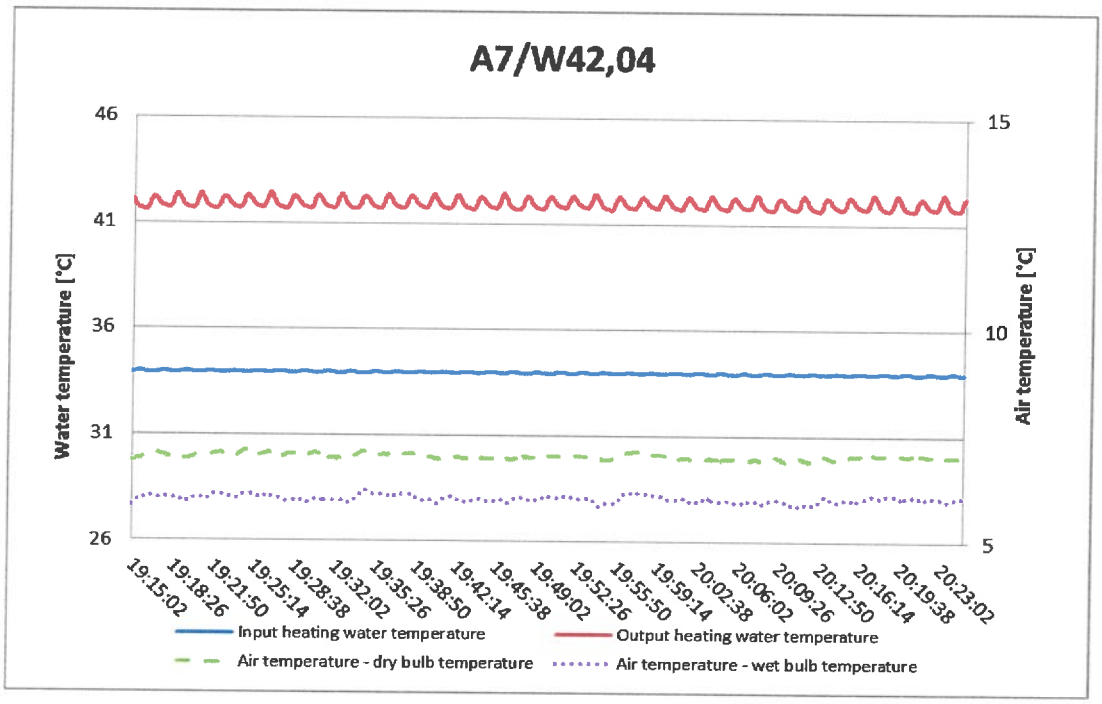


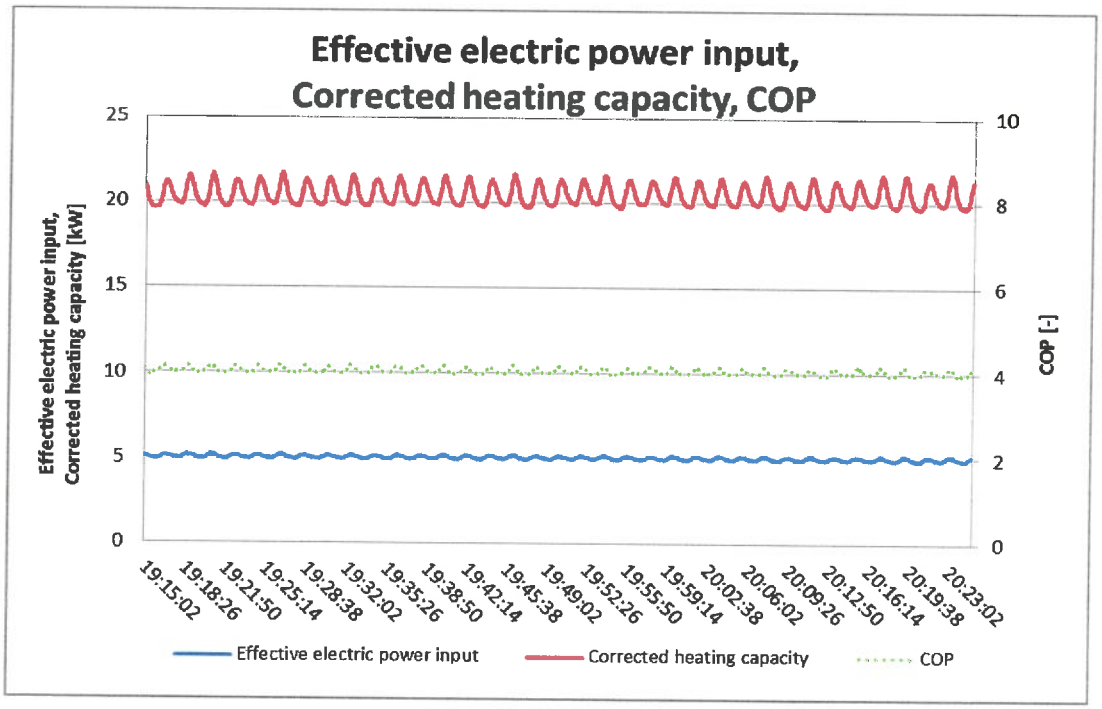
Heat pump **Airmax² 21GT:** A2/W45.69



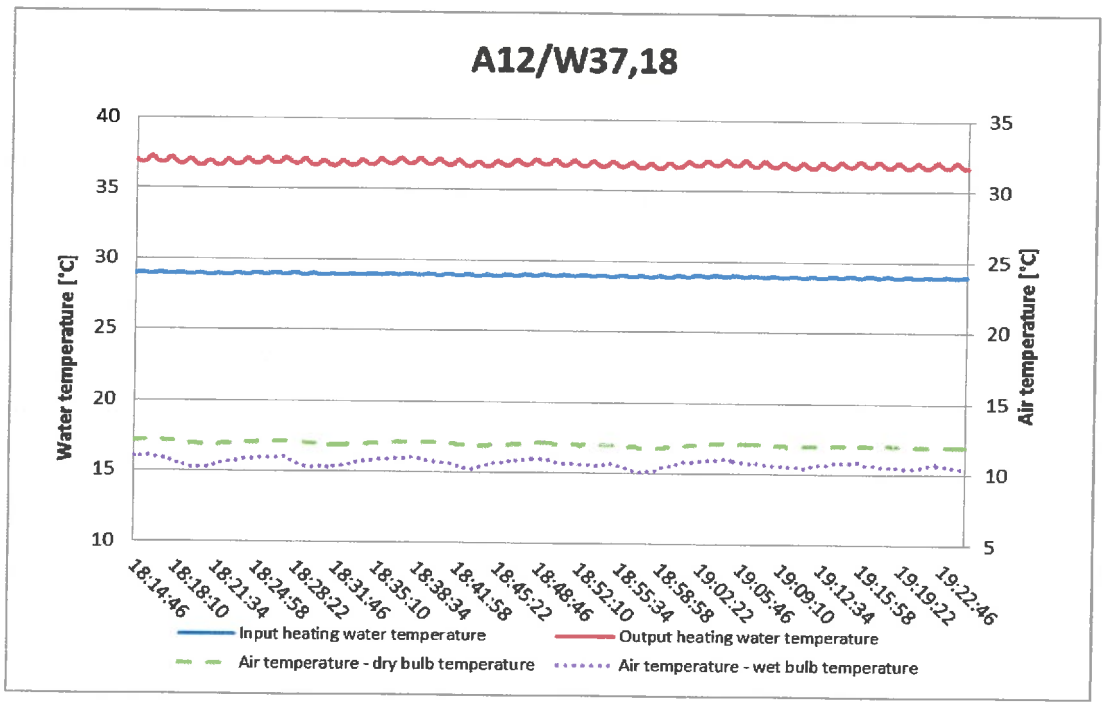


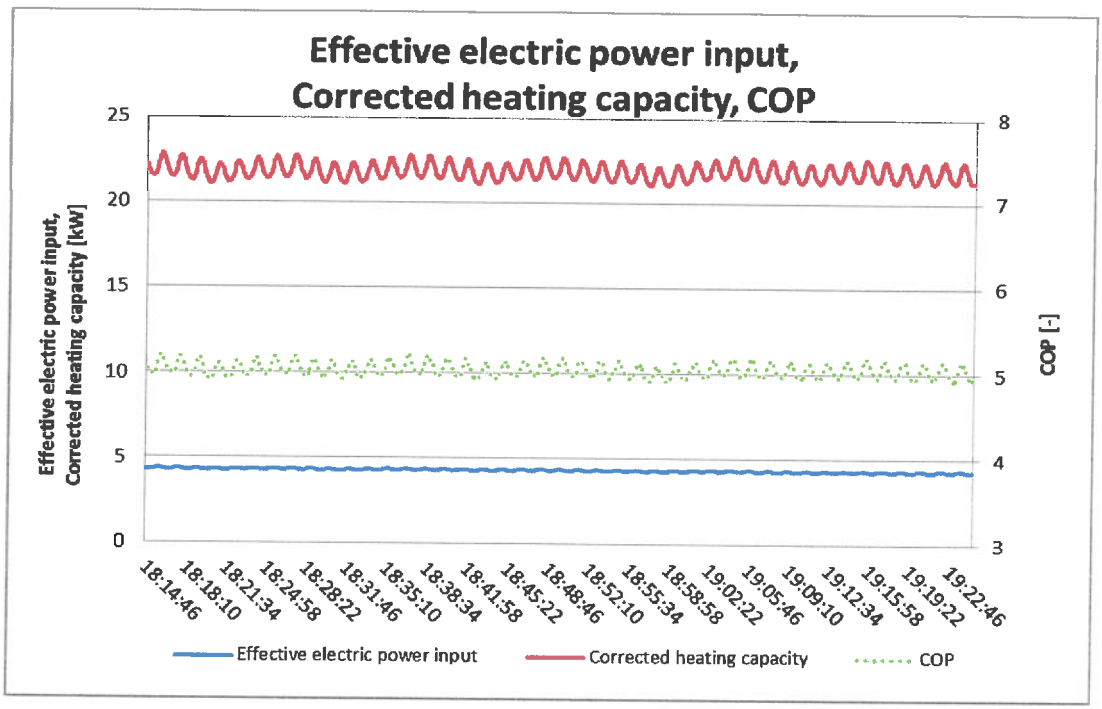
Heat pump **Airmax^2 21GT:** A7/W42.04



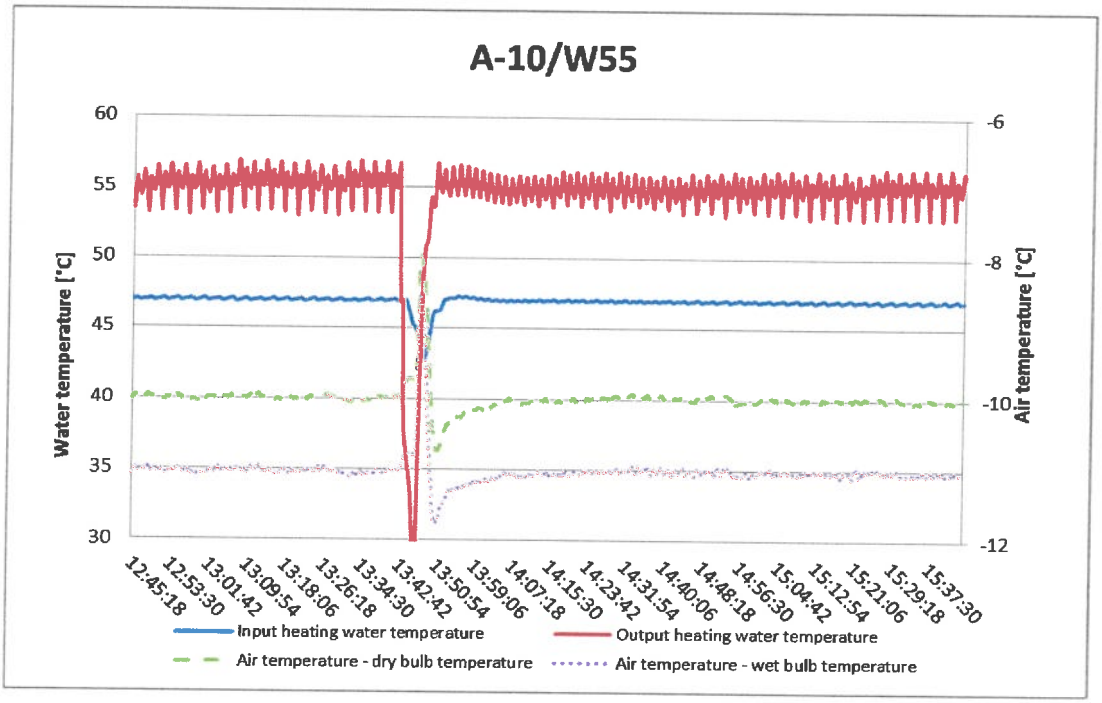


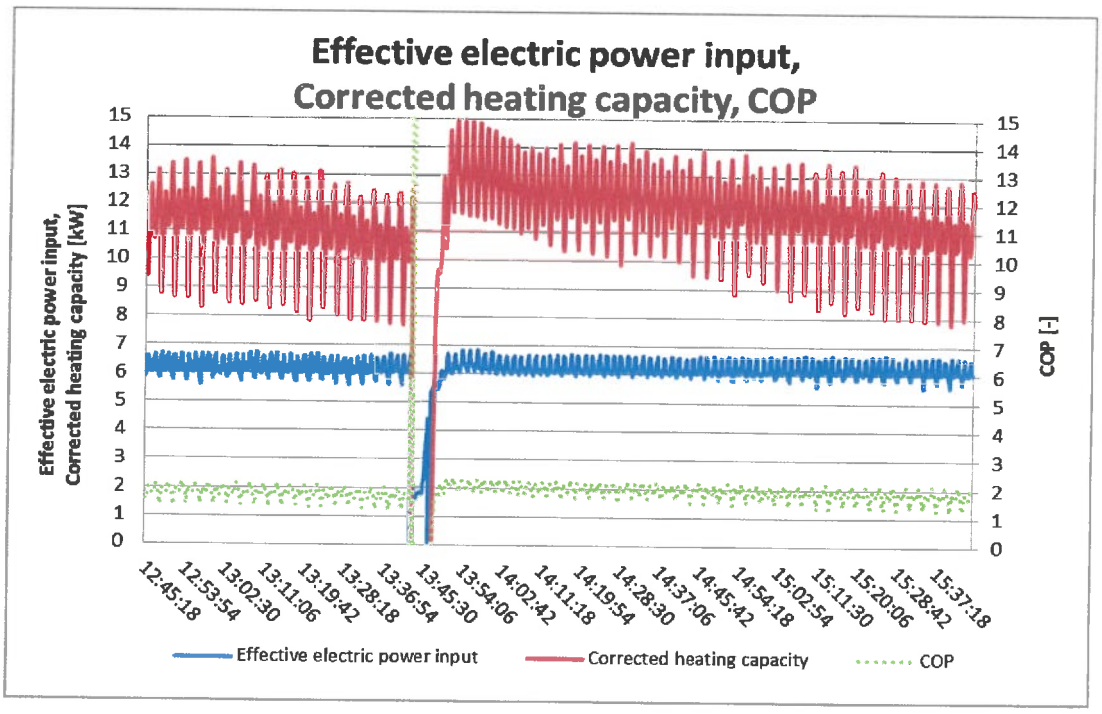
Heat pump **Airmax^2 21GT:** A12/W37.18



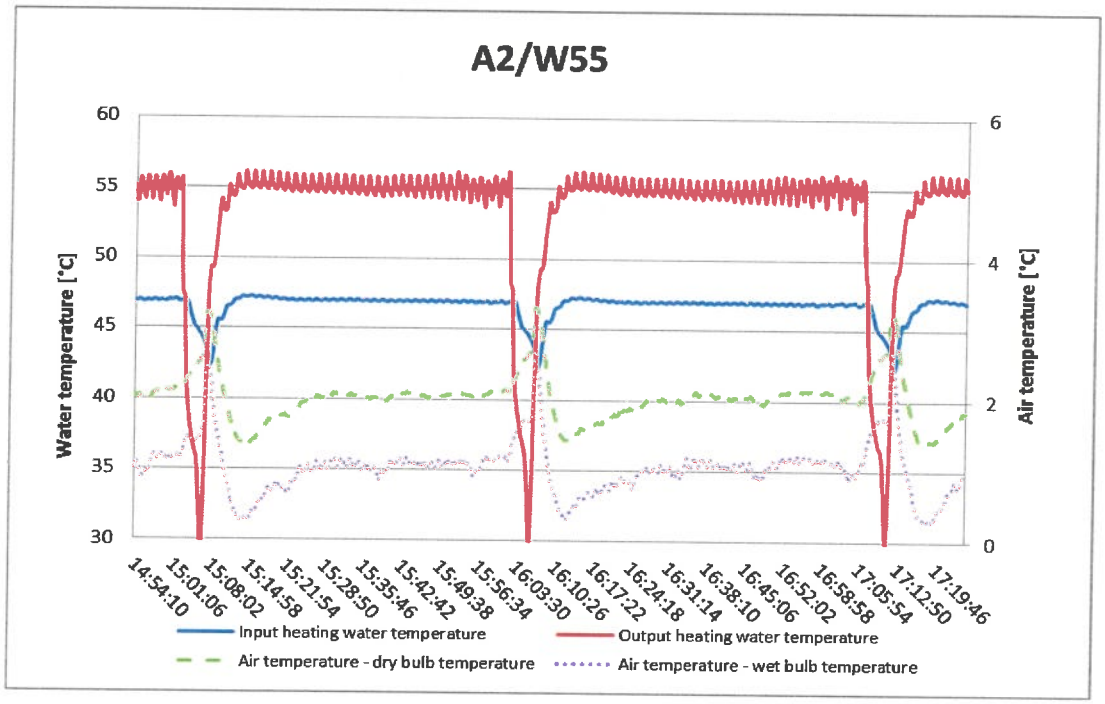


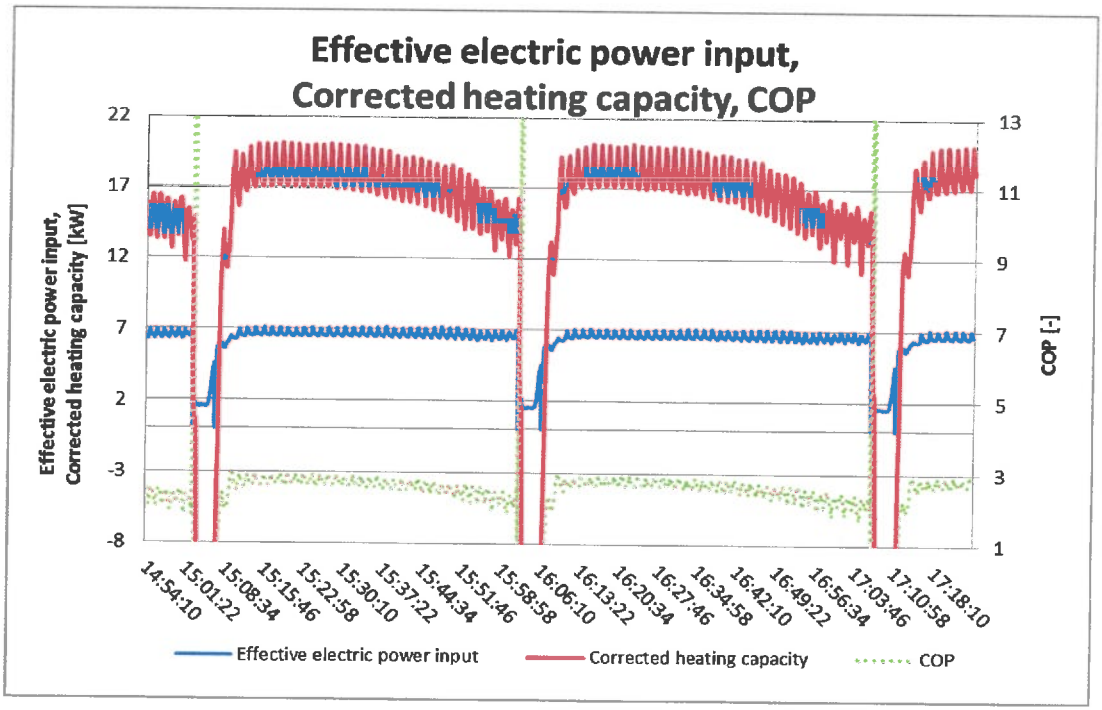
Heat pump **Airmax² 21GT:** A-10/W55



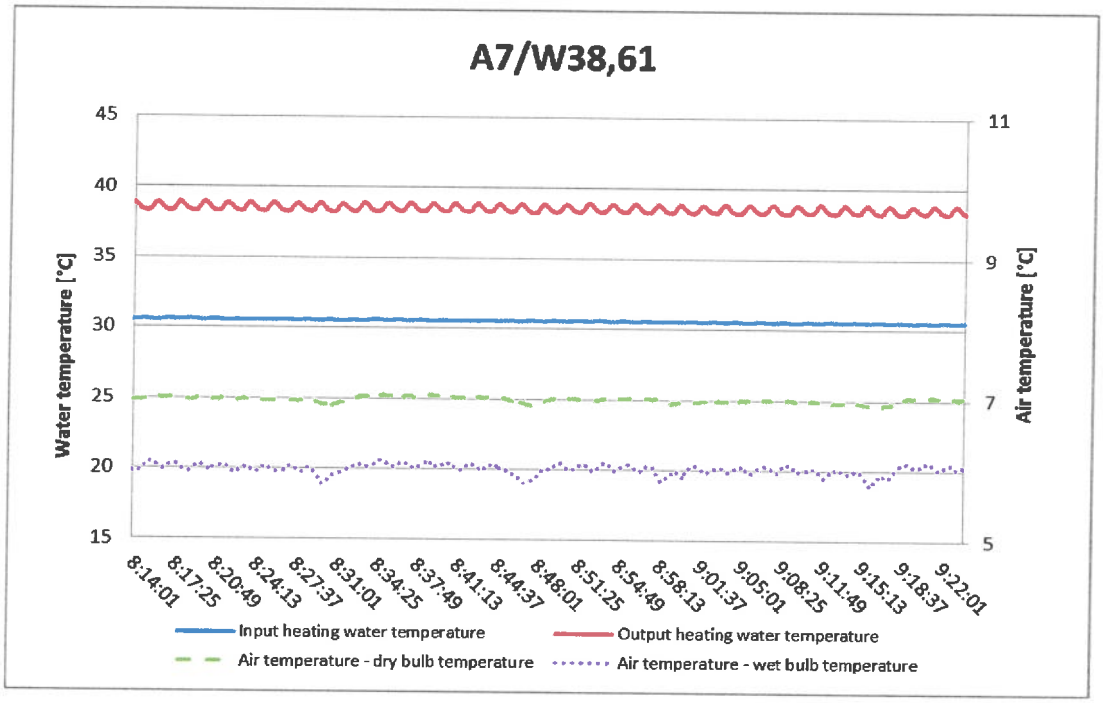


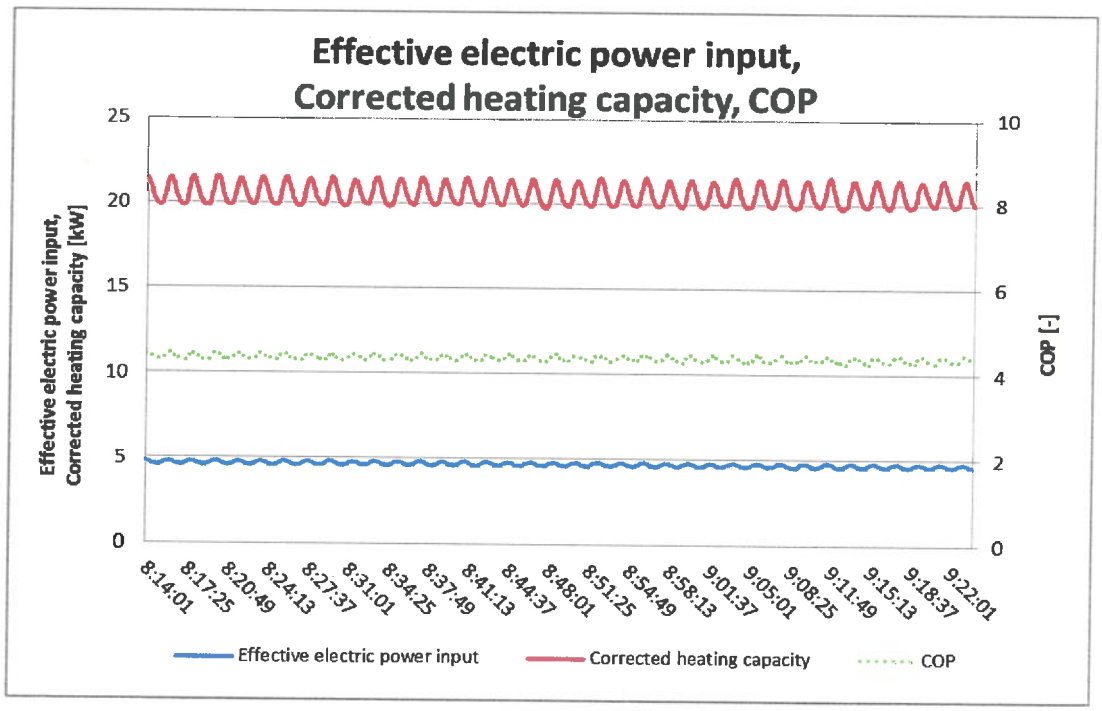
Heat pump **Airmax**^{2} **21GT:** A2/W55



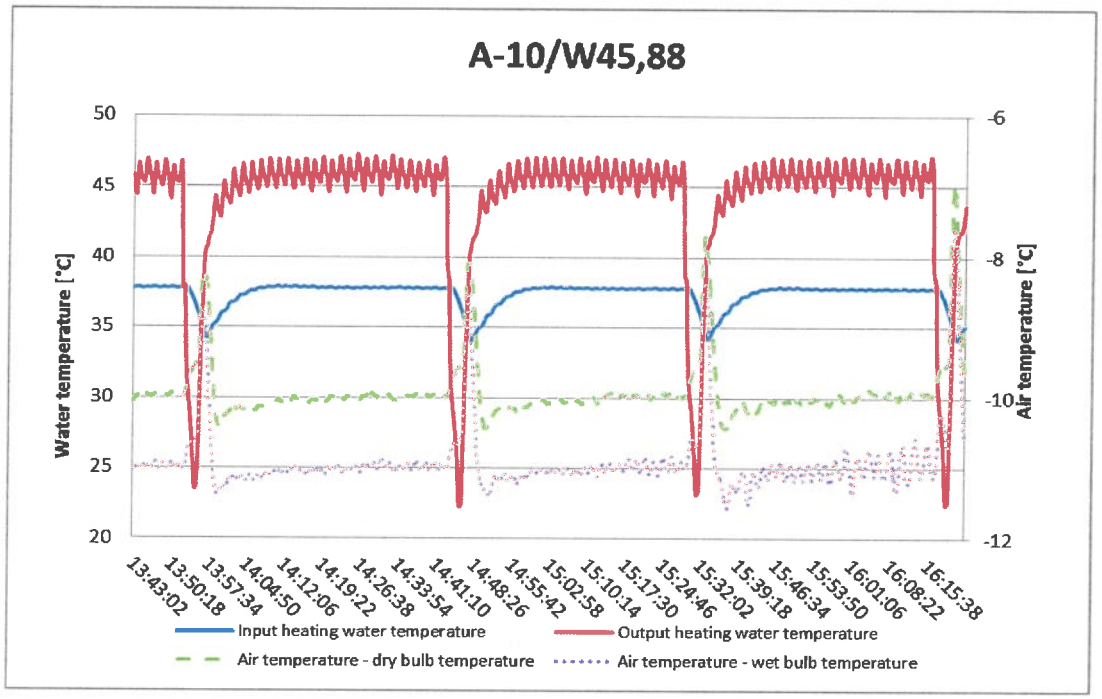


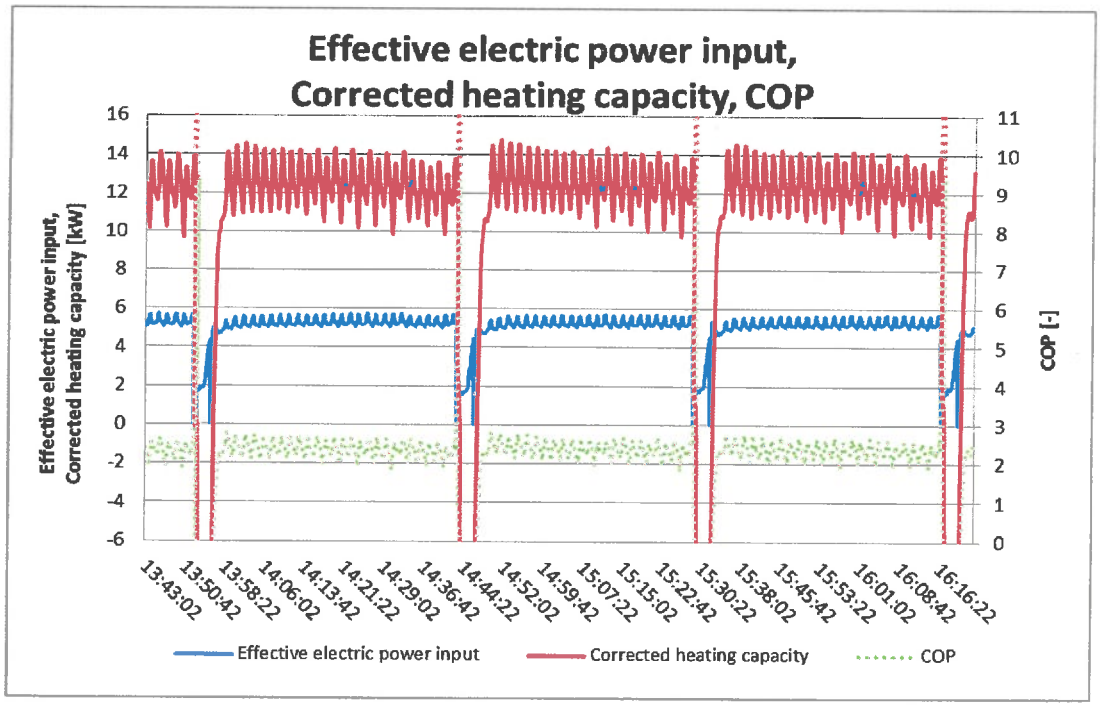
Heat pump **Airmax² 21GT:** A7/W38.61





Heat pump **Airmax^2 21GT:** A-10/W45.88





VII. List of additional documents used

- Order B-59756 of 2017-06-27 (Order reg. no. B-59756 delivered on 2017-06-28)
- Contract B-59756/39
- Amendment No. 1 to Contract B-59756/39
- ČSN EN 14511-1:2014 – Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 1: Terms, definitions and classification
- ČSN EN 14511-2:2014 – Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 2: Test conditions
- ČSN EN 14511-3:2014 – Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 3: Test methods
- ČSN EN 14511-4:2014 – Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 4: Operating requirements, marking and instructions
- ČSN EN 14825:2016 – Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance
- EHPA Testing Regulation – Testing of Air/Water Heat Pumps – Additional requirements for granting the international quality label for heat pumps – Version 2.3
- Background 39-11227
- Record measurement file: Galmet_12_2017.zip

Test Report drafted by: Ing. Tomáš Fiala – Test Engineer

Person responsible for the Report:

AKREDITOVANÁ ZKUŠEBNÍ LABORATOŘ č. 1045.1 STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. 1

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

- End of text -

[Uwagi tłumacza podane kursywą w nawiasach kwadratowych.]

[Tekst źródłowy dwustronicowy, w języku angielskim i języku trzecim, sporządzony na papierze firmowym Instytutu Badawczego Przemysłu Maszynowego w Brnie.]

[Logo Instytutu Badawczego Przemysłu Maszynowego]

[Tekst w języku trzecim]

Instytut Badawczy Przemysłu Maszynowego, Przedsiębiorstwo Państwowe, Brno, Republika Czeska

Świadectwo badania

Numer **O-39-00006-18**

Klient	Galmet Sp. z o.o. Sp. K. ul. Raciborska 36 48-100 Głubczyce Polska
Produkt	Pompa ciepła powietrze/woda – monoblokowa
Oznaczenie typu / znak towarowy	**Airmax² 16GT** **Airmax² 21GT** **Airmax² 26GT** **Airmax² 30GT**
Metody badań	ČSN EN 14511-2÷4:2014, ČSN EN 14825:2016, ČSN EN 12102:2014, Przepisy badań EHPA – Badanie pomp ciepła powietrze/woda, wersja 2.3
Podstawa wydania świadectwa	Sprawozdania z badań: 39-11227/T z 2017-01-05, 39-11227/A/H z 2017-01-05, Dokumentacja techniczna Galmet sp. z o.o. sp. K.
Temperatura stosowania	**NISKA** Referencyjna temperatura wody 35°C
Referencyjny sezon ogrzewczy	**„A" = umiarkowany / „W" = ciepły / „C" = chłodny** Warunki obliczeniowe odniesienia dla ogrzewania: $T_{designh}$ = -10°C / + 2°C / -22°C

Specyfikacja warunków:

Regulacja prędkości sprężarki	**Stała**	Znamionowe natężenie przepływu cieczy (wewnętrzny wymiennik ciepła)	**Zmienne**
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	**Zmienna**	Znamionowe natężenie przepływu cieczy (zewnętrzny wymiennik ciepła)	---
Działanie	**Odwracalne**		

[Czerwona okrągła pieczęć z logo Instytutu Badawczego Przemysłu Maszynowego w polu pieczęci i tekstem w języku trzecim oraz numerem CZ 1 w otoku pieczęci]

Zarejestrowane Centrum Badawcze
[Logo ehpa]

[Tekst w języku trzecim]

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe, Hudcova 424/56b, 621 00 Brno, Republika Czeska
www.szutest.cz

[Element graficzny]

[Logo Instytutu Badawczego Przemysłu Maszynowego]

Wyniki:

Zastosowanie niskotemperaturowe Referencyjna temperatura wody 35°C			Nazwy modeli **Airmax² 16GT** *(niebadany)*	**Airmax² 21GT** *(badany)*	**Airmax² 26GT** *(niebadany)*	**Airmax² 30GT** *(niebadany)*
Ogrzewanie przy pełnym obciążeniu	**$P_{designh}$ [kW]**	A	10,58	14,12	17,58	19,79
		W	10,70	14,27	17,80	20,30
		C	12,36	15,58	19,17	24,99
Temperatura dwuwartościowa	**$T_{bivalent}$ [°C]**	A	-7	-7	-7	-7
		W	2	2	2	2
		C	-10	-10	-10	-10
Sezonowy współczynnik efektywności	**SCOP [-]**	A	4,07	3,93	3,99	4,01
		W	5,03	4,94	4,99	5,00
		C	3,44	3,33	3,38	3,42
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	**η_s [%]**	A	159,8	154,2	156,7	157,5
		W	198,4	194,5	196,6	197,1
		C	134,8	130,1	132,2	133,8

(Badany) Ten egzemplarz testowy urządzenia został zbadany w Laboratorium Badawczym.

(Niebadany) Dane techniczne zostały zadeklarowane przez Producenta w oparciu o specyfikację gamy modeli i nie były badane przez Laboratorium Badawcze.

Instytut Badawczy Przemysłu Maszynowego, Przedsiębiorstwo Państwowe, potwierdza niniejszym Świadectwem Badania, że odnośny produkt został poddany badaniom, których wyniki są przedstawione powyżej. Instytut Badawczy Przemysłu Maszynowego, Przedsiębiorstwo Państwowe, jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2018-01-05

[Nieczytelny podpis] *[Czerwona okrągła pieczęć, jak wyżej]*

Milan Holomek
Kierownik Stacji Badawczej Urządzeń Cieplnych
i Przyjaznych dla Środowiska

- KONIEC ŚWIADECTWA -

O-39-00006-18, strona 2 (2)

[Dane teleadresowe, jak na str. 1]

Niniejszym poświadczam zgodność powyższego tłumaczenia z okazanym mi odpisem dokumentu w formacie pdf sporządzonym w języku angielskim, którego kopia jest dołączona do niniejszego tłumaczenia.
Andrzej Saczek, tłumacz przysięgły języka angielskiego, wpisany na listę tłumaczy przysięgłych, prowadzoną przez ministra sprawiedliwości, pod numerem TP/28/17.
Numer w repertorium: 37/2024
Bojano, 05.06.2024 r.

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

TEST CERTIFICATE

Number **O-39-00006-18**

Customer	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce Poland
Product	Air/Water Heat Pump – monobloc
Type designation / Trade mark	**Airmax² 16GT** **Airmax² 21GT** **Airmax² 26GT** **Airmax² 30GT**
Test methods	ČSN EN 14511-2÷4:2014, ČSN EN 14825:2016, ČSN EN 12102:2014, EHPA Testing regulation – Testing of Air/Water Heat Pumps, version 2.3
Basis of certificate	Test reports: 39-11227/T of 2017-01-05, 39-11227/A/H of 2017-01-05, Technical documents of "Galmet Sp. z o.o." Sp. K.
Temperature application	**LOW** Reference water temperature 35 °C
Reference heating season	**„A" = average / „W" = warmer / „C" = colder** Reference design conditions for heating $T_{designh}$ = -10 °C / +2 °C / -22 °C

Specification of conditions:

Compressor speed control	**Fixed**	Rated liquid flow rate (indoor heat exchanger)	**Variable**
Outlet water temperature (indoor heat exchanger)	**Variable**	Rated liquid flow rate (outdoor heat exchanger)	**---**
Function	**Reversible**		

Registered test centre

ehpa european heat pump association

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
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Results:

Low temperature application Reference water temperature 35 °C			Model names Airmax² 16GT *(Not tested)*	Airmax² 21GT *(Tested)*	Airmax² 26GT *(Not tested)*	Airmax² 30GT *(Not tested)*
Full load heating	$P_{designh}$ [kW]	A	10.58	14.12	17.58	19.79
		W	10.70	14.27	17.80	20.30
		C	12.36	15.58	19.17	24.99
Bivalent temperature	$T_{bivalent}$ [°C]	A	-7	-7	-7	-7
		W	2	2	2	2
		C	-10	-10	-10	-10
Seasonal coefficient of performance	SCOP [-]	A	4.07	3.93	3.99	4.01
		W	5.03	4.94	4.99	5.00
		C	3.44	3.33	3.38	3.42
Seasonal space heating energy efficiency	η_s [%]	A	159.8	154.2	156.7	157.5
		W	198.4	194.5	196.6	197.1
		C	134.8	130.1	132.2	133.8

(Tested) This test sample was tested at the Testing Laboratory.

(Not tested) The technical data were declared by the Manufacturer according to the model range specifications and were not tested by the Testing Laboratory.

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, 2018-01-05

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
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www.szutest.cz

[Uwagi tłumacza podane kursywą w nawiasach kwadratowych.]

[Tekst źródłowy dwustronicowy, w języku angielskim i języku trzecim, sporządzony na papierze firmowym Instytutu Badawczego Przemysłu Maszynowego w Brnie.]

[Logo Instytutu Badawczego Przemysłu Maszynowego]

[Tekst w języku trzecim]

Instytut Badawczy Przemysłu Maszynowego, Przedsiębiorstwo Państwowe, Brno, Republika Czeska

Świadectwo badania

Numer **O-39-00007-18**

Klient	Galmet Sp. z o.o. Sp. K. ul. Raciborska 36 48-100 Głubczyce Polska
Produkt	Pompa ciepła powietrze/woda – monoblokowa
Oznaczenie typu / znak towarowy	**Airmax² 16GT** **Airmax² 21GT** **Airmax² 26GT** **Airmax² 30GT**
Metody badań	ČSN EN 14511-2÷4:2014, ČSN EN 14825:2016, ČSN EN 12102:2014, Przepisy badań EHPA – Badanie pomp ciepła powietrze/woda, wersja 2.3
Podstawa wydania świadectwa	Sprawozdania z badań: 39-11227/T z 2017-01-05, 39-11227/A/H z 2017-01-05, Dokumentacja techniczna Galmet sp. z o.o. sp. K.
Temperatura stosowania	**ŚREDNIA** Referencyjna temperatura wody 55°C
Referencyjny sezon ogrzewczy	**„A" = umiarkowany / „W" = ciepły / „C" = chłodny** Warunki obliczeniowe odniesienia dla ogrzewania: $T_{designh}$ = -10°C / + 2°C / -22°C

Specyfikacja warunków:

Regulacja prędkości sprężarki	**Stała**	Znamionowe natężenie przepływu cieczy (wewnętrzny wymiennik ciepła)	**Zmienne**
Temperatura wody na wylocie (wewnętrzny wymiennik ciepła)	**Zmienna**	Znamionowe natężenie przepływu cieczy (zewnętrzny wymiennik ciepła)	---
Działanie	**Odwracalne**		

[Czerwona okrągła pieczęć z logo Instytutu Badawczego Przemysłu Maszynowego w polu pieczęci i tekstem w języku trzecim oraz numerem CZ 1 w otoku pieczęci]

Zarejestrowane Centrum Badawcze *[Logo ehpa]*

[Tekst w języku trzecim]

Instytut Badawczy Przemysłu Maszynowego, przedsiębiorstwo państwowe, Hudcova 424/56b, 621 00 Brno, Republika Czeska
www.szutest.cz

[Element graficzny]

[Logo Instytutu Badawczego Przemysłu Maszynowego]

Wyniki:

Zastosowanie średniotemperaturowe Referencyjna temperatura wody 55°C			Nazwy modeli **Airmax² 16GT** *(niebadany)*	**Airmax² 21GT** *(badany)*	**Airmax² 26GT** *(niebadany)*	**Airmax² 30GT** *(niebadany)*
Ogrzewanie przy pełnym obciążeniu	$P_{designh}$ **[kW]**	A	10,86	14,49	18,20	20,18
		W	11,05	14,63	18,30	20,40
		C	13,29	15,13	21,19	23,53
Temperatura dwuwartościowa	$T_{bivalent}$ **[°C]**	A	-7	-7	-7	-7
		W	2	2	2	2
		C	-10	-10	-10	-10
Sezonowy współczynnik efektywności	**SCOP** **[-]**	A	3,13	3,04	3,12	3,13
		W	3,71	3,56	3,63	3,63
		C	2,57	2,52	2,53	2,53
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	η_s **[%]**	A	122,4	118,8	121,7	122,3
		W	145,5	139,3	142,1	142,2
		C	99,8	97,6	98,0	98,0

(Badany) Ten egzemplarz testowy urządzenia został zbadany w Laboratorium Badawczym.

(Niebadany) Dane techniczne zostały zadeklarowane przez Producenta w oparciu o specyfikację gamy modeli i nie były badane przez Laboratorium Badawcze.

Instytut Badawczy Przemysłu Maszynowego, Przedsiębiorstwo Państwowe, potwierdza niniejszym Świadectwem Badania, że odnośny produkt został poddany badaniom, których wyniki są przedstawione powyżej. Instytut Badawczy Przemysłu Maszynowego, Przedsiębiorstwo Państwowe, jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2018-01-05

[Nieczytelny podpis] *[Czerwona okrągła pieczęć, jak wyżej]*

Milan Holomek
Kierownik Stacji Badawczej Urządzeń Cieplnych
i Przyjaznych dla Środowiska

- KONIEC ŚWIADECTWA -

O-30-00007-18, strona 2 (2)

[Dane teleadresowe, jak na str. 1]

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Andrzej Saczek, tłumacz przysięgły języka angielskiego, wpisany na listę tłumaczy przysięgłych, prowadzoną przez ministra sprawiedliwości, pod numerem TP/28/17.
Numer w repertorium: 38/2024
Bojano, 05.06.2024 r.

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

TEST CERTIFICATE

Number **O-39-00007-18**

Customer	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce Poland
Product	Air/Water Heat Pump – monobloc
Type designation / Trade mark	**Airmax² 16GT** **Airmax² 21GT** **Airmax² 26GT** **Airmax² 30GT**
Test methods	ČSN EN 14511-2÷4:2014, ČSN EN 14825:2016, ČSN EN 12102:2014, EHPA Testing regulation – Testing of Air/Water Heat Pumps, version 2.3
Basis of certificate	Test reports: 39-11227/T of 2017-01-05, 39-11227/A/H of 2017-01-05, Technical documents of "Galmet Sp. z o.o." Sp. K.
Temperature application	**MEDIUM** Reference water temperature 55 °C
Reference heating season	**„A" = average / „W" = warmer / „C" = colder** Reference design conditions for heating $T_{designh}$ = -10 °C / +2 °C / -22 °C

Specification of conditions:

Compressor speed control	**Fixed**	Rated liquid flow rate (indoor heat exchanger)	**Variable**
Outlet water temperature (indoor heat exchanger)	**Variable**	Rated liquid flow rate (outdoor heat exchanger)	**---**
Function	**Reversible**		

Registered test centre

ehpa european heat pump association

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

Results:

Medium temperature application Reference water temperature 55 °C			Model names Airmax² 16GT *(Not tested)*	Airmax² 21GT *(Tested)*	Airmax² 26GT *(Not tested)*	Airmax² 30GT *(Not tested)*
Full load heating	$P_{designh}$ [kW]	A	10.86	14.49	18.20	20.18
		W	11.05	14.63	18.30	20.40
		C	13.29	15.13	21.19	23.53
Bivalent temperature	$T_{bivalent}$ [°C]	A	-7	-7	-7	-7
		W	2	2	2	2
		C	-10	-10	-10	-10
Seasonal coefficient of performance	SCOP [-]	A	3.13	3.04	3.12	3.13
		W	3.71	3.56	3.63	3.63
		C	2.57	2.52	2.53	2.53
Seasonal space heating energy efficiency	η_s [%]	A	122.4	118.8	121.7	122.3
		W	145.5	139.3	142.1	142.2
		C	99.8	97.6	98.0	98.0

(Tested) This test sample was tested at the Testing Laboratory.

(Not tested) The technical data were declared by the Manufacturer according to the model range specifications and were not tested by the Testing Laboratory.

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, 2018-01-05

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

[Przyp. tłum.: Do tłumaczenia przedstawiono dokument dwujęzyczny. Treści w języku czeskim nie zostały przetłumaczone.]

Strojírenský zkušební ústav, s.p., Brno, Česká republika

Techniczny Instytut Badawczy, Przedsiębiorstwo Państwowe, Brno, Czechy

ŚWIADECTWO BADAŃ

Numer: **O-39-00005-18**

Klient	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Glubczyce Polska
Produkt	Pompa ciepła powietrze/woda — monoblok
Oznaczenie typu / Znak towarowy	**Airmax² 16GT** **Airmax² 21GT** **Airmax² 26GT** **Airmax² 30GT**
Metoda badawcza	ČSN EN 14511-2÷4:2014, ČSN EN 14825:2016, ČSN EN 12102:2014, Rozporządzenie w sprawie badań — Badanie pomp ciepła powietrze/woda Europejskiego Stowarzyszenia Pomp Ciepła (*ang. European Heat Pump Association, EHPA*), wersja 2.3
Podstawa świadectwa	Raporty z badań: 39-11227/T z dnia 05-01-2017 r., 39-11227/A/H z dnia 05-01-2017 r., Dokumentacja techniczna „Galmet Sp. z o.o." Sp. K.
Temperatura robocza	**NISKA, ŚREDNIA** Temperatura referencyjna wody 35 °C oraz 55 °C
Referencyjny sezon grzewczy	**„A" = średni / „W" = cieplejszy/ „C" = zimniejszy** Referencyjne założenia projektowe ogrzewania $T_{designh}$ = -10 °C / +2 °C / -22 °C

Ja, Edyta Więcławska, tłumacz przysięgły z języka angielskiego ustanowiony przy Sądzie Okręgowym w Rzeszowie, Polska z siedzibą przy ul. Plac Śreniawitów 3, 35-959; wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod nr TP/1023/05 Polska. Potwierdzam zgodność niniejszego tłumaczenia z fotokopią dokumentu w języku angielskim. Błażowa, 22 października 2020 r. Numer Repertorium 435/2020.

Określenie warunków:

Regulacja prędkości sprężarki	Stała	Znamionowa prędkość przepływu cieczy (wewnętrzny wymiennik ciepła)	Zmienna
Temperatura wody na wyjściu (wewnętrzny wymiennik ciepła)	Zmienna	Znamionowa prędkość przepływu cieczy (zewnętrzny wymiennik ciepła)	---
Funkcja	Odwracalna		

Zarejestrowane centrum badawcze

0-30-00005-18, strona 1 (2)

Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, Česká republika
Techniczny Instytut Badawczy, Przedsiębiorstwo Państwowe, Hudcova 424/56b, 621 00 Brno, Czechy
www.szutest.cz

/strona 2/

Wyniki:

Warunki znamionowe*			Nazwy modeli: Airmax² 16GT (nietestowany)	Airmax² 21GT (testowany)	Airmax² 26GT (nietestowany)	Airmax² 30GT (nietestowany)
A7/W35	Skorygowana moc cieplna	[kW]	15,55	20,981	26,01	29,82
	Rzeczywisty pobór mocy	[kW]	3,31	4,586	5,64	6,41
	COP	[-]	4,70	4,575	4,61	4,65
	Ustawienia kontrolne	[%]	-	-	-	-
A2/W35	Skorygowana moc cieplna	[kW]	11,25	15,031	18,75	21,42
	Rzeczywisty pobór mocy	[kW]	3,17	4,342	5,34	6,09
	COP	[-]	3,55	3,461	3,51	3,52
	Ustawienia kontrolne	[%]	-	-	-	-
A7/W55	Skorygowana moc cieplna	[kW]	15,75	21,216	26,40	30,10
	Rzeczywisty pobór mocy	[kW]	4,85	6,759	8,25	9,47
	COP	[-]	3,25	3,139	3,20	3,18
	Ustawienia kontrolne	[%]	-	-	-	-

Poziom mocy akustycznej w warunkach A7/W55*, klasa dokładności: techniczna (poziom 2)

L_{WA}	Jednostka wewnętrzna	[dB(A)]	---	---	---	---
	Jednostka zewnętrzna		73,5 ± 1,5	74,4 ± 1,5	75,0± 1,5	75,5 ± 1,5

(*) Objaśnienie skrótowego oznaczenia: np. A7/W35: A (powietrze), 7 (powietrze wchodzące — temperatura termometru suchego w °C) / W (woda), 35 (temperatura wody podgrzanej na wyjściu w °C).

(Testowany) Ta próbka była badana w Laboratorium Badawczym.

(Nietestowany) Dane techniczne zgodnie z deklaracją Producenta na podstawie zakresu specyfikacji modelu, niebadane przez Laboratorium Badawcze.

Na podstawie niniejszego Świadectwa Techniczny Instytut Badawczy, Przedsiębiorstwo Państwowe potwierdza, że podczas badania danego produktu otrzymano wyniki, które zostały przedstawione powyżej.

Techniczny Instytut Badawczy, Przedsiębiorstwo Państwowe jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 05-01-2018 r.

[*Nieczytelny podpis, przyp. tłum.*]

Milan Holomek

Kierownik stanowiska do badania sprzętu grzewczego i przyjaznego dla środowiska (*ang. Head of Heat and Environment-Friendly Equipment Test Station*)

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, S.P. CZ

- KONIEC ŚWIADECTWA -

O-30-00005-18, strona 2 (2)

Ja, Edyta Więcławska, tłumacz przysięgły z języka angielskiego ustanowiony przy Sądzie Okręgowym w Rzeszowie, Polska z siedzibą przy ul. Plac Śreniawitów 3, 35-959; wpisany na listę tłumaczy przysięgłych prowadzoną przez Ministra Sprawiedliwości pod nr TP/1023/05 Polska. Potwierdzam zgodność niniejszego tłumaczenia z fotokopią dokumentu w języku angielskim. Błażowa, 22 października 2020 r. Numer Repertorium 435/2020.

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

TEST CERTIFICATE

Number **O-39-00005-18**

Customer	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce Poland
Product	Air/Water Heat Pump – monobloc
Type designation / Trade mark	**Airmax² 16GT** **Airmax² 21GT** **Airmax² 26GT** **Airmax² 30GT**
Test methods	ČSN EN 14511-2÷4:2014, ČSN EN 14825:2016, ČSN EN 12102:2014, EHPA Testing regulation – Testing of Air/Water Heat Pumps, version 2.3
Basis of certificate	Test reports: 39-11227/T of 2017-01-05, 39-11227/A/H of 2017-01-05, Technical documents of "Galmet Sp. z o.o." Sp. K.
Temperature application	**LOW, MEDIUM** Reference water temperature 35 °C and 55 °C
Reference heating season	**„A" = average / „W" = warmer / „C" = colder** Reference design conditions for heating $T_{designh}$ = -10 °C / +2 °C / -22 °C

Specification of conditions:

Compressor speed control	**Fixed**	Rated liquid flow rate (indoor heat exchanger)	**Variable**
Outlet water temperature (indoor heat exchanger)	**Variable**	Rated liquid flow rate (outdoor heat exchanger)	**---**
Function	**Reversible**		

Registered test centre

ehpa european heat pump association

Results:

Rating condition*			Model names: Airmax² 16GT (Not tested)	Airmax² 21GT (Tested)	Airmax² 26GT (Not tested)	Airmax² 30GT (Not tested)
A7/W35	Corrected heat capacity	[kW]	15.55	20.981	26.01	29.82
	Effective power input	[kW]	3.31	4.586	5.64	6.41
	COP	[-]	4.70	4.575	4.61	4.65
	Control settings	[%]	-	-	-	-
A2/W35	Corrected heat capacity	[kW]	11.25	15.031	18.75	21.42
	Effective power input	[kW]	3.17	4.342	5.34	6.09
	COP	[-]	3.55	3.461	3.51	3.52
	Control settings	[%]	-	-	-	-
A7/W55	Corrected heat capacity	[kW]	15.75	21.216	26.40	30.10
	Effective power input	[kW]	4.85	6.759	8.25	9.47
	COP	[-]	3.25	3.139	3.20	3.18
	Control settings	[%]	-	-	-	-

Sound power level at condition A7/W55*, accuracy class: Engineering (grade 2)

L_{WA}	Indoor unit	[dB(A)]	- - -	- - -	- - -	- - -
	Outdoor unit		73.5 ± 1.5	74.4 ± 1.5	75.0 ± 1.5	75.5 ± 1.5

(*) 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).

(Tested) This test sample was tested at the Testing Laboratory.

(Not tested) The technical data were declared by the Manufacturer according to the model range specifications and were not tested by the Testing Laboratory.

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, 2018-01-05

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

- END OF TEST CERTIFICATE-

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

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-39-00002-18**

Klient	„Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce Polska
Produkt	Pompa ciepła powietrze/woda – monoblok
Oznaczenie typu/Znak towarowy	**Airmax² 21GT**
Metody badań	ČSN EN 14825:2016, ČSN EN 12102:2014, Regulamin badań EHPA – badanie pomp ciepła powietrze/woda, wersja 2.3, komunikat Komisji nr 2014/C 207/02
Podstawa wydania świadectwa	Sprawozdania z badań: 39-11227/T z dnia 2017-01-05, 39-11227/A/H z dnia 2017-01-05, Dokumenty techniczne przedstawione przez „Galmet Sp. z o.o." Sp. K.
Referencyjny sezon grzewczy	„A" = średni Referencyjne projektowe warunki ogrzewania T_{projh}=-10 °C

Wyniki:

NISKA TEMPERATURA (referencyjna temperatura wody 35°C)		**WYSOKA TEMPERATURA** (referencyjna temperatura wody 55°C)
14,12	**P_{projh} [kW]** ... Ogrzewanie przy pełnym obciążeniu	**14,49**
3,93	**SCOP [-]** ... Sezonowy współczynnik wydajności	**3,04**

Temperatura zewnętrzna	Deklarowana efektywność ogrzewania	Współczynnik wydajności przy deklarowanej efektywności	Temperatura zewnętrzna	Deklarowana efektywność ogrzewania	Współczynnik wydajności przy deklarowanej efektywności
T_j [°C]	**P_{dh} [kW]**	**COP_d[-]**	**T_j [°C]**	**P_{dh} [kW]**	**COP_d[-]**
T_j = -7	**12,490**	**2,944**	**T_j = -7**	**12,819**	**2,171**
T_j = +2	**15,016**	**3,734**	**T_j = +2**	**14,468**	**2,806**
T_j = +7	**20,357**	**4,949**	**T_j = +7**	**20,496**	**4,060**
T_j = +12	**22,322**	**5,828**	**T_j = +12**	**21,856**	**5,046**
T_j = TOL = -10	**10,789**	**2,524**	**T_j = TOL = -10**	**10,932**	**1,793**
T_j = T_{dwuw} = -7	**12,490**	**2,944**	**T_j = T_{dwuw} = -7**	**12,819**	**2,171**

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

Zarejestrowane centrum badawcze
[logo EHPA]

[hologram]

[pieczątka: MARCIN KOTLICKI TŁUMACZ PRZYSIĘGŁY JĘZYKA ANGIELSKIEGO NR TP/32/12]

[logo]

NISKA TEMPERATURA (referencyjna temperatura wody 35°C)				WYSOKA TEMPERATURA (referencyjna temperatura wody 55°C)
Zużycie mocy w trybach innych niż „tryb aktywny"				
9,8	Tryb wyłączenia	P_{OFF}	[W]	9,8
10,0	Tryb wyłączenia termostatu	P_{TO}	[W]	9,7
9,8	Tryb czuwania	P_{SB}	[W]	9,8
0,0	Tryb ogrzewania karteru	P_{CK}	[W]	0,0
Roczne zużycie energii elektrycznej na ogrzewanie zgodnie z				
7421	ČSN EN 14825:2016	Q_{HE}	[kWh]	9834
Sezonowa efektywność energetyczna ogrzewania pomieszczeń				
154,2	ČSN EN 14825:2016	η_s	[%]	118,8
Prędkość przepływu cieczy w zewnętrznym wymienniku ciepła				
---	Ciecz źródłowa	min max	[m^3/h]	---
Prędkość przepływu cieczy w zewnętrznym wymienniku ciepła				
2,039 3,829	Woda grzewcza	min max	[m^3/h]	1,255 2,402
Poziom mocy akustycznej w warunkach A7/W55*, inżynieryjna klasa dokładności (stopień 2)				
L_{WA} - dB(A)	Airmax² 21GT			L_{WA} 74,4 ± 1,5 dB(A)

(*) Uwaga dotycząca skróconego oznaczenia, np. A7/W55: A (powietrze), 7 (temperatura wlotowa - temperatura termometru suchego w °C) / W (woda), 55 (temperatura wylotowa wody w °C)

Specyfikacja warunków:

Sterowanie prędkością sprężarki	**Stałe**	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, 2018-01-05

[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 28 marca 2024 r.
Tłumacz przysięgły języka angielskiego Marcin Kotlicki
Nr TP/32/12
ul. Rataje 162/13, 61-168 Poznań
nr rep 367/2024

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

TEST CERTIFICATE

Number **O-39-00002-18**

Customer	"Galmet Sp. z o.o." Sp. K. ul. Raciborska 36 48-100 Głubczyce Poland
Product	Air/Water Heat Pump – monobloc
Type designation / Trade mark	**Airmax² 21GT**
Test methods	ČSN EN 14825:2016, ČSN EN 12102:2014, EHPA Testing regulation – Testing of Air/Water Heat Pumps, version 2.3, Commission communication No. 2014/C 207/02.
Basis of certificate	Test reports: 39-11227/T of 2017-01-05, 39-11227/A/H of 2017-01-05, 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)

14.12	**$P_{designh}$ [kW]** ... Full load heating	**14.49**
3.93	**SCOP [-]** ... Seasonal coefficient of performance	**3.04**

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	12.490	2.944	T_j = -7	12.819	2.171
T_j = +2	15.016	3.734	T_j = +2	14.468	2.806
T_j = +7	20.357	4.949	T_j = +7	20.496	4.060
T_j = +12	22.322	5.828	T_j = +12	21.856	5.046
T_j = TOL = -10	10.789	2.524	T_j = TOL = -10	10.932	1.793
T_j = $T_{bivalent}$ = -7	12.490	2.944	T_j = $T_{bivalent}$ = -7	12.819	2.171

Registered test centre

ehpa european heat pump association

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

LOW TEMPERATURE (Reference water temperature 35 °C)				MEDIUM TEMPERATURE (Reference water temperature 55 °C)
Power consumption in modes other than „active mode“				
9.8	Off mode	P_{OFF}	[W]	9.8
10.0	Thermostat off mode	P_{TO}	[W]	9.7
9.8	Standby mode	P_{SB}	[W]	9.8
0.0	Crankcase heater mode	P_{CK}	[W]	0.0
Annual electricity consumption for heating according to				
7421	ČSN EN 14825:2016	Q_{HE}	[kWh]	9834
Seasonal Space heating energy efficiency				
154.2	ČSN EN 14825:2016	η_s	[%]	118.8
Liquid flow rate in outdoor heating exchanger				
---	Source liquid	Min/ Max	[m^3/h]	---
Liquid flow rate in indoor heating exchanger				
2.039 3.829	Heating water	Min/ Max	[m^3/h]	1.255 2.402
Sound power level at condition A7/W55*, Engineering accuracy class (grade 2)				
L_{WA} - dB(A)	Airmax^2 21GT			L_{WA} 74.4 ± 1.5 dB(A)

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

Specification of conditions:

Compressor speed control	**Fixed**	Rated liquid flow rate (indoor heat exchanger)	**Variable**
Outlet water temperature (indoor heat exchanger)	**Variable**	Rated liquid 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, 2018-01-05

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

OŚWIADCZENIE

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

1) Airmax2 16GT; Nr.kat.: 09-261600
Oznaczenie/typ/identyfikator modelu

2) Airmax2 21GT; Nr.kat.: 09-262100
Oznaczenie/typ/identyfikator modelu

3) Airmax2 26GT; Nr.kat.: 09-262600
Oznaczenie/typ/identyfikator modelu

4) Airmax2 30GT; Nr.kat.: 09-263000
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.

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

Głubczyce, 14.05.2024
Miejscowość, data

Podpis osoby upoważnionej