L 1045.1

TEST REPORT
31-10708/1/T

Product:	Outdoor Air/Water Heat Pump – split
Type designation:	**AWM1501.090.XB12.H00.C11**
Customer:	W&H ELECTRIC POLSKA Sp. z.o.o. (Trade Mark: BeGreen) ul. Biecka 21A 38-300 Gorlice POLAND
Manufacturer:	W&H ELECTRIC POLSKA Sp. z.o.o. (Trade Mark: BeGreen) ul. Biecka 21A 38-300 Gorlice POLAND
Responsible employee:	Ing. Mario Jankola
Report issue date:	2022-04-08
Distribution list:	1 copy to the Customer 1 copy to the Engineering Test Institute

I. Description of product tested

The Heat pump **AWM1501.090.XB12.H00.C11** supplied by the company **W&H Electric LLC (trade mark BeGreen)** is structurally adapted to operate in air/water system. Device is divided to the outdoor unit **OU.H.105.A11**, placed outside on a pedestal, indoor unit **IU.AWM1501.090.XB12.H00**. Outdoor and indoor units are connected by copper piping and electrical wires. Refrigerant R410A is used with charge 2.0 kg. Power supply is a three-phase. Heat pump is able to work in heating mode.

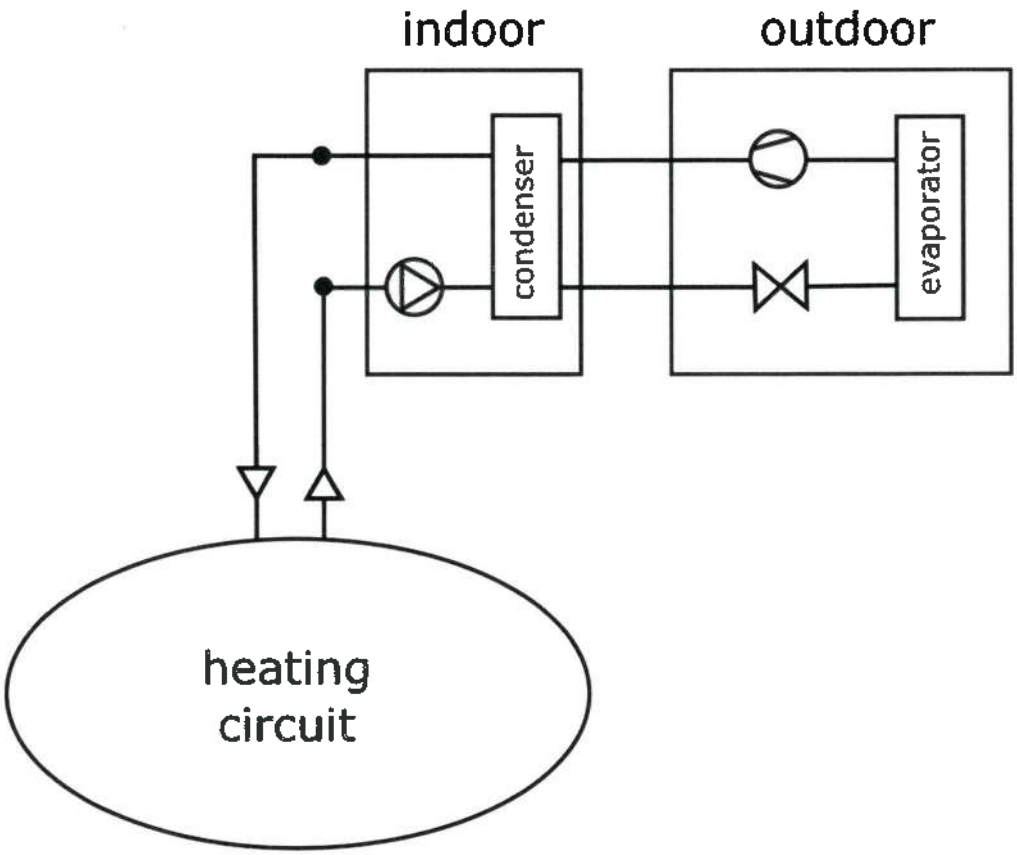
Main components of the outdoor unit **OU.H.105.A11**:

- Serial number AA9Z3 0E1F0 0AVM4 90018
- Dimensions 945 × 370 × 940 mm (D × W × H)
- Frame and casing made of varnished steel sheets
- L-shaped 2 rows evaporator, dimensions, 925 x 1025 x 40 mm (H × W × D), spacing 1.5 mm
- Compressor Mitsubishi Electric TNB306FPPMC
- Refrigerant R410A (2.0 kg)
- Electric expansion valve
- 4-way reversing valve Sanhua with coil Sanhua V13996
- Axial fan ø 540 mm with motor ZhongShan
- pressostat ChangZhou Match-Well YK 0.05/0.15
- Temperature sensors
- Refrigerant accumulator

Main components of the indoor unit type **IU.AWM1501.090.XB12.H00**:

- Serial number Prototype
- Dimensions 630 × 420 × 310 mm (W × D × H)
- Frame and casing made of varnished steel
- Electric backup heater
- Plate condenser with dimensions 70 x 130 x 550 mm (W × D × H), including insulation
- Circulation pump WILO Stratos PARA 25/1-9
- Temperature sensors
- Flowmeter
- Expansion vessel
- Pressure relief valve
- Air vent
- Regulation Siemens + display

Scheme:



Photodocumentation:

Heat pump **AWM1501.090.XB12.H00.C11** - outdoor unit
– Front view –

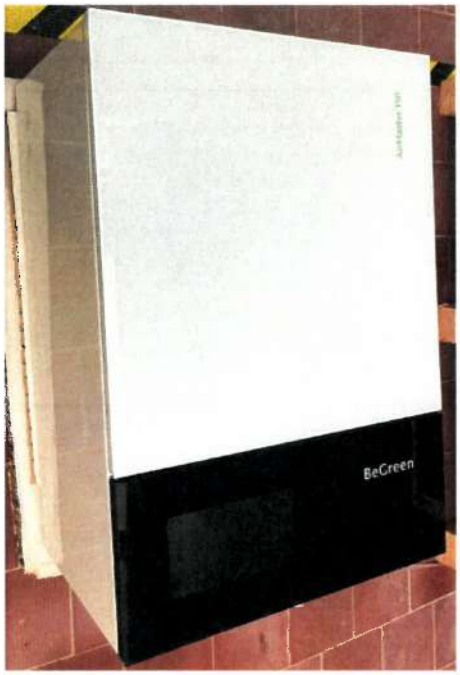
Heat pump **AWM1501.090.XB12.H00.C11** - outdoor unit
– Back view –

Heat pump **AWM1501.090.XB12.H00.C11** - outdoor unit
– Compressor label –

Heat pump **AWM1501.090.XB12.H00.C11** - outdoor unit
– Outdoor unit label –

Heat pump **AWM1501.090.XB12.H00.C11** - outdoor unit
– Without cover –

Heat pump **AWM1501.090.XB12.H00.C11** - indoor unit
– Label –



Heat pump **AWM1501.090.XB12.H00.C11** - indoor unit
– With cover –

Heat pump **AWM1501.090.XB12.H00.C11** - indoor unit
– Without cover –

II. Sample tested

SZU reg. no.	Product name	Date of submission
0213.22.36005.001	Outdoor Air/Water Heat Pump – split	2022-01-06

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

III. Measuring and test equipment:

No.	Name:	Inventory number:	Calibration is valid to:	Accuracy see Calibration Sheet number:
1.	Electrical energy meter	022370/1	07/2022	082/12/E
2.	Digital watt meter	MaR01/EM01	07/2027	K17071728
3.	Flow meter Krohne Optiflux	022370/5	02/2022	6015-KL-P0077-18
4.	Barometer	022370/7	04/2024	4257/2019
5.	Differential pressure gauge	MaR01_TI	04/2023	KL-P-0021-21
6.	Temperature-humidity meter HC2-IC305	022370/10	10/2024	6036-KL-V0417-19
7.	Temperature-humidity meter HC2-IC305	022370/11	10/2024	6036-KL-V0416-19
8.	Thermometers	022370/13	01/2024	KL-T-0002-21

IV. Methods, results of tests and verifications

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

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

Test objective:	Heat pumps
Exact name of the test procedure:	T 037* - Tests of leakage, pressure resistance, thermal and technical parameters, combustion efficiency, safety functions
Test method:	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14511-4:2019, ČSN EN 14825:2020, EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a, ČSN EN 12102-1:2018
Sample tested:	Heat pump **AWM1501.090.XB12.H00.C11**
Measuring equipment used:	see Chapter III
Place of test:	at the Engineering Test Institute

a) Rating conditions:

Measurement results: Heat pump **AWM1501.090.XB12.H00.C11**

Test number		1	2
Assessment condition		**Rating conditions**	
Specification of the assessment condition*		**A7/W35**	**A7/W55**
Date of testing		**2022-01-05**	**2022-01-05**
Transient test procedure	YES / NO	NO	NO
Average defrost time of 1 cycle	[min]	–	–
Average time of 1 cycle	[min]	–	–
Calculation time	[min]	70.0	70.0
Output heating water – temperature calculation	[°C]	35.06	54.97
Input heating water – temperature calculation	[°C]	29.99	46.99
Output heating water temperature	[°C]	35.06	54.97
Input heating water temperature	[°C]	29.99	46.99
Air temperature – dry bulb temperature	[°C]	7.00	7.00
Air temperature – wet bulb temperature	[°C]	6.01	6.01
Relative humidity	[%]	87.00	87.00
Barometric pressure	[kPa]	97.003	97.154
Ambient temperature	[°C]	20.98	20.89
Secondary circuit pressure difference	[kPa]	7.385	7.707
Efficiency of the secondary liquid pump	[–]	0.161	0.144
Volume flow rate of heating water	$[m^3 \cdot h^{-1}]$	1.8404	1.1427
Density of heating water	$[kg \cdot m^{-3}]$	993.9	985.8
Specific heat capacity of heating water	$[kJ \cdot kg^{-1} \cdot K^{-1}]$	4.180	4.180
Voltage	[V]	230.68	230.79
Total current	[A]	11.68	17.22
Overall power input	[kW]	2.636	3.890
Capacity correction of sec. liquid pump	[W]	19.715	14.575
Power input correction of sec. liquid pump	[W]	23.49	17.02
Heating capacity – heating water	[kW]	10.746	10.423
Corrected heating capacity – heating water	**[kW]**	**10.726**	**10.408**
Uncertainty of corrected heating capacity	[kW]	± 0.182	± 0.116
Effective electric power input	**[kW]**	**2.612**	**3.873**
COP	**[–]**	**4.106**	**2.688**
Uncertainty of COP	[–]	± 0.070	± 0.030
Control settings	**[Hz]**	**70**	**75**
Circulation pump settings – heating water	[%]	59	45

*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 $T_{designh}$ = -10 °C)
„W" = warmer (reference water temperature 35 °C, reference design conditions for heating $T_{designh}$ = +2 °C)
„C" = colder (reference water temperature 35 °C, reference design conditions for heating $T_{designh}$ = -22 °C)

Model			Heat pump **AWM1501.090.XB12.H00.C11**				
Design			Outdoor Air / water – split				
Conditions specification according to ČSN EN 14825:2020	Temperature application			**Low** (reference water temperature 35 °C)			
	Reference heating season			**A, W, C**			
	Outlet water temperature - indoor heat exchanger			Variable			
	Compressor speed control			Variable			
	Water flow rate – primary circuit			–			
	Water flow rate – secondary circuit			Variable			
Seasonal space heating energy efficiency	Heating	Average	**η_s / A**		157.7		%
		Warmer	η_s / W		210.4	(Not tested)	%
		Colder	η_s / C		138.4	(Not tested)	%
Seasonal efficiency according to ČSN EN 14825:2020	Heating	Average	**SCOP / A**		4.02		–
		Warmer	SCOP / W		5.33	(Not tested)	–
		Colder	SCOP / C		3.53	(Not tested)	–
Function	Cooling				Yes		
	Heating	Yes	Reference heating season	Average	Yes		
				Warmer	Yes		
				Colder	Yes		
Full heating load	Cooling		$P_{designc}$		–		kW
	Heating	Average	$P_{designh}$		9.39		kW
		Warmer	$P_{designh}$		9.13		kW
		Colder	$P_{designh}$		10.05		kW
Bivalent temperatures	Heating	Average	$T_{bivalent}$		-7		°C
		Warmer	$T_{bivalent}$		2		°C
		Colder	$T_{bivalent}$		-12		°C
Operation limit temperatures	Heating	Average	TOL		-10		°C
		Warmer	TOL		2		°C
		Colder	TOL		-20		°C
Seasonal power consumption according to ČSN EN 14825:2020	Cooling		Q_{CE}		–		kWh
	Heating	Average	Q_{HE}/A		4828		kWh
		Warmer	Q_{HE}/W		2287	(Not tested)	kWh
		Colder	Q_{HE}/C		7012	(Not tested)	kWh
Modes other than „active mode"	Off mode			P_{OFF}	13.8		W
	Thermostat off mode			P_{TO}	13.8		W
	Standby mode			P_{SB}	13.8		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 14825:2020:

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

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

Measured data:

P_{TO}	0.0138	[kW]
P_{SB}	0.0138	[kW]
P_{CK}	0.0000	[kW]
P_{OFF}	0.0138	[kW]
$P_{designh}$	9.39	[kW]
$SCOP_{ON}$	4.02	[–]

Coefficient and correction:

F(1)	3	[%]
F(2)	0	[%]
CC	2.5	[–]

Calculation of SCOP:

7.3 Calculation of the reference annual heating demand (Q_H)

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

$Q_H = 9.39 \cdot 2066 = 19401$ [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]

$Q_{HE} = 19401 / 4.02 + 178 \cdot 0.0138 + 0 \cdot 0.0138 + 178 \cdot 0 + 0 \cdot 0.0138 = 4828$ [kWh]

7.2 General formula for calculation of reference SCOP

$SCOP = Q_H / Q_{HE}$ [–]

$SCOP = 19401 / 4828 = 4.02$ [–]

7.1 Calculation of the seasonal space heating efficiency η_s

$\Sigma F(i) = F(1) + F(2)$ [–]

$\Sigma F = 0.03 + 0 = 0.03$ [–]

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

$\eta_s (A) = (1 / 2.5) \cdot 4.02 - 0.03 =$ **1.577** [–]

Test results for single part load conditions

Measurement results: Heat pump **AWM1501.090.XB12.H00.C11**

Test number		3	4	5
Temperature level		Low (reference water temperature 35 °C)		
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)		
Assessment condition		**A, Tbiv (F)**	**B**	**C****
Specification of the assessment condition*		**A-7/W34**	**A2/W30**	**A7/W28.57**
Date of testing		**2022-01-06**	**2022-01-06**	**2022-01-12**
Transient test procedure	YES / NO	YES	YES	YES
Average defrost time of 1 cycle	[min]	4.1	4.9	–
Average time of 1 cycle	[min]	94.3	168.1	–
Calculation time	[min]	94.3	168.1	180.0
Output heating water – temperature calculation	[°C]	33.55	29.54	28.54
Input heating water – temperature calculation	[°C]	28.96	24.98	23.99
Output heating water temperature	[°C]	34.03	29.93	28.54
Input heating water temperature	[°C]	29.00	25.03	23.99
Air temperature – dry bulb temperature	[°C]	-7.00	2.01	7.00
Air temperature – wet bulb temperature	[°C]	-8.01	1.02	6.03
Relative humidity	[%]	74.99	84.00	87.01
Barometric pressure	[kPa]	98.034	98.650	100.479
Ambient temperature	[°C]	19.73	19.04	19.16
Secondary circuit pressure difference	[kPa]	9.394	9.816	9.857
Efficiency of the secondary liquid pump	[–]	0.165	0.147	0.144
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	1.5643	0.9774	0.9044
Density of heating water	[$kg \cdot m^{-3}$]	994.4	995.6	995.9
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.180	4.180	4.180
Voltage	[V]	230.91	231.15	230.98
Total current	[A]	15.08	8.16	5.97
Overall power input	[kW]	3.390	1.378	0.858
Capacity correction of sec. liquid pump	[W]	20.711	15.480	14.707
Power input correction of sec. liquid pump	[W]	24.79	18.14	17.18
Heating capacity – heating water	[kW]	8.328	5.180	4.754
Corrected heating capacity – heating water	**[kW]**	**8.307**	**5.164**	**4.739**
Uncertainty of corrected heating capacity	[kW]	± 0.155	± 0.098	± 0.090
Effective electric power input	**[kW]**	**3.366**	**1.359**	**0.840**
COP	**[–]**	**2.468**	**3.799**	**5.639**
Uncertainty of COP	[–]	± 0.046	± 0.072	± 0.108
Control settings	**[Hz]**	**100**	**45**	**30**
Circulation pump settings – heating water	[%]	**55**	**45**	**44**

* 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)
** This condition was measured as transient, because of increased comp. speed during the test, which was caused by crankcase lubrication.

Test results for single part load conditions

Measurement results: Heat pump **AWM1501.090.XB12.H00.C11**

Test number		6	7
Temperature level		Low (reference water temperature 35 °C)	
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)	
Assessment condition		**D****	**TOL (E)**
Specification of the assessment condition*		**A12/W27.73**	**A-10/W35**
Date of testing		**2022-01-13**	**2022-01-07**
Transient test procedure	ANO / NE	YES	YES
Average defrost time of 1 cycle	[min]	–	4.0
Average time of 1 cycle	[min]	–	144.3
Calculation time	[min]	180.0	144.3
Output heating water – temperature calculation	[°C]	27.76	34.62
Input heating water – temperature calculation	[°C]	22.69	29.94
Output heating water temperature	[°C]	27.76	34.97
Input heating water temperature	[°C]	22.69	30.01
Air temperature – dry bulb temperature	[°C]	12.01	-10.02
Air temperature – wet bulb temperature	[°C]	11.02	-11.18
Relative humidity	[%]	89.00	64.79
Barometric pressure	[kPa]	100.345	98.928
Ambient temperature	[°C]	19.36	19.06
Secondary circuit pressure difference	[kPa]	8.863	9.911
Efficiency of the secondary liquid pump	[–]	0.143	0.163
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.9744	1.4385
Density of heating water	[$kg \cdot m^{-3}$]	996.1	994.1
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.178	4.180
Voltage	[V]	230.96	230.66
Total current	[A]	5.54	15.04
Overall power input	[kW]	0.801	3.381
Capacity correction of sec. liquid pump	[W]	14.364	20.317
Power input correction of sec. liquid pump	[W]	16.76	24.27
Heating capacity – heating water	[kW]	5.704	7.786
Corrected heating capacity – heating water	**[kW]**	**5.690**	**7.765**
Uncertainty of corrected heating capacity	[kW]	± 0.098	± 0.143
Effective electric power input	**[kW]**	**0.785**	**3.357**
COP	**[–]**	**7.251**	**2.313**
Uncertainty of COP	[–]	± 0.125	± 0.043
Control settings	**[Hz]**	**30**	**100**
Circulation pump settings – heating water	[%]	**44**	**53**

* 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)
** This condition was measured as transient, because of increased comp. speed during the test, which was caused by crankcase lubrication.

Test results for single part load conditions

Measurement results: Heat pump **AWM1501.090.XB12.H00.C11**

Test number		8	9	10
Temperature level		Low (reference water temperature 35 °C)		
Reference heating season		„W" = warmer (Tdesignh = 2 °C)	„C" = colder (Tdesignh = -22 °C)	
Assessment condition		**B, TOL (E), Tbiv (F)**	**B****	**Tbiv (F)**
Specification of the assessment condition*		**A2/W35**	**A2/W27**	**A-12/W31.67**
Date of testing		**2022-01-10**	**2022-01-13**	**2022-01-12**
Transient test procedure	YES / NO	YES	YES	YES
Average defrost time of 1 cycle	[min]	4.5	–	4.1
Average time of 1 cycle	[min]	61.8	–	101.1
Calculation time	[min]	185.3	180.0	101.1
Output heating water – temperature calculation	[°C]	34.07	27.03	31.16
Input heating water – temperature calculation	[°C]	29.93	23.57	26.56
Output heating water temperature	[°C]	34.72	27.03	31.67
Input heating water temperature	[°C]	29.96	23.57	26.67
Air temperature – dry bulb temperature	[°C]	2.04	2.00	-12.03
Air temperature – wet bulb temperature	[°C]	1.06	1.02	-12.99
Relative humidity	[%]	84.07	84.00	66.16
Barometric pressure	[kPa]	99.284	100.492	100.490
Ambient temperature	[°C]	19.08	19.25	19.18
Secondary circuit pressure difference	[kPa]	10.448	9.859	9.531
Efficiency of the secondary liquid pump	[–]	0.181	0.144	0.160
Volume flow rate of heating water	$[m^3 \cdot h^{-1}]$	1.8624	0.9041	1.3913
Density of heating water	$[kg \cdot m^{-3}]$	994.2	996.3	995.2
Specific heat capacity of heating water	$[kJ \cdot kg^{-1} \cdot K^{-1}]$	4.180	4.180	4.180
Voltage	[V]	230.87	230.95	230.89
Total current	[A]	15.40	5.99	14.21
Overall power input	[kW]	3.464	0.856	3.188
Capacity correction of sec. liquid pump	[W]	23.382	14.706	19.390
Power input correction of sec. liquid pump	[W]	28.54	17.18	23.07
Heating capacity – heating water	[kW]	9.157	3.618	7.427
Corrected heating capacity – heating water	**[kW]**	**9.134**	**3.604**	**7.408**
Uncertainty of corrected heating capacity	[kW]	± 0.184	± 0.090	± 0.138
Effective electric power input	**[kW]**	**3.435**	**0.839**	**3.165**
COP	**[–]**	**2.659**	**4.296**	**2.341**
Uncertainty of COP	[–]	± 0.054	± 0.107	± 0.044
Control settings	**[Hz]**	**100**	**30**	**100**
Circulation pump settings – heating water	[%]	**62**	**44**	**52**

* 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)
** This condition was measured as transient, because of increased comp. speed during the test, which was caused by crankcase lubrication.

Data for SCOP calculation (Heat pump **AWM1501.090.XB12.H00.C11**)

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

	Outdoor heat exchanger Outdoor air inlet	Indoor heat exchanger Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	34.00	88.46	8.31	8.307	2.468	0.900	1.00	2.468	–
B	2	30.00	53.85	5.06	5.164	3.799	0.900	1.00	3.799	–
C	7	28.57	34.62	3.25	4.739	5.639	0.984	0.69	5.597	0.0138
D	12	27.73	15.38	1.44	5.690	7.251	0.982	0.25	6.895	0.0138
TOL (E)	-10	35.00	100.00	9.39	7.765	2.313	0.900	1.00	2.313	–
Tbiv (F)	-7	34.00	88.46	8.31	8.307	2.468	0.900	1.00	2.468	–

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

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

General formulas and derivation:

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

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

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

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

For variable flow:

$\Delta t = 5$

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

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

Measured data:

$t_{outlet,\ average}$	24,00	[°C]
Declared capacity	5.690	[kW]
Declared capacity standard rating condition A7/W35	–	[kW]
Part load	1.44	[kW]

Calculation of water temperature

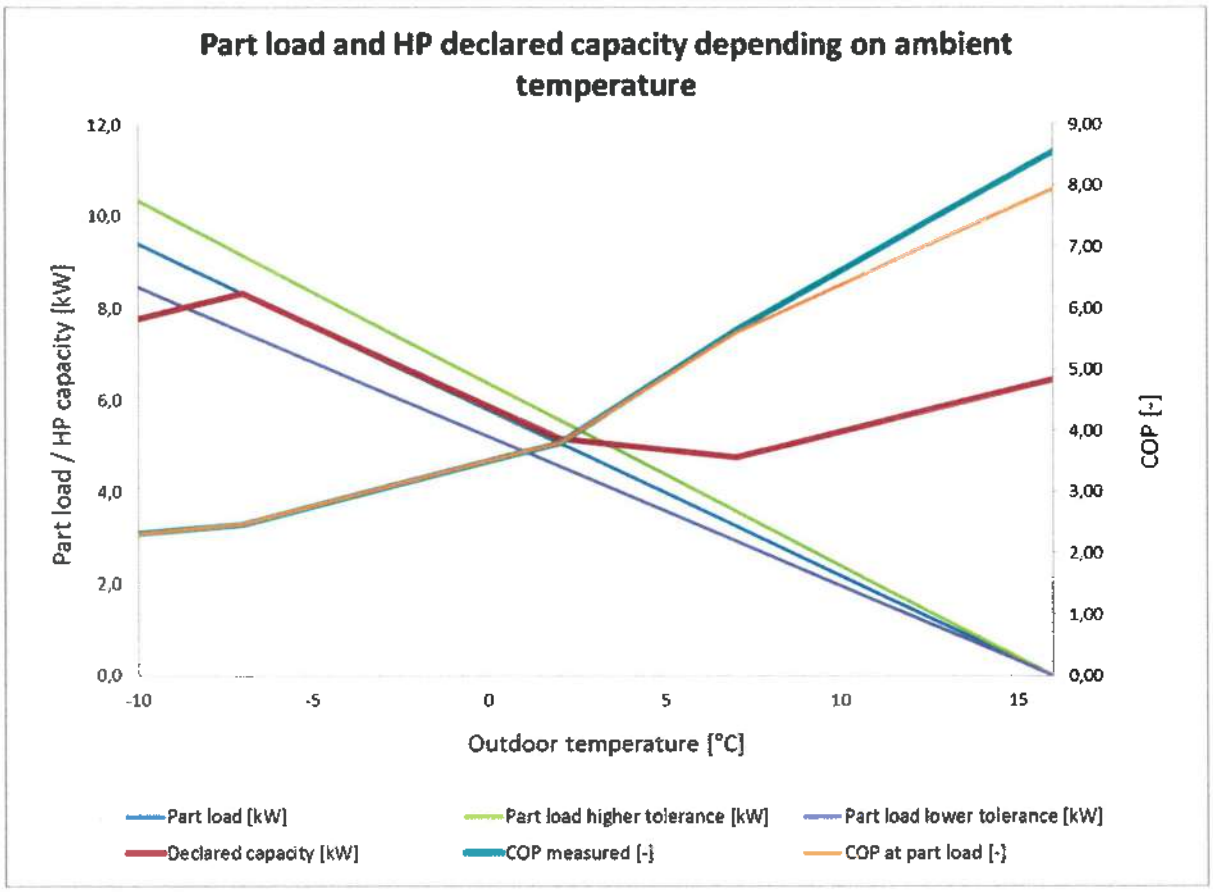
$t_{outlet,\ capacity\ test,\ variable\ flow} = 24 + 5 - 1.44 / 5.69 \cdot 5 =$ **27.73** [°C]

Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **AWM1501.090.XB12.H00.C11**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average

	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	Tj	hj		Ph(Tj)			elbu(Tj)	hj x elbu(Tj)	COPbin (Tj)	hj x Ph(Tj)		hj x (P h(Tj) - elbu(Tj))	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
TOL (E)	**21**	**-10**	**1**	**100.00**	**9.39**	**7.77**	**7.77**	**1.63**	**1.63**	**2.31**	**9**	**5**	**8**	**3**
	22	-9	25	96.15	9.03	7.95	7.95	1.08	27.08	2.36	226	111	199	84
	23	-8	23	92.31	8.67	8.13	8.13	0.54	12.46	2.42	199	90	187	77
A,Tbiv (F)	**24**	**-7**	**24**	**88.46**	**8.31**	**8.31**	**8.31**	**0.00**	**0.00**	**2.47**	**199**	**81**	**199**	**81**
	25	-6	27	84.62	7.95	7.96	7.95	0.00	0.00	2.62	215	82	215	82
	26	-5	68	80.77	7.58	7.61	7.58	0.00	0.00	2.76	516	187	516	187
	27	-4	91	76.92	7.22	7.26	7.22	0.00	0.00	2.91	657	226	657	226
	28	-3	89	73.08	6.86	6.91	6.86	0.00	0.00	3.06	611	200	611	200
	29	-2	165	69.23	6.50	6.56	6.50	0.00	0.00	3.21	1073	334	1073	334
	30	-1	173	65.38	6.14	6.21	6.14	0.00	0.00	3.36	1062	317	1062	317
	31	0	240	61.54	5.78	5.86	5.78	0.00	0.00	3.50	1387	396	1387	396
	32	1	280	57.69	5.42	5.51	5.42	0.00	0.00	3.65	1517	415	1517	415
B	**33**	**2**	**320**	**53.85**	**5.06**	**5.16**	**5.06**	**0.00**	**0.00**	**3.80**	**1618**	**426**	**1618**	**426**
	34	3	357	50.00	4.70	5.08	4.70	0.00	0.00	4.16	1676	403	1676	403
	35	4	356	46.15	4.33	4.99	4.33	0.00	0.00	4.52	1543	342	1543	342
	36	5	303	42.31	3.97	4.91	3.97	0.00	0.00	4.88	1204	247	1204	247
	37	6	330	38.46	3.61	4.82	3.61	0.00	0.00	5.24	1192	228	1192	228
C	**38**	**7**	**326**	**34.62**	**3.25**	**4.74**	**3.25**	**0.00**	**0.00**	**5.60**	**1060**	**189**	**1060**	**189**
	39	8	348	30.77	2.89	4.93	2.89	0.00	0.00	5.86	1006	172	1006	172
	40	9	335	26.92	2.53	5.12	2.53	0.00	0.00	6.12	847	138	847	138
	41	10	315	23.08	2.17	5.31	2.17	0.00	0.00	6.38	683	107	683	107
	42	11	215	19.23	1.81	5.50	1.81	0.00	0.00	6.64	388	59	388	59
D	**43**	**12**	**169**	**15.38**	**1.44**	**5.69**	**1.44**	**0.00**	**0.00**	**6.89**	**244**	**35**	**244**	**35**
	44	13	151	11.54	1.08	5.88	1.08	0.00	0.00	7.15	164	23	164	23
	45	14	105	7.69	0.72	6.07	0.72	0.00	0.00	7.41	76	10	76	10
	46	15	74	3.85	0.36	6.26	0.36	0.00	0.00	7.67	27	3	27	3
		Σ	4910							Σ	19397	4825	19356	4784

SCOPon	4.02	SCOPnet	4.05
		SCOP	**4.02**

Power diagram (Heat pump **AWM1501.090.XB12.H00.C11**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „A" – average



c) 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 $T_{designh}$ = -10 °C)
„W" = warmer (reference water temperature 35 °C, reference design conditions for heating $T_{designh}$ = +2 °C)
„C" = colder (reference water temperature 35 °C, reference design conditions for heating $T_{designh}$ = -22 °C)

Model			Heat pump **AWM1501.090.XB12.H00.C11**				
Design			Outdoor Air / water – split				
Conditions specification according to ČSN EN 14825:2020	Temperature application			**Medium** (reference water temperature 55 °C)			
	Reference heating season			**A, W, C**			
	Outlet water temperature - indoor heat exchanger			Variable			
	Compressor speed control			Variable			
	Water flow rate – primary circuit			–			
	Water flow rate – secondary circuit			Variable			
Seasonal space heating energy efficiency	Heating	Average	η_s / **A**	113.6		%	
		Warmer	η_s / W	132.3	(Not tested)	%	
		Colder	η_s / C	102.3	(Not tested)	%	
Seasonal efficiency according to ČSN EN 14825:2020	Heating	Average	**SCOP / A**	2.92		–	
		Warmer	SCOP / W	3.38	(Not tested)	–	
		Colder	SCOP / C	2.63	(Not tested)	–	
Function	Cooling			Yes			
	Heating	Yes	Reference heating season: Average	Yes			
			Warmer	Yes			
			Colder	Yes			
Full heating load	Cooling		$P_{designc}$	–		kW	
	Heating	Average	$P_{designh}$	9.39		kW	
		Warmer	$P_{designh}$	9.02		kW	
		Colder	$P_{designh}$	10.71		kW	
Bivalent temperatures	Heating	Average	$T_{bivalent}$	-6		°C	
		Warmer	$T_{bivalent}$	2		°C	
		Colder	$T_{bivalent}$	-10		°C	
Operation limit temperatures	Heating	Average	TOL	-10		°C	
		Warmer	TOL	2		°C	
		Colder	TOL	-18		°C	
Seasonal power consumption according to ČSN EN 14825:2020	Cooling		Q_{CE}	–		kWh	
	Heating	Average	Q_{HE}/A	6656		kWh	
		Warmer	Q_{HE}/W	3565	(Not tested)	kWh	
		Colder	Q_{HE}/C	10030	(Not tested)	kWh	
Modes other than „active mode"	Off mode		P_{OFF}	13.8		W	
	Thermostat off mode		P_{TO}	13.8		W	
	Standby mode		P_{SB}	13.8		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 14825:2020:

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

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

Measured data:

P_{TO}	0.0138	[kW]
P_{SB}	0.0138	[kW]
P_{CK}	0.0000	[kW]
P_{OFF}	0.0138	[kW]
$P_{designh}$	9.39	[kW]
$SCOP_{ON}$	2.92	[–]

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]

$Q_H = 9.39 \cdot 2066 = 19404$ [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]

$Q_{HE} = 19404 / 2.92 + 178 \cdot 0.0138 + 0 \cdot 0.0138 + 178 \cdot 0 + 0 \cdot 0.0138 = 6656$ [kWh]

7.2 General formula for calculation of reference SCOP

$SCOP = Q_H / Q_{HE}$ [–]

$SCOP = 19404 / 6656 = 2.92$ [–]

7.1 Calculation of the seasonal space heating efficiency η_s

$\Sigma F(i) = F(1) + F(2)$ [–]

$\Sigma F = 0.03 + 0 = 0.03$ [–]

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

$\eta_s (A) = (1 / 2.5) \cdot 2.92 - 0.03 =$ **1.136** [–]

Test results for single part load conditions

Measurement results:

Heat pump **AWM1501.090.XB12.H00.C11**

Test number		11	12	13
Temperature level		Medium (reference water temperature 55 °C)		
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)		
Assessment condition		**A**	**B**	**C****
Specification of the assessment condition*		**A-7/W52**	**A2/W42**	**A7/W37.76**
Date of testing		**2022-01-11**	**2022-01-10**	**2022-01-11**
Transient test procedure	YES / NO	YES	YES	YES
Average defrost time of 1 cycle	[min]	4.3	4.7	–
Average time of 1 cycle	[min]	148.6	174.7	–
Calculation time	[min]	148.6	174.7	180.0
Output heating water – temperature calculation	[°C]	51.59	41.71	37.87
Input heating water – temperature calculation	[°C]	44.08	36.69	33.75
Output heating water temperature	[°C]	52.06	41.98	37.87
Input heating water temperature	[°C]	44.09	36.65	33.75
Air temperature – dry bulb temperature	[°C]	-6.99	2.01	7.01
Air temperature – wet bulb temperature	[°C]	-7.99	1.02	6.03
Relative humidity	[%]	75.00	83.99	87.00
Barometric pressure	[kPa]	99.999	98.359	100.256
Ambient temperature	[°C]	20.75	19.12	19.47
Secondary circuit pressure difference	[kPa]	10.028	9.895	9.968
Efficiency of the secondary liquid pump	[–]	0.145	0.144	0.144
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.9056	0.9073	0.9028
Density of heating water	[$kg \cdot m^{-3}$]	987.4	991.5	993.0
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.180	4.180	4.170
Voltage	[V]	230.74	231.00	231.13
Total current	[A]	19.14	8.39	6.97
Overall power input	[kW]	4.311	1.888	1.088
Capacity correction of sec. liquid pump	[W]	14.908	14.784	14.809
Power input correction of sec. liquid pump	[W]	17.43	17.28	17.31
Heating capacity – heating water	[kW]	7.784	5.248	4.281
Corrected heating capacity – heating water	**[kW]**	**7.769**	**5.233**	**4.266**
Uncertainty of corrected heating capacity	[kW]	± 0.092	± 0.091	± 0.089
Effective electric power input	**[kW]**	**4.293**	**1.870**	**1.070**
COP	**[–]**	**1.810**	**2.798**	**3.985**
Uncertainty of COP	[–]	± 0.022	± 0.049	± 0.084
Control settings	**[Hz]**	**100**	**48**	**100**
Circulation pump settings – heating water	[%]	44	44	44

* 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)
** This condition was measured as transient, because of increased comp. speed during the test, which was caused by crankcase lubrication.

Test results for single part load conditions

Measurement results: Heat pump **AWM1501.090.XB12.H00.C11**

Test number		**14**	**15**	**16**
Temperature level		Medium (reference water temperature 55 °C)		
Reference heating season		„A" = average ($T_{designh}$ = -10 °C)		
Assessment condition		**D****	**TOL (E)**	**Tbiv (F)**
Specification of the assessment condition*		**A12/W35.78**	**A-10/W55**	**A-6/W50.89**
Date of testing		**2022-01-13**	**2022-01-07**	**2022-01-05**
Transient test procedure	YES / NO	YES	NO	YES
Average defrost time of 1 cycle	[min]	–	–	4.2
Average time of 1 cycle	[min]	–	–	130.1
Calculation time	[min]	180.0	70.0	130.1
Output heating water – temperature calculation	[°C]	35.78	55.00	50.24
Input heating water – temperature calculation	[°C]	30.77	47.84	42.88
Output heating water temperature	[°C]	35.78	55.00	50.83
Input heating water temperature	[°C]	30.77	47.84	42.91
Air temperature – dry bulb temperature	[°C]	12.00	-10.00	-5.99
Air temperature – wet bulb temperature	[°C]	11.01	-10.99	-6.99
Relative humidity	[%]	89.00	70.00	76.70
Barometric pressure	[kPa]	100.200	98.701	97.566
Ambient temperature	[°C]	20.27	19.99	19.61
Secondary circuit pressure difference	[kPa]	9.909	10.079	10.552
Efficiency of the secondary liquid pump	[–]	0.144	0.145	0.148
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	0.9057	0.9052	0.9421
Density of heating water	[$kg \cdot m^{-3}$]	993.7	985.8	988.0
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.180	4.180	4.180
Voltage	[V]	230.94	230.82	230.92
Total current	[A]	6.51	19.90	18.96
Overall power input	[kW]	0.972	4.492	4.270
Capacity correction of sec. liquid pump	[W]	14.780	14.958	15.915
Power input correction of sec. liquid pump	[W]	17.27	17.49	18.67
Heating capacity – heating water	[kW]	5.227	7.411	7.963
Corrected heating capacity – heating water	**[kW]**	**5.212**	**7.396**	**7.947**
Uncertainty of corrected heating capacity	[kW]	± 0.091	± 0.092	± 0.096
Effective electric power input	**[kW]**	**0.955**	**4.474**	**4.251**
COP	**[–]**	**5.459**	**1.653**	**1.869**
Uncertainty of COP	[–]	± 0.095	± 0.021	± 0.023
Control settings	**[Hz]**	**30**	**100**	**100**
Circulation pump settings – heating water	[%]	44	44	45

* 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)
** This condition was measured as transient, because of increased comp. speed during the test, which was caused by crankcase lubrication.

Test results for single part load conditions

Measurement results: Heat pump **AWM1501.090.XB12.H00.C11**

Test number		17	18	19
Temperature level		Medium (reference water temperature 55 °C)		
Reference heating season		„W" = warmer (Tdesignh = 2 °C)	„C" = colder (Tdesignh = -22 °C)	
Assessment condition		**B, TOL (E), Tbiv (F)**	**B****	**Tbiv (F)**
Specification of the assessment condition*		**A2/W55**	**A2/W37**	**A-10/W45.88**
Date of testing		**2022-01-10**	**2022-01-12**	**2022-01-11**
Transient test procedure	YES / NO	YES	YES	YES
Average defrost time of 1 cycle	[min]	4.2	–	4.2
Average time of 1 cycle	[min]	79.5	–	182.2
Calculation time	[min]	158.9	180.0	182.2
Output heating water – temperature calculation	[°C]	54.01	36.99	45.49
Input heating water – temperature calculation	[°C]	46.95	33.16	38.42
Output heating water temperature	[°C]	54.91	36.99	45.85
Input heating water temperature	[°C]	47.01	33.16	38.43
Air temperature – dry bulb temperature	[°C]	2.01	2.00	-10.00
Air temperature – wet bulb temperature	[°C]	1.02	1.06	-10.99
Relative humidity	[%]	83.97	84.63	69.99
Barometric pressure	[kPa]	98.756	100.389	100.083
Ambient temperature	[°C]	19.77	20.34	19.24
Secondary circuit pressure difference	[kPa]	9.283	9.942	10.009
Efficiency of the secondary liquid pump	[–]	0.149	0.144	0.145
Volume flow rate of heating water	[$m^3 \cdot h^{-1}$]	1.1015	0.9044	0.9043
Density of heating water	[$kg \cdot m^{-3}$]	986.2	993.3	990.0
Specific heat capacity of heating water	[$kJ \cdot kg^{-1} \cdot K^{-1}$]	4.180	4.170	4.180
Voltage	[V]	230.75	230.92	230.72
Total current	[A]	20.10	8.67	17.11
Overall power input	[kW]	4.522	1.294	3.859
Capacity correction of sec. liquid pump	[W]	16.188	14.801	14.872
Power input correction of sec. liquid pump	[W]	19.01	17.30	17.39
Heating capacity – heating water	[kW]	9.040	3.986	7.344
Corrected heating capacity – heating water	**[kW]**	**9.024**	**3.971**	**7.329**
Uncertainty of corrected heating capacity	[kW]	± 0.111	± 0.089	± 0.092
Effective electric power input	**[kW]**	**4.503**	**1.276**	**3.841**
COP	**[–]**	**2.004**	**3.111**	**1.908**
Uncertainty of COP	[–]	± 0.025	± 0.070	± 0.024
Control settings	**[Hz]**	**100**	**37**	**100**
Circulation pump settings – heating water	[%]	46	44	44

* 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)
** This condition was measured as transient, because of increased comp. speed during the test, which was caused by crankcase lubrication.

Data for SCOP calculation (Heat pump **AWM1501.090.XB12.H00.C11**)

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

	Outdoor heat exchanger Outdoor air inlet	Indoor heat exchanger Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	52.00	88.46	8.31	7.769	1.810	0.900	1.00	1.810	–
B	2	42.00	53.85	5.06	5.233	2.798	0.900	1.00	2.798	–
C	7	37.90	34.62	3.25	4.266	3.985	0.987	0.76	3.969	0.0138
D	12	35.78	15.38	1.44	5.212	5.200	0.986	0.28	5.020	0.0138
TOL (E)	-10	55.00	100.00	9.39	7.396	1.653	0.900	1.00	1.653	–
Tbiv (F)	-6	50.89	84.62	7.95	7.947	1.869	0.900	1.00	1.869	–

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

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

General formulas and derivation:

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

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

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

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

For variable flow:

$\Delta t = 8$

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

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

Measured data:

$t_{outlet,\,average}$	30.00	[°C]
Declared capacity	5.212	[kW]
Declared capacity standard rating condition A7/W35	-	[kW]
Part load	1.44	[kW]

Calculation of water temperature

$t_{outlet,\,capacity\,test,\,variable\,flow} = 30 + 8 - 1.44 / 5.212 \cdot 8 =$ **35.78** [°C]

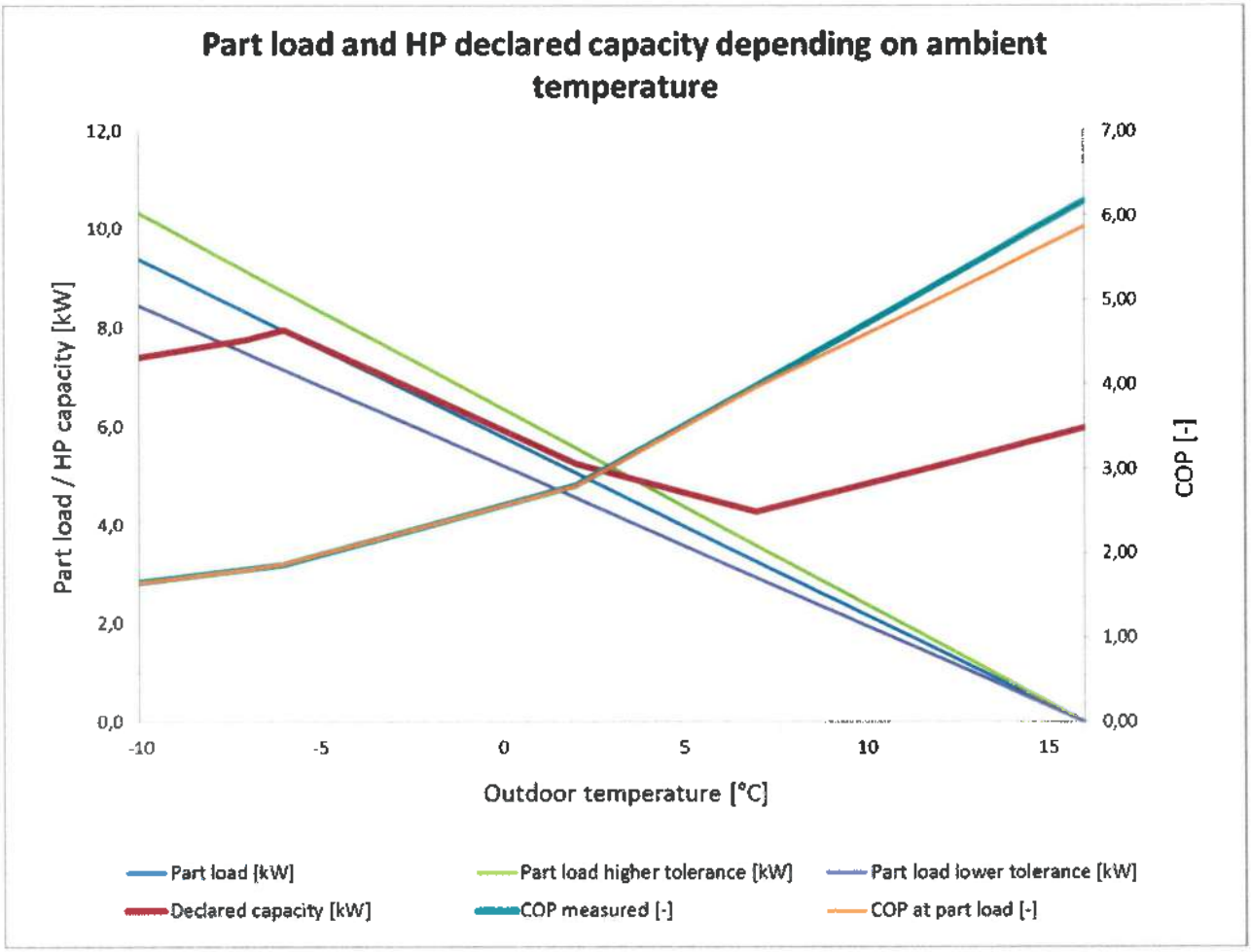
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **AWM1501.090.XB12.H00.C11**)

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

	Bin j [–]	Outdoor temp. (dry bulb) Tj [°C]	Hours hj [h]	Part load ratio [%]	Heat load Ph(Tj) [kW]	Capacity of HP [kW]	Heat load covered by heat pump [kW]	Resistive heat elbu (Tj) elbu(Tj) [kW]	Annual resistive heat hj x elbu(Tj) [kWh]	COPbin (Tj) COPbin (Tj) [–]	Annual heating demand hj x Ph(Tj) [kWh]	Annual power input including electric back up heating [kWh]	Net annual heating capacity hj x (Ph(Tj) - elbu(Tj)) [kWh]	Net annual power input without electric back up heating [kWh]
TOL (E)	**21**	**-10**	**1**	**100.00**	**9.39**	**7.40**	**7.40**	**2.00**	**2.00**	**1.65**	**9**	**6**	**7**	**4**
	22	-9	25	96.15	9.03	7.52	7.52	1.51	37.76	1.71	226	148	188	110
	23	-8	23	92.31	8.67	7.64	7.64	1.02	23.57	1.76	199	124	176	100
A	**24**	**-7**	**24**	**88.46**	**8.31**	**7.77**	**7.77**	**0.54**	**12.94**	**1.81**	**199**	**116**	**186**	**103**
Tbiv (F)	**25**	**-6**	**27**	**84.62**	**7.95**	**7.95**	**7.95**	**0.00**	**0.00**	**1.87**	**215**	**115**	**215**	**115**
	26	-5	68	80.77	7.59	7.61	7.59	0.00	0.00	1.99	516	260	516	260
	27	-4	91	76.92	7.22	7.27	7.22	0.00	0.00	2.10	657	313	657	313
	28	-3	89	73.08	6.86	6.93	6.86	0.00	0.00	2.22	611	275	611	275
	29	-2	165	69.23	6.50	6.59	6.50	0.00	0.00	2.33	1073	460	1073	460
	30	-1	173	65.38	6.14	6.25	6.14	0.00	0.00	2.45	1062	434	1062	434
	31	0	240	61.54	5.78	5.91	5.78	0.00	0.00	2.57	1387	541	1387	541
	32	1	280	57.69	5.42	5.57	5.42	0.00	0.00	2.68	1517	566	1517	566
B	**33**	**2**	**320**	**53.85**	**5.06**	**5.23**	**5.06**	**0.00**	**0.00**	**2.80**	**1618**	**578**	**1618**	**578**
	34	3	357	50.00	4.70	5.04	4.70	0.00	0.00	3.03	1676	553	1676	553
	35	4	356	46.15	4.33	4.85	4.33	0.00	0.00	3.27	1543	472	1543	472
	36	5	303	42.31	3.97	4.65	3.97	0.00	0.00	3.50	1204	344	1204	344
	37	6	330	38.46	3.61	4.46	3.61	0.00	0.00	3.73	1192	319	1192	319
C	**38**	**7**	**326**	**34.62**	**3.25**	**4.27**	**3.25**	**0.00**	**0.00**	**3.97**	**1060**	**267**	**1060**	**267**
	39	8	348	30.77	2.89	4.45	2.89	0.00	0.00	4.18	1006	241	1006	241
	40	9	335	26.92	2.53	4.64	2.53	0.00	0.00	4.39	847	193	847	193
	41	10	315	23.08	2.17	4.83	2.17	0.00	0.00	4.60	683	148	683	148
	42	11	215	19.23	1.81	5.02	1.81	0.00	0.00	4.81	388	81	388	81
D	**43**	**12**	**169**	**15.38**	**1.44**	**5.21**	**1.44**	**0.00**	**0.00**	**5.02**	**244**	**49**	**244**	**49**
	44	13	151	11.54	1.08	5.40	1.08	0.00	0.00	5.23	164	31	164	31
	45	14	105	7.69	0.72	5.59	0.72	0.00	0.00	5.44	76	14	76	14
	46	15	74	3.85	0.36	5.78	0.36	0.00	0.00	5.65	27	5	27	5
		Σ	4910							Σ	19400	6652	19324	6576

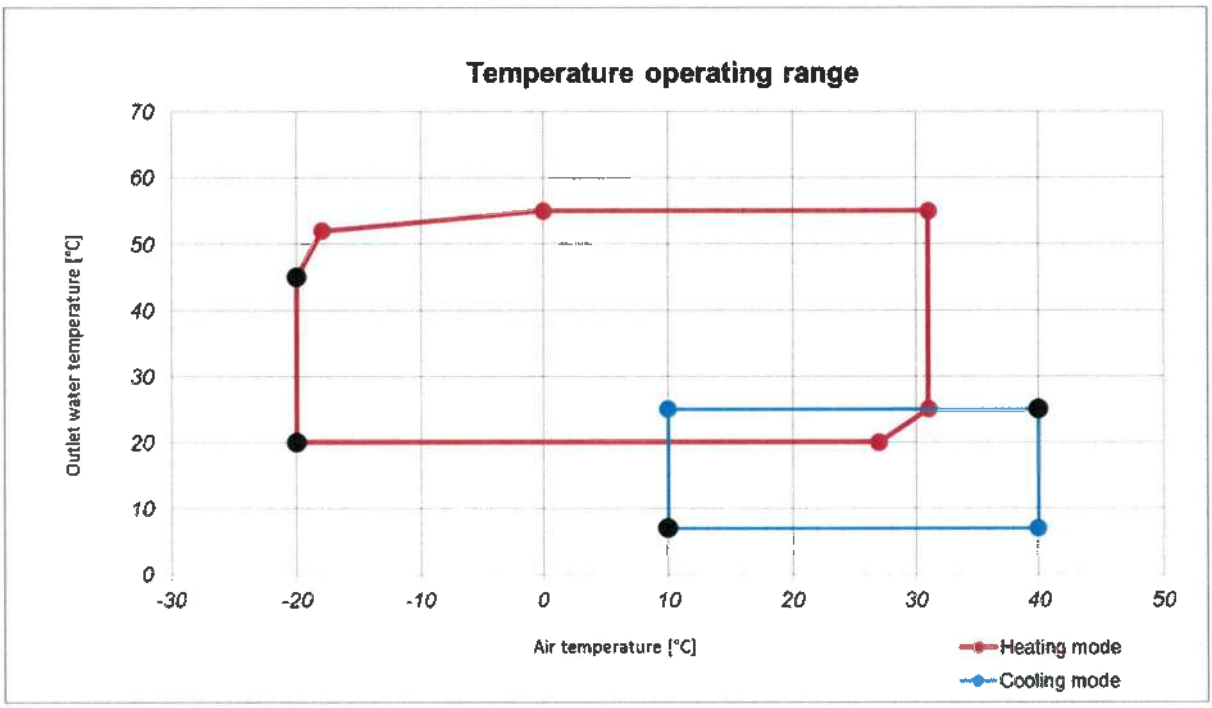
SCOPon	2.92	SCOPnet	2.94
		SCOP	**2.92**

Power diagram (Heat pump **AWM1501.090.XB12.H00.C11**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „A" – average



Test objective:	Heat pumps
Exact name of the test procedure:	T 037* - Tests of leakage, pressure resistance, thermal and technical parameters, combustion efficiency, safety functions
Test method:	ČSN EN 14511-4:2019
Sample tested:	Heat pump **AWM1501.090.XB12.H00.C11**
Measuring equipment used:	see Chapter III
Place of test:	at the Engineering Test Institute

1) Temperature operating range



Test point	Inlet air dry bulb temperature [°C]		Outlet heating water temperature [°C]		Water flow rate in condenser [m³/h]	Note
Heating mode						
1.	A	-20	W	20	Minimum	Minimum water flow rate: **0.900 m³·h⁻¹** Maximum water flow rate: **2.400 m³·h⁻¹**
2.	A	-20	W	45	Minimum	
Cooling mode						
1.	A	10	W	7	Minimum	Minimum starting water flow rate: **0.900 m³·h⁻¹** Maximum water flow rate: **2.400 m³·h⁻¹**
2.	A	40	W	25	Maximum	

Heat pump **AWM1501.090.XB12.H00.C11** is fully operational in the temperature operating range.

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

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

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

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

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

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

2) Outside the operating range

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

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

3) Freeze-up test in cooling mode

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

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

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

–... The unit did not fulfill test requirements.

0... The requirement does not apply to the product concerned.

x... Test was not required.

4) Shutting off the heat transfer medium flows

Required operating conditions	Test result	Note
Test for section a) Art. 4.5 ČSN EN 14511-4:2019 – heating	+	–
Test for section a) Art. 4.5 ČSN EN 14511-4:2019 – cooling	+	–
Test for section b) Art. 4.5 ČSN EN 14511-4:2019 – heating	+	Flow switch, no request fault
Test for section b) Art. 4.5 ČSN EN 14511-4:2019 – cooling	+	No request
Test for section c) Art. 4.5 ČSN EN 14511-4:2019	0	–

Evaluation:
+... The unit shall remain capable of operating after restoration of the flow rates for 30 min once the compressor has restarted.

–... The unit did not fulfill test requirements.

0... The requirement does not apply to the product concerned.

x... Test was not required.

5) Complete power supply failure

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

Evaluation:
+... The unit has to restart automatically within 30 min. When manufacturer states that the unit does not automatically restart, fault detection is necessary. The unit is checked for any damage sustained during the test and if any safety devices have operated during the test.

–... The unit did not fulfill test requirements.

0... The requirement does not apply to the product concerned.

x... Test was not required.

6) Condensate draining and enclosure sweat test

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

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

Evaluation:
+... During the test of 4 hours no condensed water shall drip, run or blow off the unit except through the drain. For indoor units, drain holes shall be provided with suitable pipe connection, the minimum diameter of which shall be 12 mm.

–... The unit did not fulfill test requirements.

0... The requirement does not apply to the product concerned.

x... Test was not required.

V. Test results – Out of accredited tests

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

Testing method:	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14825:2020 EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a
Sample tested:	Heat pump **AWM1501.090.XB12.H00.C11**

Data for SCOP calculation (Heat pump **AWM1501.090.XB12.H00.C11**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „W" – warmer

	Outdoor heat exchanger Outdoor air inlet	Indoor heat exchanger Outlet water temperature	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	–	–	–	–	–	–	–	–	–	–
B	2	35.00	100.00	9.13	9.134	2.659	0.900	1.00	2.659	–
C	7	31.00	64.29	5.87	5.720	4.890	0.900	1.00	4.890	–
D	12	28.67	28.57	2.61	5.590	6.570	0.984	0.47	6.451	0.0138
TOL (E)	2	35.00	100.00	9.13	9.134	2.659	0.900	1.00	2.659	–
Tbiv (F)	2	35.00	100.00	9.13	9.134	2.659	0.900	1.00	2.659	–

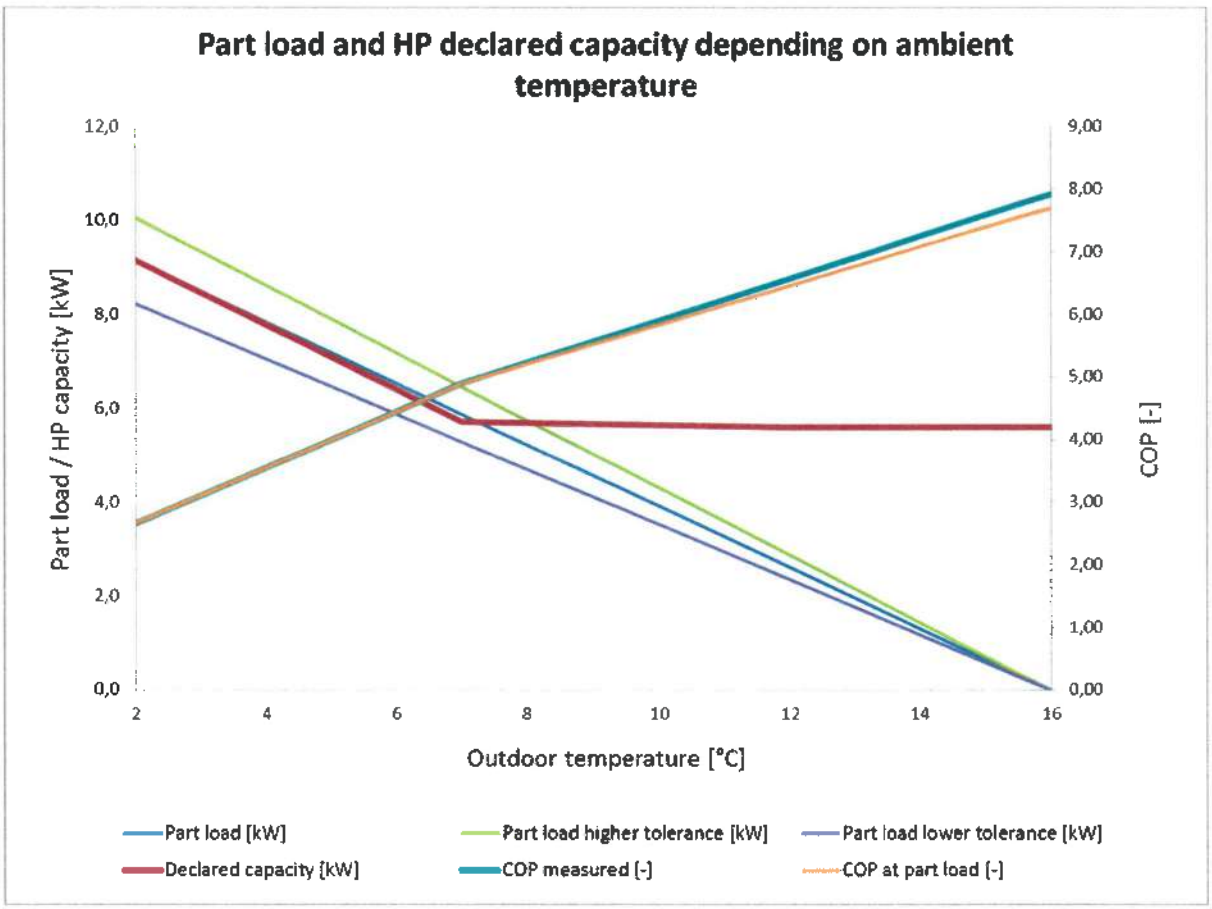
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **AWM1501.090.XB12.H00.C11**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „W" – warmer

	Bin j	Outdoor temp. (dry bulb) T_j	Hours h_j	Part load ratio	Heat load $P_{h(Tj)}$	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj) $elbu_{(Tj)}$	Annual resistive heat h_j x $elbu_{(Tj)}$	COPbin (Tj) COPbin (Tj)	Annual heating demand h_j x $P_{h(Tj)}$	Annual power input including electric back up heating	Net annual heating capacity $h_j \times (P_{h(Tj)} - elbu_{(Tj)})$	Net annual power input without electric back up heating
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
B, TOL (E), Tbiv (F)	**33**	**2**	**3**	**100.00**	**9.13**	**9.13**	**9.13**	**0.00**	**0.00**	**2.66**	**27**	**10**	**27**	**10**
	34	3	22	92.86	8.48	8.45	8.45	0.00	0.00	3.11	187	60	187	60

	35	4	63	85.71	7.83	7.77	7.77	0.00	0.00	3.55	493	139	493	139
	36	5	63	78.57	7.18	7.09	7.09	0.00	0.00	4.00	452	113	452	113
	37	6	175	71.43	6.52	6.40	6.40	0.00	0.00	4.44	1142	257	1142	257
C	**38**	**7**	**162**	**64.29**	**5.87**	**5.72**	**5.72**	**0.00**	**0.00**	**4.89**	**951**	**195**	**951**	**195**
	39	8	259	57.14	5.22	5.69	5.22	0.00	0.00	5.20	1352	260	1352	260
	40	9	360	50.00	4.57	5.67	4.57	0.00	0.00	5.51	1644	298	1644	298
	41	10	428	42.86	3.91	5.64	3.91	0.00	0.00	5.83	1675	288	1675	288
	42	11	430	35.71	3.26	5.62	3.26	0.00	0.00	6.14	1403	229	1403	229
D	**43**	**12**	**503**	**28.57**	**2.61**	**5.59**	**2.61**	**0.00**	**0.00**	**6.45**	**1313**	**203**	**1313**	**203**
	44	13	444	21.43	1.96	5.56	1.96	0.00	0.00	6.76	869	129	869	129
	45	14	384	14.29	1.30	5.54	1.30	0.00	0.00	7.07	501	71	501	71
	46	15	294	7.14	0.65	5.51	0.65	0.00	0.00	7.39	192	26	192	26
		Σ	3590							Σ	12201	2277	12201	2277

SCOPon	5.36	SCOPnet	5.36
		SCOP	**5.33**

Power diagram (Heat pump **AWM1501.090.XB12.H00.C11**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „W" – warmer



Data for SCOP calculation (Heat pump **AWM1501.090.XB12.H00.C11**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C" – colder

	Outdoor heat exchanger	Indoor heat exchanger	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	30.00	60.53	6.08	6.060	3.100	0.900	1.00	3.100	–
B	2	27.00	36.84	3.70	3.604	4.296	0.900	1.00	4.296	–
C	7	27.52	23.68	2.38	4.810	5.850	0.983	0.50	5.752	0.0138
D	12	28.07	10.53	1.06	5.690	7.251	0.982	0.19	6.733	0.0138
TOL (E)	-20	34.14	94.74	9.52	5.400	1.990	0.900	1.00	1.990	–
Tbiv (F)	-12	31.25	73.68	7.41	7.408	2.341	0.900	1.00	2.341	–
G	-15	32.00	81.58	8.20	6.655	2.209	0.900	1.00	2.209	–

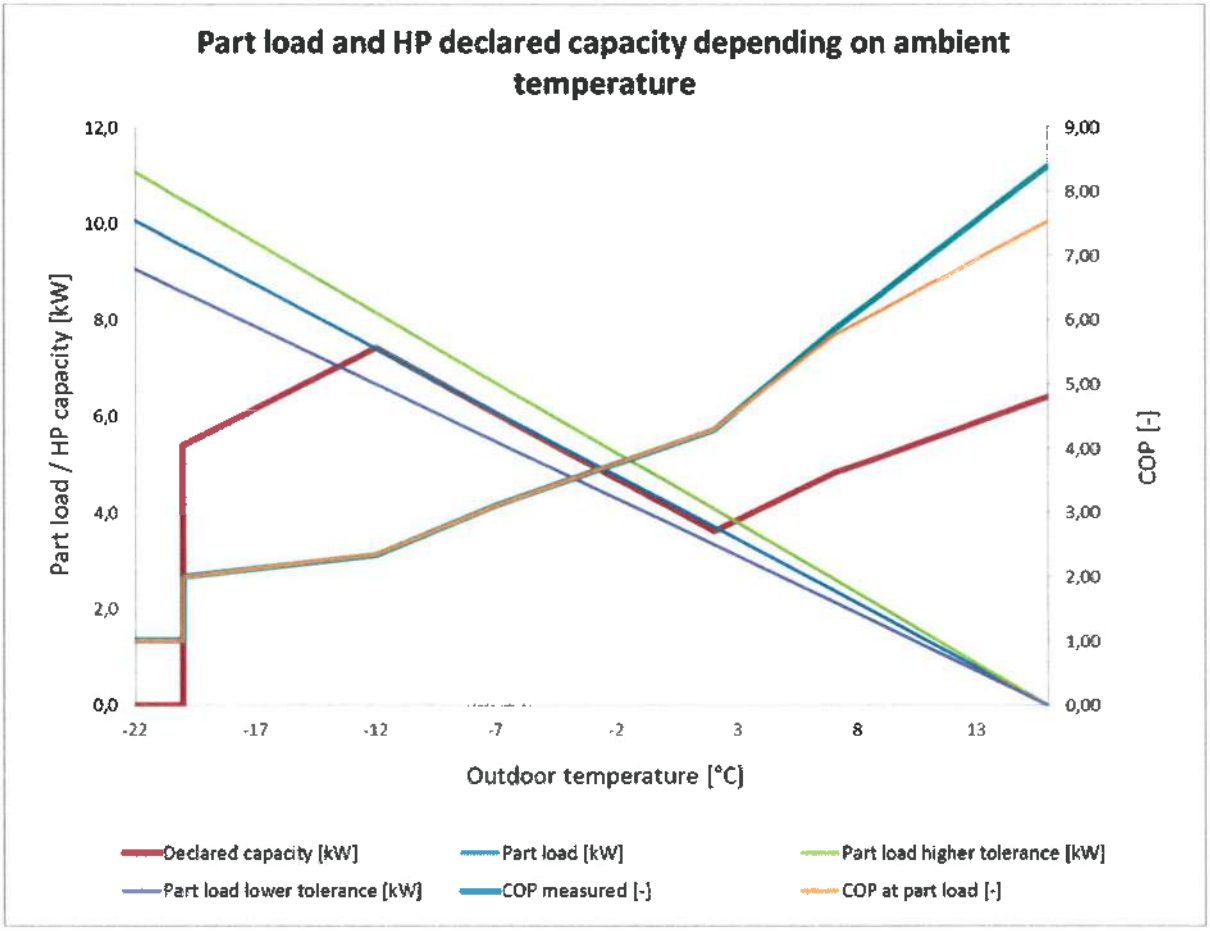
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **AWM1501.090.XB12.H00.C11**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C" – colder

	Bin	Outdoor temp. (dry bulb)	Hours	Part load ratio	Heat load	Capacity of HP	Heat load covered by heat pump	Resistive heat elbu (Tj)	Annual resistive heat	COPbin (Tj)	Annual heating demand	Annual power input including electric back up heating	Net annual heating capacity	Net annual power input without electric back up heating
	j	T_j	h_j		$P_{h(Tj)}$			$elbu_{(Tj)}$	h_j x $elbu_{(Tj)}$	COP bin (Tj)	h_j x $P_{h(Tj)}$		h_j x ($P_{h(Tj)}$ - $elbu_{(Tj)}$)	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
	9	-22	1	100.00	10.05	0.00	0.00	10.05	10.05	1.00	10	10	0	0
	10	-21	6	97.37	9.79	0.00	0.00	9.79	58.73	1.00	59	59	0	0
TOL (E)	**11**	**-20**	**13**	**94.74**	**9.52**	**5.40**	**5.40**	**4.12**	**53.61**	**1.99**	**124**	**89**	**70**	**35**
	12	-19	17	92.11	9.26	5.65	5.65	3.61	61.35	2.03	157	109	96	47
	13	-18	19	89.47	8.99	5.90	5.90	3.09	58.77	2.08	171	113	112	54
	14	-17	26	86.84	8.73	6.15	6.15	2.58	67.02	2.12	227	142	160	75
	15	-16	39	84.21	8.47	6.40	6.40	2.06	80.42	2.17	330	196	250	115
G	**16**	**-15**	**41**	**81.58**	**8.20**	**6.65**	**6.65**	**1.55**	**63.41**	**2.21**	**336**	**187**	**273**	**124**
	17	-14	35	78.95	7.94	6.91	6.91	1.03	36.09	2.25	278	143	242	107
	18	-13	52	76.32	7.67	7.16	7.16	0.52	26.81	2.30	399	189	372	162
Tbiv (F)	**19**	**-12**	**37**	**73.68**	**7.41**	**7.41**	**7.41**	**0.00**	**0.00**	**2.34**	**274**	**117**	**274**	**117**
	20	-11	41	71.05	7.14	7.14	7.14	0.00	0.00	2.49	293	117	293	117
	21	-10	43	68.42	6.88	6.87	6.87	0.00	0.00	2.64	296	112	296	112

	22	-9	54	65.79	6.61	6.60	6.60	0.00	0.00	2.80	357	128	357	128
	23	-8	90	63.16	6.35	6.33	6.33	0.00	0.00	2.95	571	194	571	194
A	**24**	**-7**	**125**	**60.53**	**6.08**	**6.06**	**6.06**	**0.00**	**0.00**	**3.10**	**761**	**245**	**761**	**245**
	25	-6	169	57.89	5.82	5.79	5.79	0.00	0.00	3.23	984	304	984	304
	26	-5	195	55.26	5.56	5.51	5.51	0.00	0.00	3.37	1083	322	1083	322
	27	-4	278	52.63	5.29	5.24	5.24	0.00	0.00	3.50	1471	420	1471	420
	28	-3	306	50.00	5.03	4.97	4.97	0.00	0.00	3.63	1538	424	1538	424
	29	-2	454	47.37	4.76	4.70	4.70	0.00	0.00	3.76	2162	574	2162	574
	30	-1	385	44.74	4.50	4.42	4.42	0.00	0.00	3.90	1732	444	1732	444
	31	0	490	42.11	4.23	4.15	4.15	0.00	0.00	4.03	2074	515	2074	515
	32	1	533	39.47	3.97	3.88	3.88	0.00	0.00	4.16	2115	508	2115	508
B	**33**	**2**	**380**	**36.84**	**3.70**	**3.60**	**3.60**	**0.00**	**0.00**	**4.30**	**1407**	**328**	**1407**	**328**
	34	3	228	34.21	3.44	3.84	3.44	0.00	0.00	4.59	784	171	784	171
	35	4	261	31.58	3.17	4.09	3.17	0.00	0.00	4.88	829	170	829	170
	36	5	279	28.95	2.91	4.33	2.91	0.00	0.00	5.17	812	157	812	157
	37	6	229	26.32	2.65	4.57	2.65	0.00	0.00	5.46	606	111	606	111
C	**38**	**7**	**269**	**23.68**	**2.38**	**4.81**	**2.38**	**0.00**	**0.00**	**5.75**	**640**	**111**	**640**	**111**
	39	8	233	21.05	2.12	4.99	2.12	0.00	0.00	5.95	493	83	493	83
	40	9	230	18.42	1.85	5.16	1.85	0.00	0.00	6.14	426	69	426	69
	41	10	243	15.79	1.59	5.34	1.59	0.00	0.00	6.34	386	61	386	61
	42	11	191	13.16	1.32	5.51	1.32	0.00	0.00	6.54	253	39	253	39
D	**43**	**12**	**146**	**10.53**	**1.06**	**5.69**	**1.06**	**0.00**	**0.00**	**6.73**	**155**	**23**	**155**	**23**
	44	13	150	7.89	0.79	5.87	0.79	0.00	0.00	6.93	119	17	119	17
	45	14	97	5.26	0.53	6.04	0.53	0.00	0.00	7.13	51	7	51	7
	46	15	61	2.63	0.26	6.22	0.26	0.00	0.00	7.32	16	2	16	2
		Σ	6446							Σ	24779	7010	24262	6494

SCOPon	3.53	SCOPnet	3.74
		SCOP	**3.53**

Power diagram (Heat pump **AWM1501.090.XB12.H00.C11**)
- Low temperature application (reference water temperature 35 °C)
- Reference heating season „C" – colder



Data for SCOP calculation (Heat pump **AWM1501.090.XB12.H00.C11**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „W" – warmer

	Outdoor heat exchanger	Indoor heat exchanger	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	–	–	–	–	–	–	–	–	–	–
B	2	55.00	100.00	9.02	9.024	2.004	0.900	1.00	2.004	–
C	7	46.00	64.29	5.80	5.650	3.250	0.900	1.00	3.250	–
D	12	37.73	28.57	2.58	4.830	3.830	0.989	0.53	3.794	0.0138
TOL (E)	2	55.00	100.00	9.02	9.024	2.004	0.900	1.00	2.004	–
Tbiv (F)	2	55.00	100.00	9.02	9.024	2.004	0.900	1.00	2.004	–

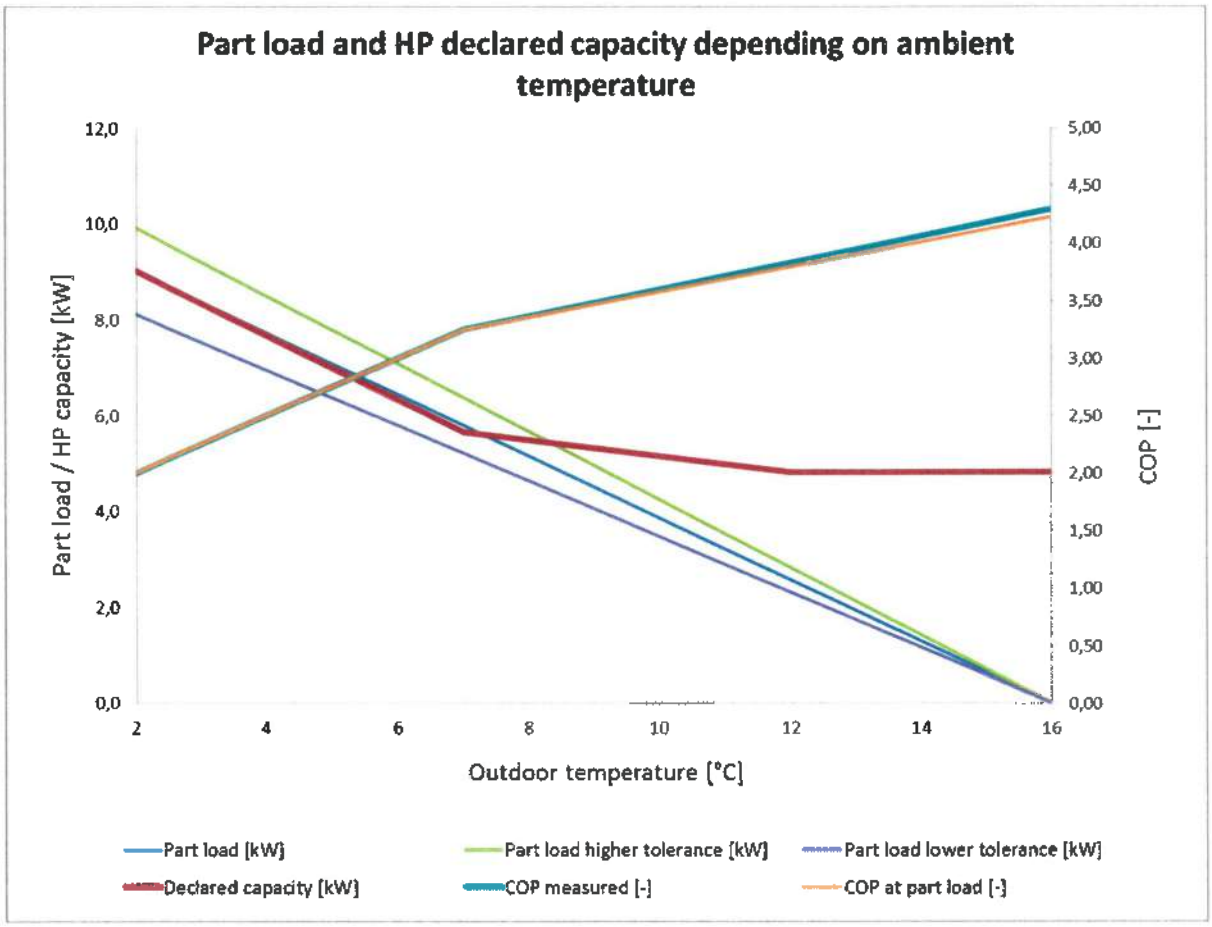
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **AWM1501.090.XB12.H00.C11**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „W" – warmer

	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 x $elbu_{(Tj)}$	COPbin (Tj)	h_j x $P_{h(Tj)}$		h_j x ($P_{h(Tj)}$ - $elbu_{(Tj)}$)	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
B	**33**	**2**	**3**	**100.00**	**9.02**	**9.02**	**9.02**	**0.00**	**0.00**	**2.00**	**27**	**14**	**27**	**14**
	34	3	22	92.86	8.38	8.35	8.35	0.00	0.00	2.25	184	82	184	82
	35	4	63	85.71	7.73	7.67	7.67	0.00	0.00	2.50	487	195	487	195
	36	5	63	78.57	7.09	7.00	7.00	0.00	0.00	2.75	447	162	447	162
	37	6	175	71.43	6.45	6.32	6.32	0.00	0.00	3.00	1128	376	1128	376
C	**38**	**7**	**162**	**64.29**	**5.80**	**5.65**	**5.65**	**0.00**	**0.00**	**3.25**	**940**	**289**	**940**	**289**
	39	8	259	57.14	5.16	5.49	5.16	0.00	0.00	3.36	1336	398	1336	398
	40	9	360	50.00	4.51	5.32	4.51	0.00	0.00	3.47	1624	468	1624	468
	41	10	428	42.86	3.87	5.16	3.87	0.00	0.00	3.58	1655	463	1655	463
	42	11	430	35.71	3.22	4.99	3.22	0.00	0.00	3.68	1386	376	1386	376
D	**43**	**12**	**503**	**28.57**	**2.58**	**4.83**	**2.58**	**0.00**	**0.00**	**3.79**	**1297**	**342**	**1297**	**342**
	44	13	444	21.43	1.93	4.67	1.93	0.00	0.00	3.90	859	220	859	220
	45	14	384	14.29	1.29	4.50	1.29	0.00	0.00	4.01	495	123	495	123

	46	15	294	7.14	0.64	4.34	0.64	0.00	0.00	4.12	189	46	189	46
		Σ	3590							Σ	12054	3554	12054	3554

SCOPon	3.39	SCOPnet	3.39
		SCOP	**3.38**

Power diagram (Heat pump **AWM1501.090.XB12.H00.C11**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „W" – warmer



Data for SCOP calculation (Heat pump **AWM1501.090.XB12.H00.C11**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C" – colder

	Outdoor heat exchanger	Indoor heat exchanger	Part load ratio	Part load	DC Declared capacity	COPd at declared capacity	Cdh degradation coefficient	CR	COPbin (Tj)	Eff. power input of compressor off state
	Outdoor air inlet	Outlet water temperature								
	[°C]	[°C]	[%]	[kW]	[kW]	[–]	[–]	[–]	[–]	[kW]
A	-7	44.00	60.53	6.48	6.430	2.230	0.900	1.00	2.230	–
B	2	37.00	36.84	3.95	3.971	3.111	0.900	1.00	3.111	–
C	7	35.52	23.68	2.54	4.530	4.970	0.985	0.56	4.912	0.0138
D	12	34.36	10.53	1.13	5.510	6.080	0.985	0.20	5.740	0.0138
TOL (E)	-18	51.57	89.47	9.58	5.400	1.650	0.900	1.00	1.650	–
Tbiv (F)	-10	45.88	68.42	7.33	7.329	1.908	0.900	1.00	1.908	–
G	-15	49.00	81.58	8.74	6.123	1.747	0.900	1.00	1.747	–

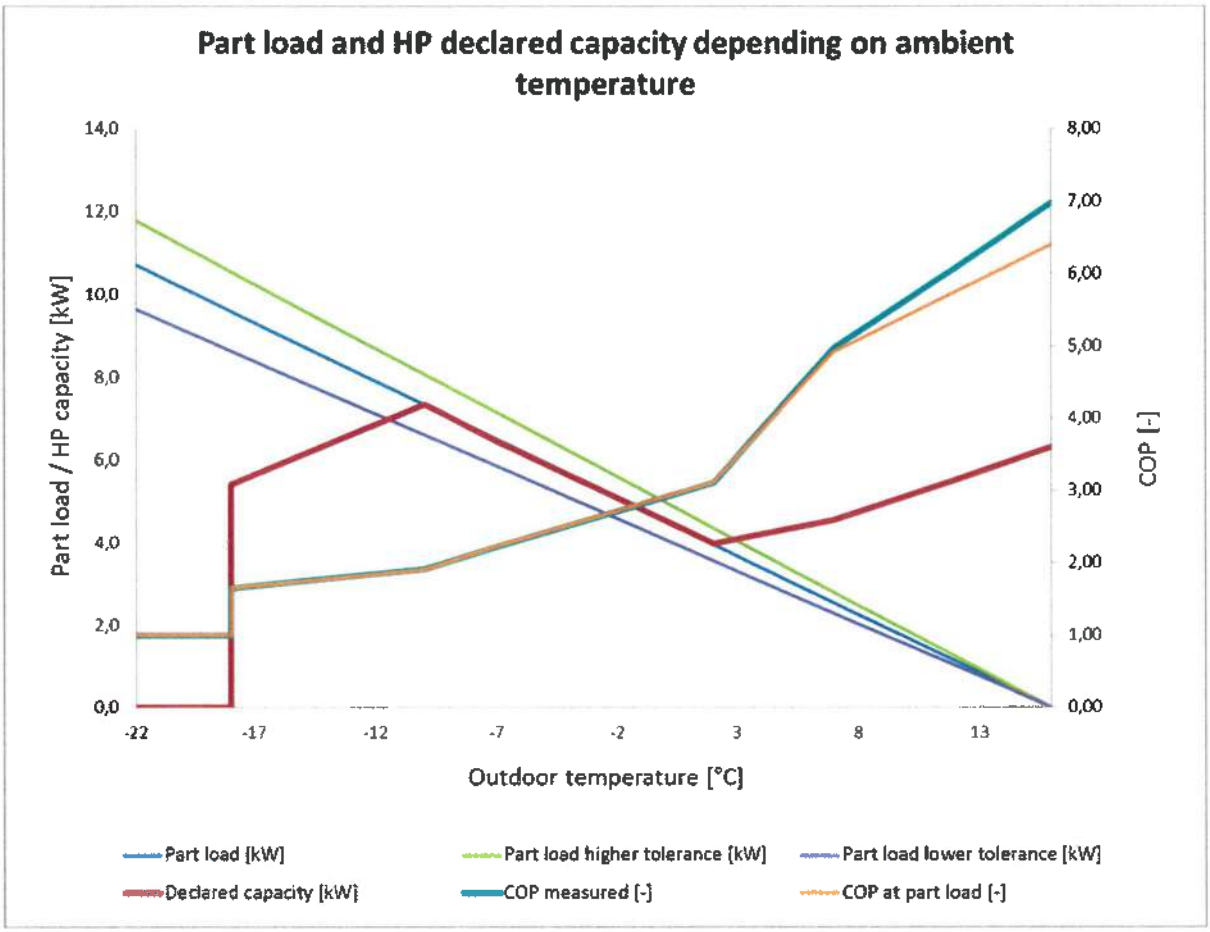
Calculation SCOP, $SCOP_{on}$, $SCOP_{net}$ (Heat pump **AWM1501.090.XB12.H00.C11**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C" – colder

	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 x $elbu_{(Tj)}$	COP bin (Tj)	h_j x $P_{h(Tj)}$		h_j x ($P_{h(Tj)}$ - $elbu_{(Tj)}$)	
	[–]	[°C]	[h]	[%]	[kW]	[kW]	[kW]	[kW]	[kWh]	[–]	[kWh]	[kWh]	[kWh]	[kWh]
	9	-22	1	100.00	10.71	0.00	0.00	10.71	10.71	1.00	11	11	0	0
	10	-21	6	97.37	10.43	0.00	0.00	10.43	62.58	1.00	63	63	0	0
	11	-20	13	94.74	10.15	0.00	0.00	10.15	131.92	1.00	132	132	0	0
	12	-19	17	92.11	9.87	0.00	0.00	9.87	167.72	1.00	168	168	0	0
TOL (E)	**13**	**-18**	**19**	**89.47**	**9.58**	**5.40**	**5.40**	**4.18**	**79.50**	**1.65**	**182**	**142**	**103**	**62**
	14	-17	26	86.84	9.30	5.64	5.64	3.66	95.19	1.68	242	182	147	87
	15	-16	39	84.21	9.02	5.88	5.88	3.14	122.39	1.71	352	256	229	134
G	**16**	**-15**	**41**	**81.58**	**8.74**	**6.12**	**6.12**	**2.62**	**107.22**	**1.75**	**358**	**251**	**251**	**144**
	17	-14	35	78.95	8.46	6.36	6.36	2.09	73.22	1.78	296	198	223	125
	18	-13	52	76.32	8.17	6.61	6.61	1.57	81.59	1.81	425	271	343	190
	19	-12	37	73.68	7.89	6.85	6.85	1.05	38.70	1.84	292	176	253	137
	20	-11	41	71.05	7.61	7.09	7.09	0.52	21.44	1.88	312	176	291	155

Tbiv (F)	21	-10	43	68.42	7.33	7.33	7.33	0.00	0.00	1.91	315	165	315	165
	22	-9	54	65.79	7.05	7.03	7.03	0.00	0.00	2.02	381	189	381	189
	23	-8	90	63.16	6.77	6.73	6.73	0.00	0.00	2.12	609	287	609	287
A	**24**	**-7**	**125**	**60.53**	**6.48**	**6.43**	**6.43**	**0.00**	**0.00**	**2.23**	**810**	**363**	**810**	**363**
	25	-6	169	57.89	6.20	6.16	6.16	0.00	0.00	2.33	1048	450	1048	450
	26	-5	195	55.26	5.92	5.88	5.88	0.00	0.00	2.43	1154	476	1154	476
	27	-4	278	52.63	5.64	5.61	5.61	0.00	0.00	2.52	1567	621	1567	621
	28	-3	306	50.00	5.36	5.34	5.34	0.00	0.00	2.62	1639	625	1639	625
	29	-2	454	47.37	5.07	5.06	5.06	0.00	0.00	2.72	2304	847	2304	847
	30	-1	385	44.74	4.79	4.79	4.79	0.00	0.00	2.82	1845	655	1845	655
	31	0	490	42.11	4.51	4.52	4.51	0.00	0.00	2.92	2210	758	2210	758
	32	1	533	39.47	4.23	4.24	4.23	0.00	0.00	3.01	2254	748	2254	748
B	**33**	**2**	**380**	**36.84**	**3.95**	**3.97**	**3.95**	**0.00**	**0.00**	**3.11**	**1500**	**482**	**1500**	**482**
	34	3	228	34.21	3.66	4.08	3.66	0.00	0.00	3.47	836	241	836	241
	35	4	261	31.58	3.38	4.19	3.38	0.00	0.00	3.83	883	230	883	230
	36	5	279	28.95	3.10	4.31	3.10	0.00	0.00	4.19	865	206	865	206
	37	6	229	26.32	2.82	4.42	2.82	0.00	0.00	4.55	646	142	646	142
C	**38**	**7**	**269**	**23.68**	**2.54**	**4.53**	**2.54**	**0.00**	**0.00**	**4.91**	**682**	**139**	**682**	**139**
	39	8	233	21.05	2.26	4.73	2.26	0.00	0.00	5.08	525	103	525	103
	40	9	230	18.42	1.97	4.92	1.97	0.00	0.00	5.24	454	87	454	87
	41	10	243	15.79	1.69	5.12	1.69	0.00	0.00	5.41	411	76	411	76
	42	11	191	13.16	1.41	5.31	1.41	0.00	0.00	5.57	269	48	269	48
D	**43**	**12**	**146**	**10.53**	**1.13**	**5.51**	**1.13**	**0.00**	**0.00**	**5.74**	**165**	**29**	**165**	**29**
	44	13	150	7.89	0.85	5.71	0.85	0.00	0.00	5.91	127	21	127	21
	45	14	97	5.26	0.56	5.90	0.56	0.00	0.00	6.07	55	9	55	9
	46	15	61	2.63	0.28	6.10	0.28	0.00	0.00	6.24	17	3	17	3
		Σ	6446							Σ	26402	10027	25410	9035

SCOPon	2.63	SCOPnet	2.81
		SCOP	**2.63**

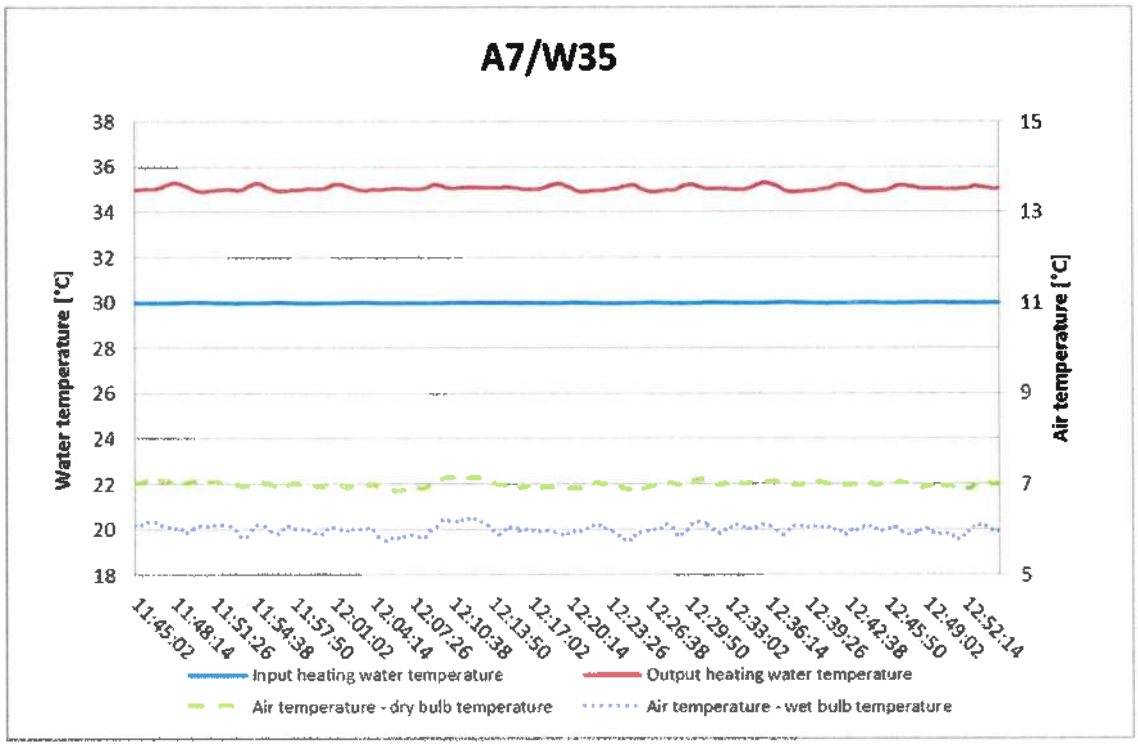
Power diagram (Heat pump **AWM1501.090.XB12.H00.C11**)
- Medium temperature application (reference water temperature 55 °C)
- Reference heating season „C" – colder

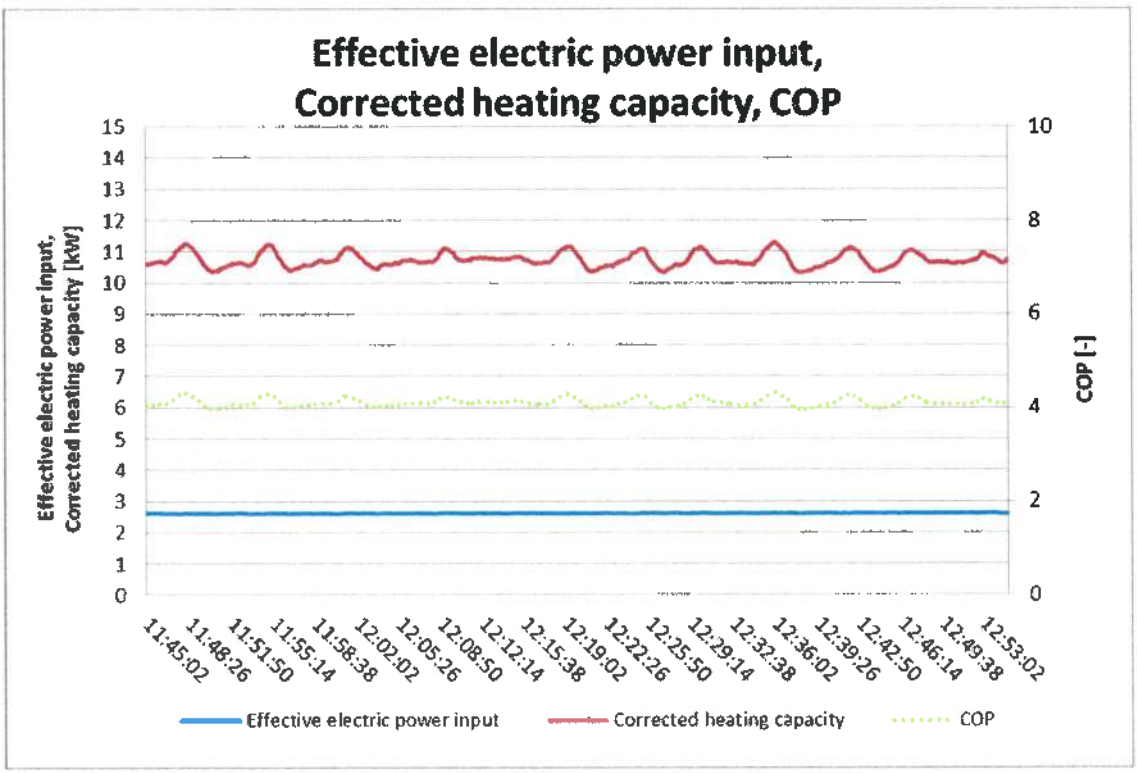


Tested by:	Ing. Dominik Šedivý	Date:	2022-04-08	Signed:	
Reviewed and approved by:	Ing. Mario Jankola	Date:	2022-04-08	Signed:	

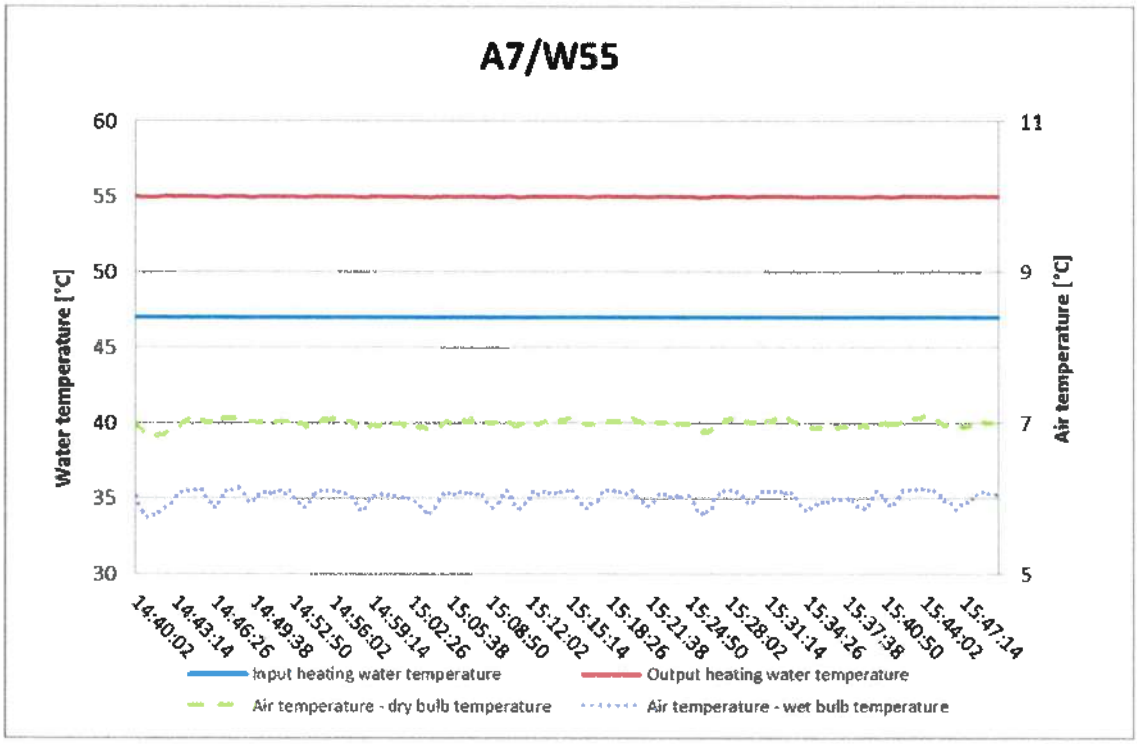
VI. Graphs

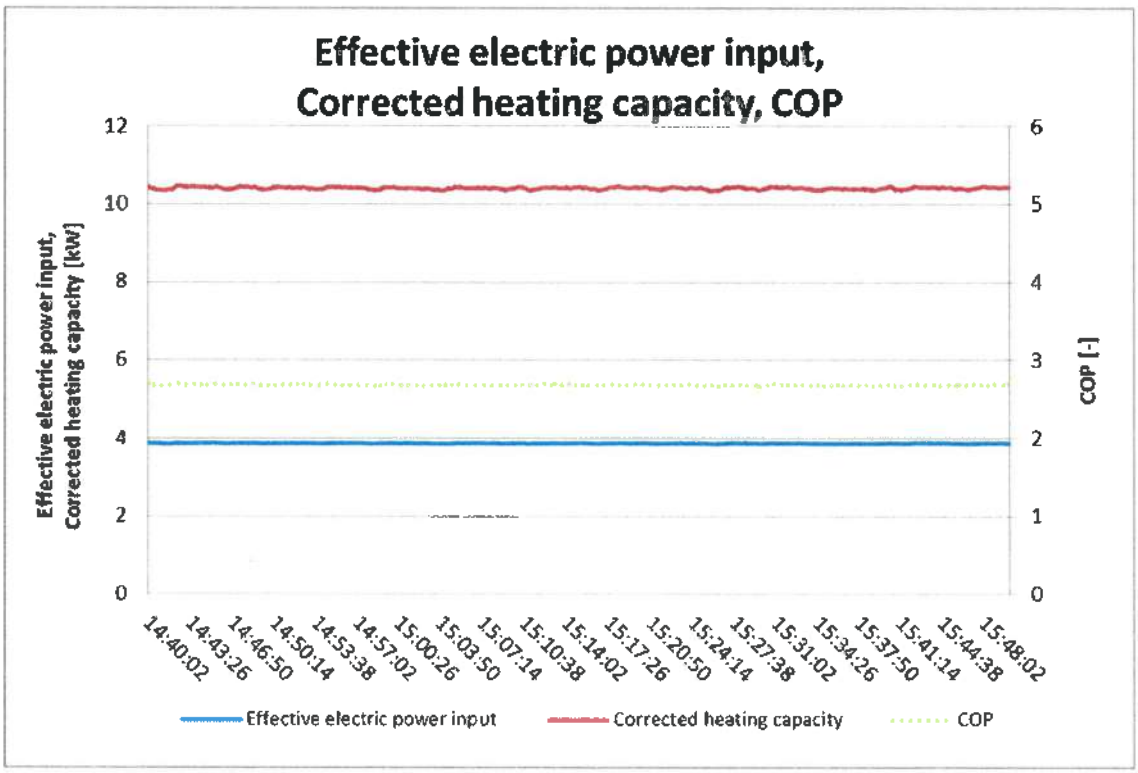
Heat Pump **AWM1501.090.XB12.H00.C11**: A7/W35 (70 Hz)



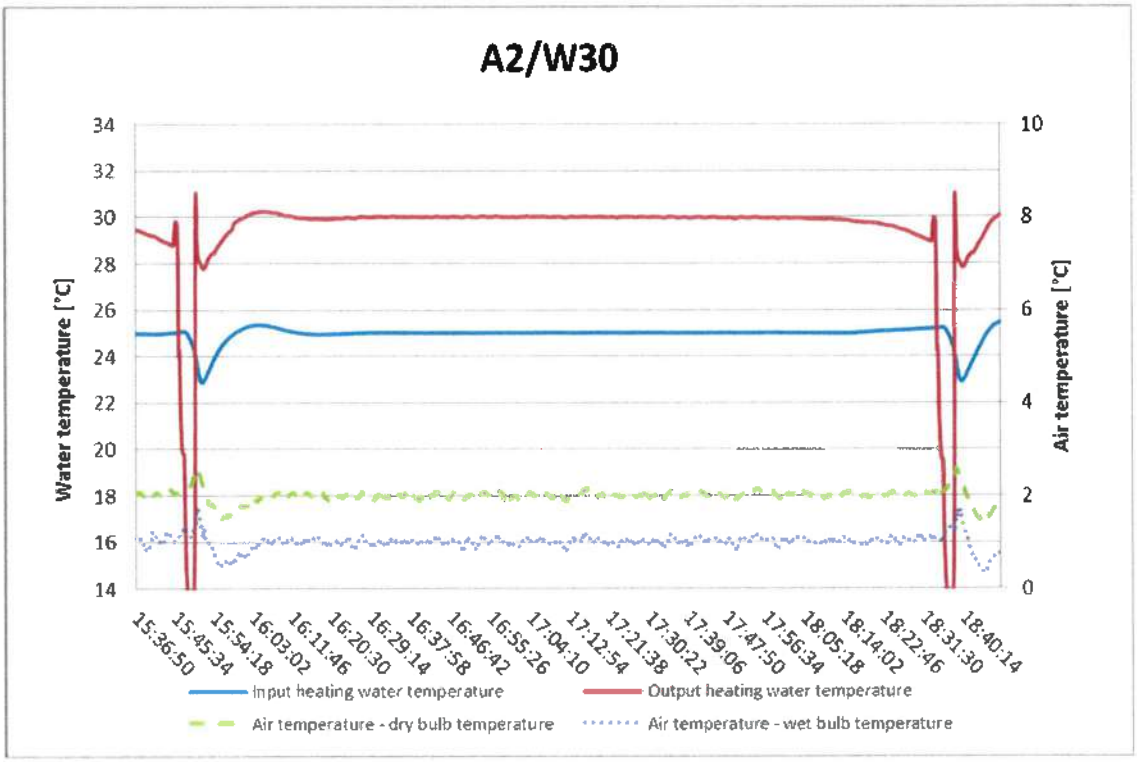


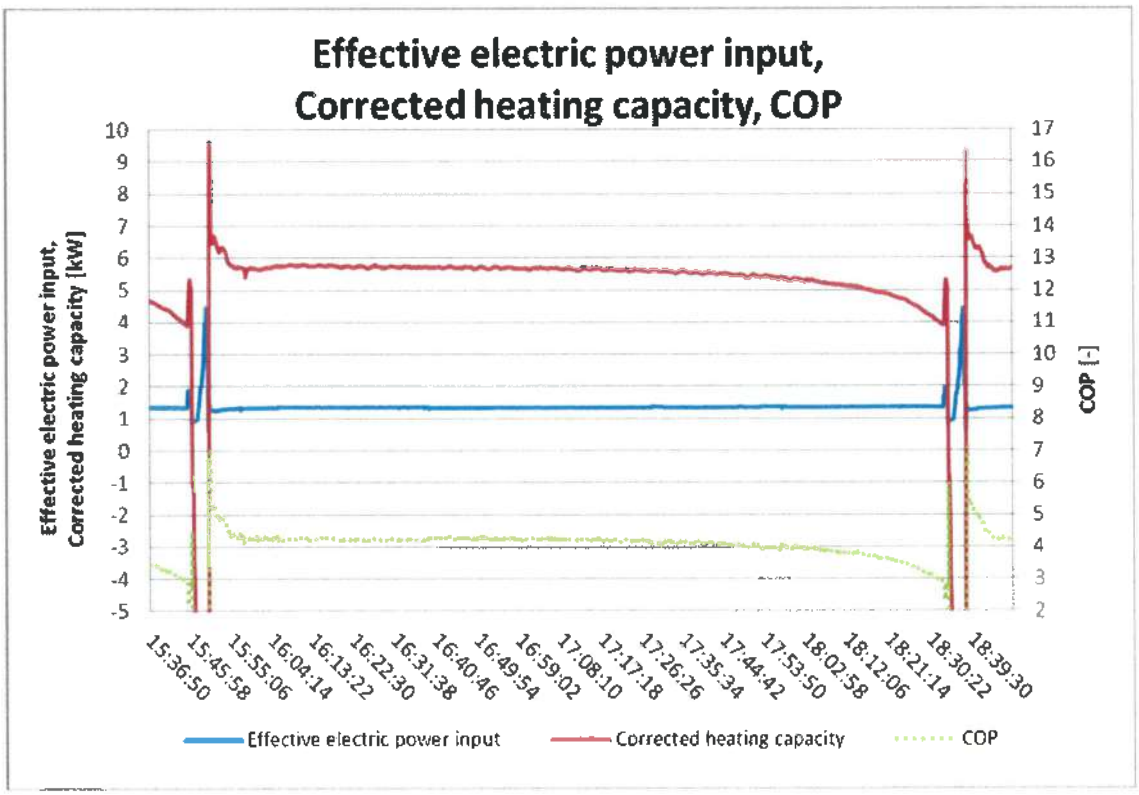
Heat Pump **AWM1501.090.XB12.H00.C11**: A7/W55 (75 Hz)



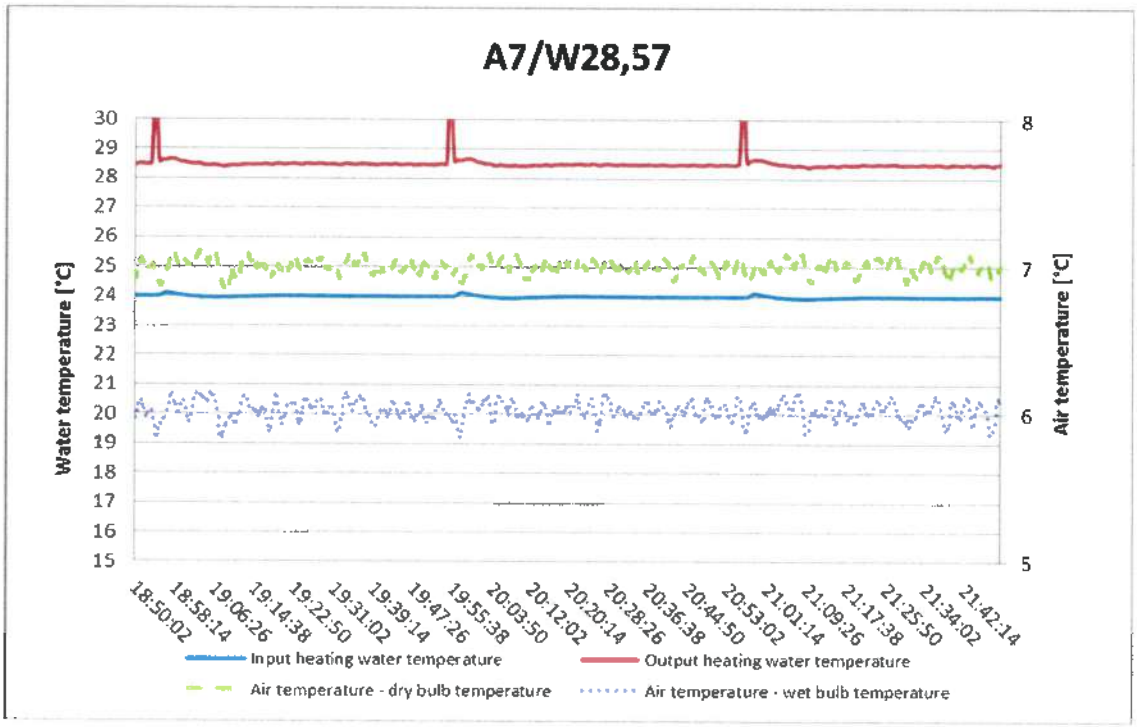


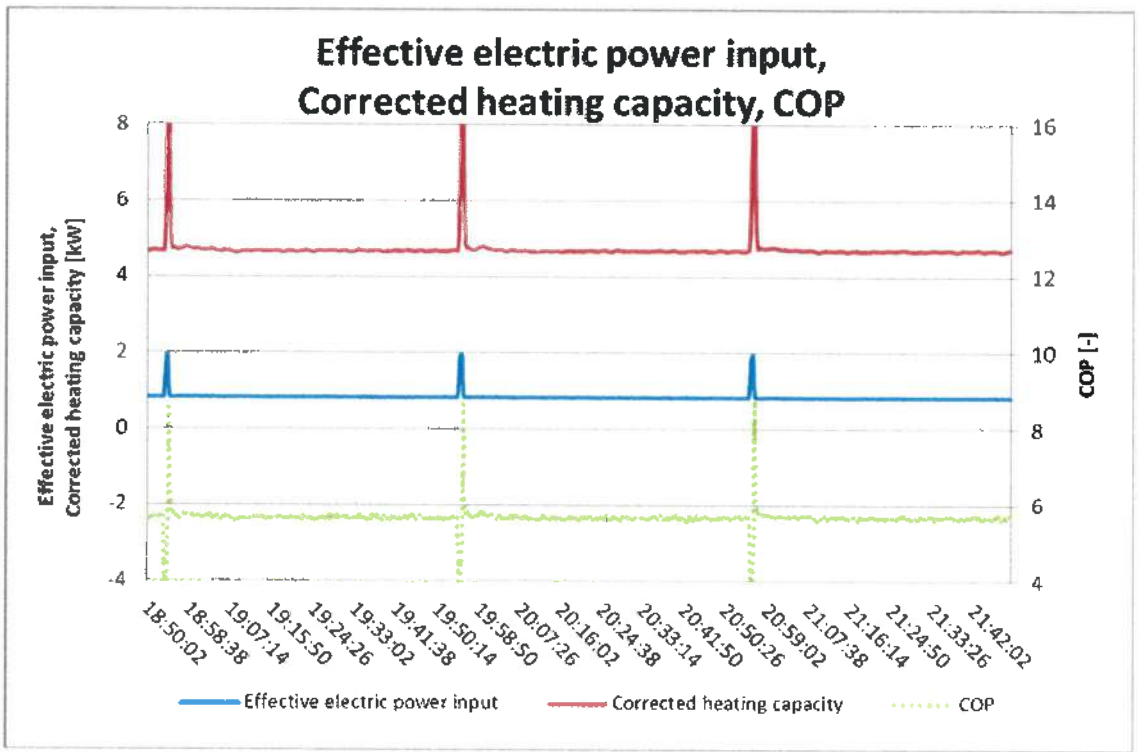
Heat Pump **AWM1501.090.XB12.H00.C11**: A2/W30 (45 Hz)



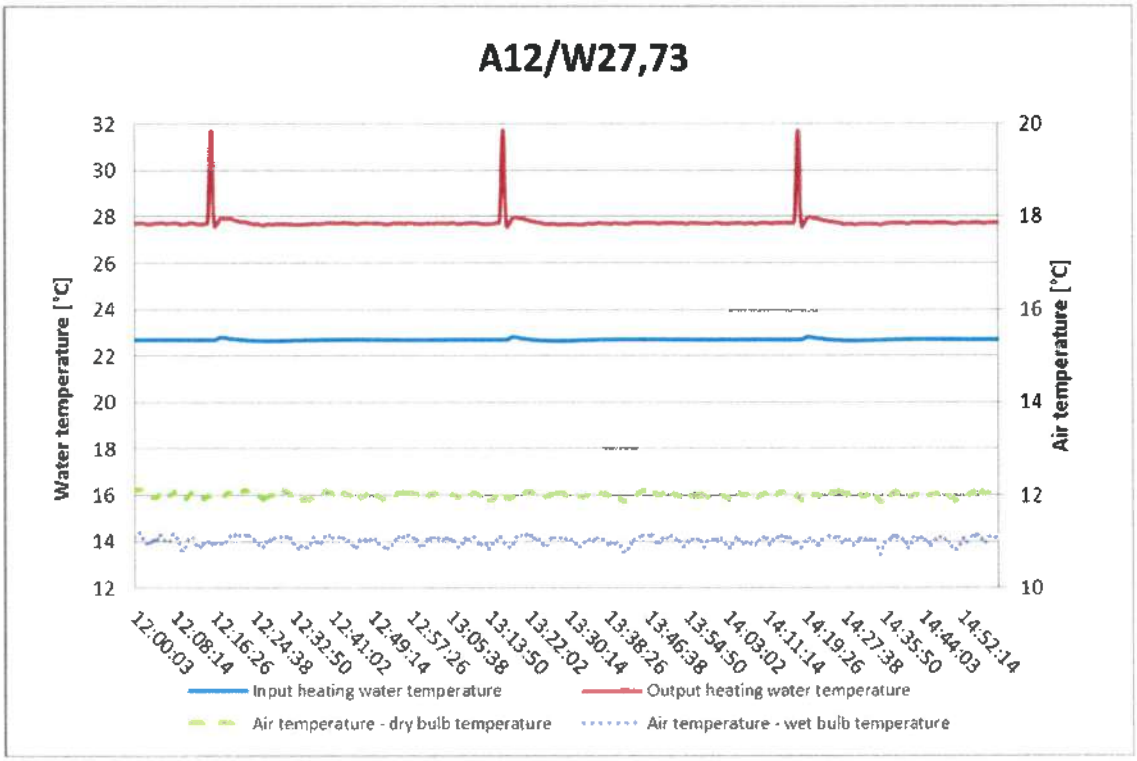


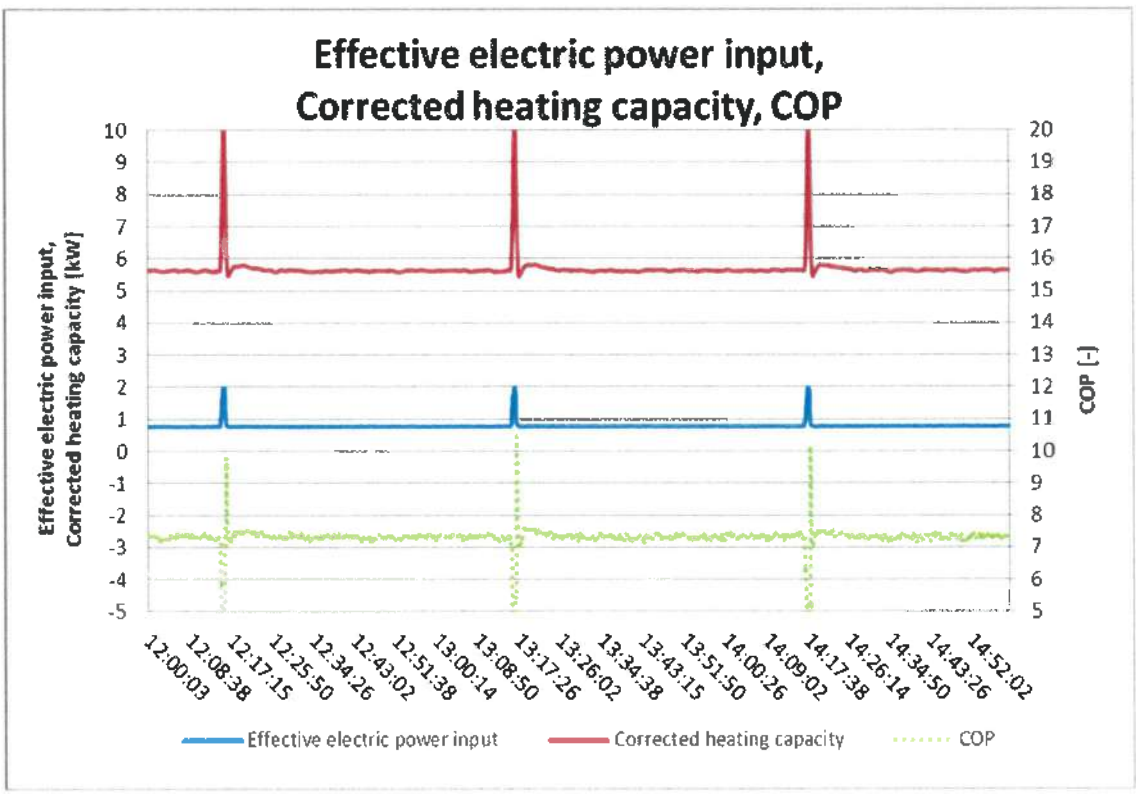
Heat Pump **AWM1501.090.XB12.H00.C11**: A7/W28.57 (30 Hz)



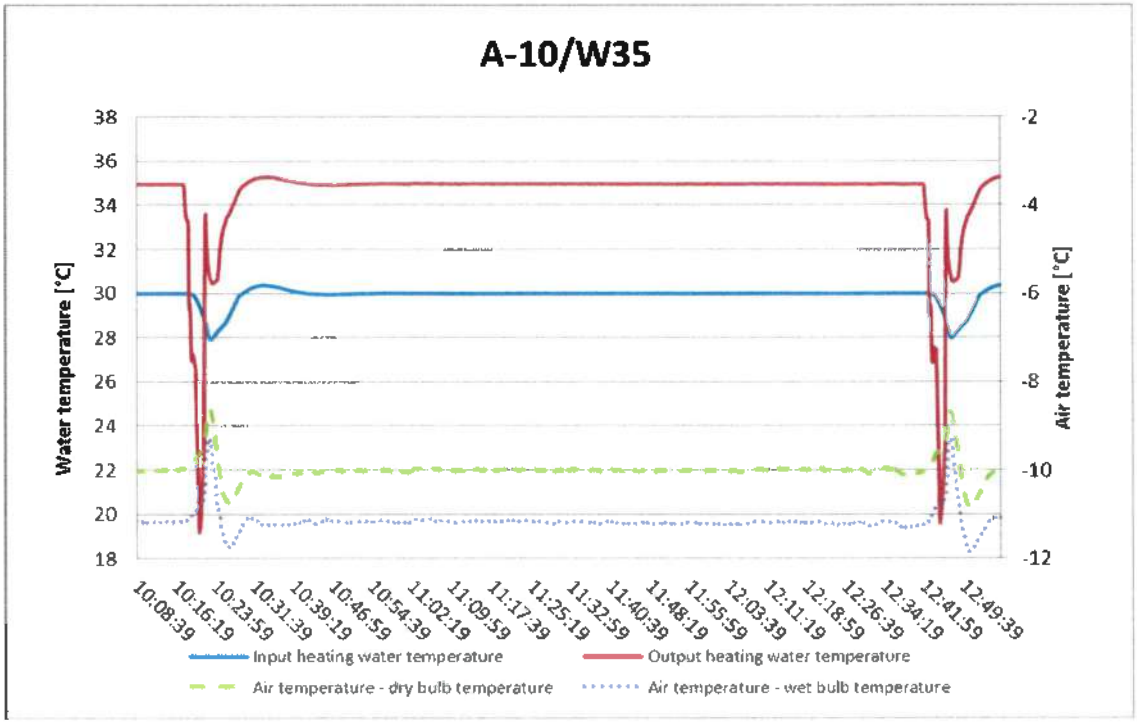


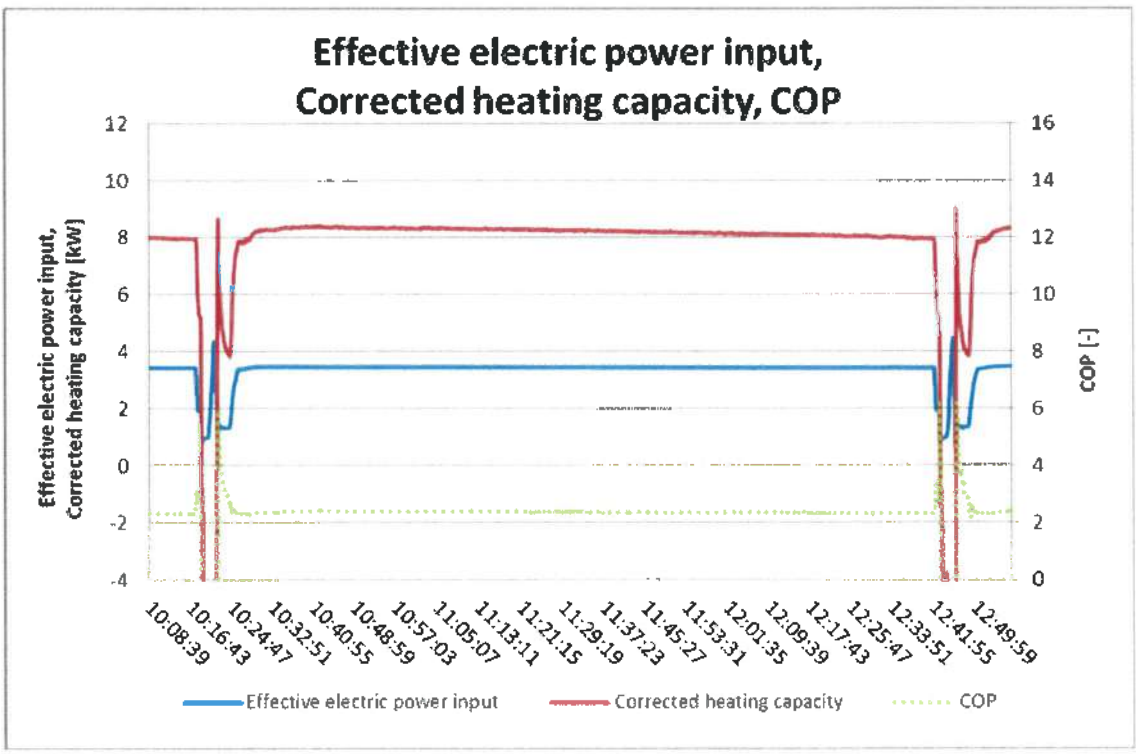
Heat Pump **AWM1501.090.XB12.H00.C11**: A12/W27.73 (30 Hz)



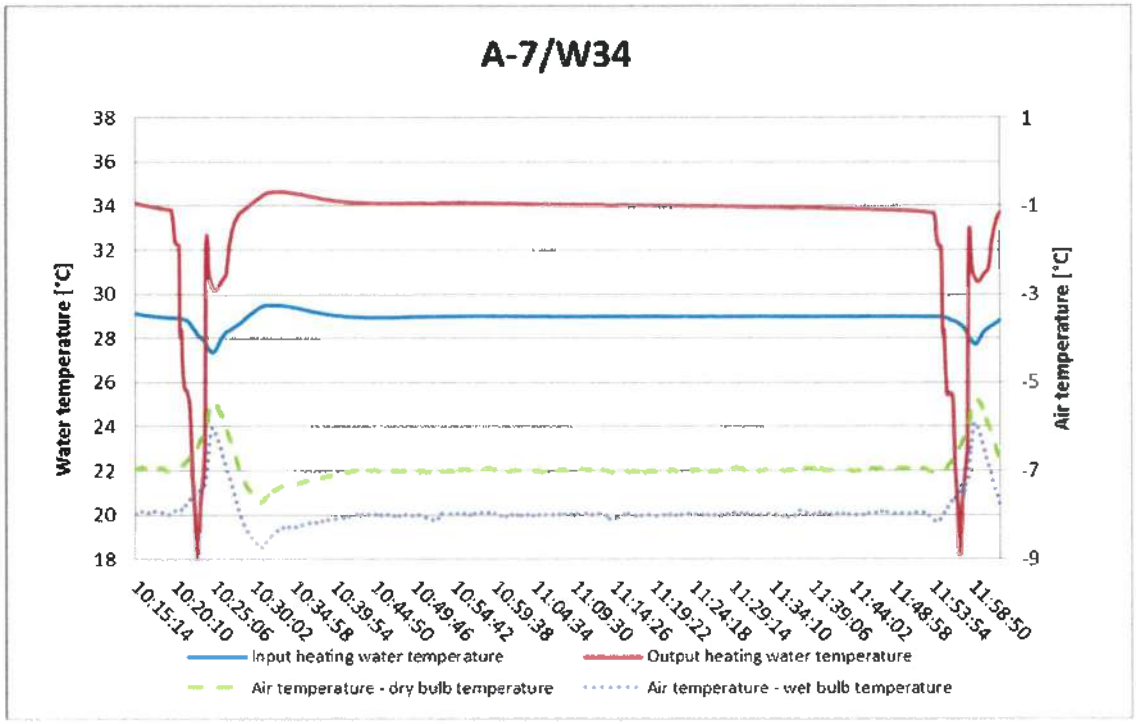


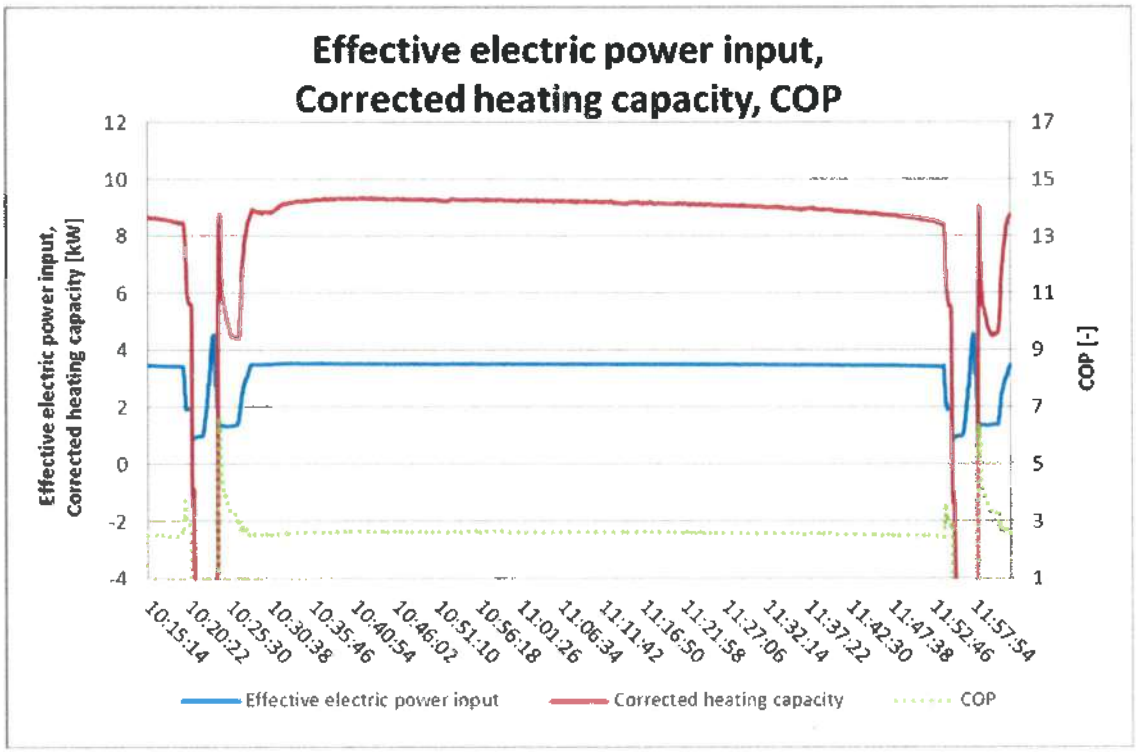
Heat Pump **AWM1501.090.XB12.H00.C11**: A-10/W35 (100 Hz)



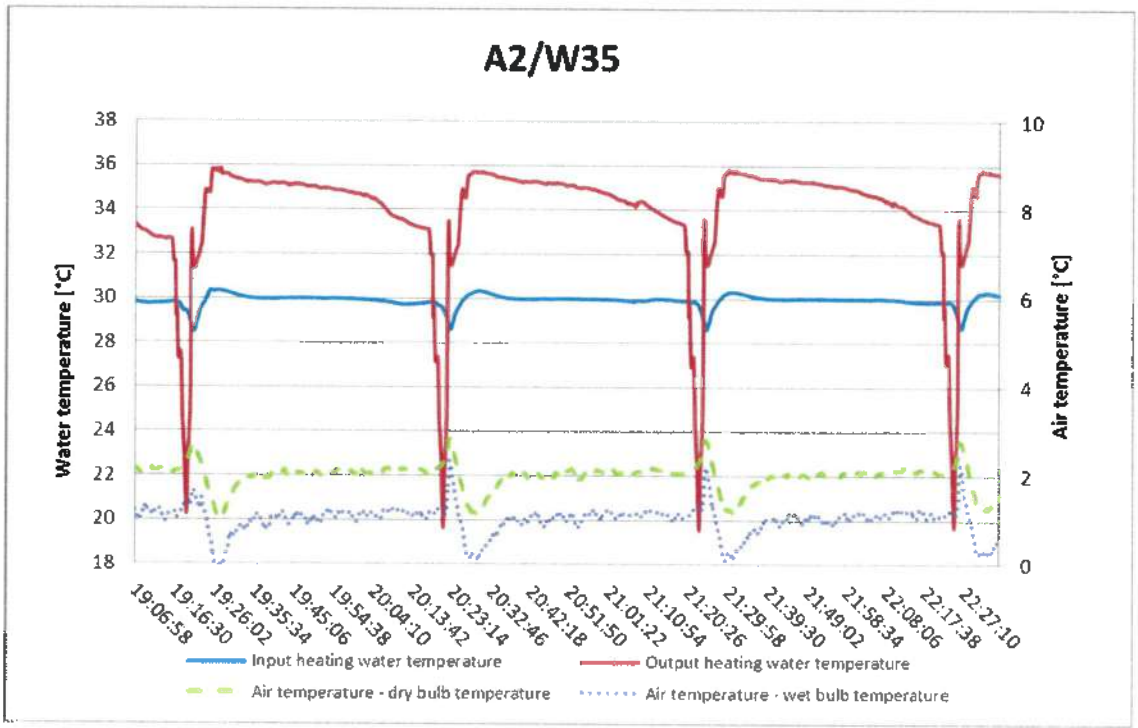


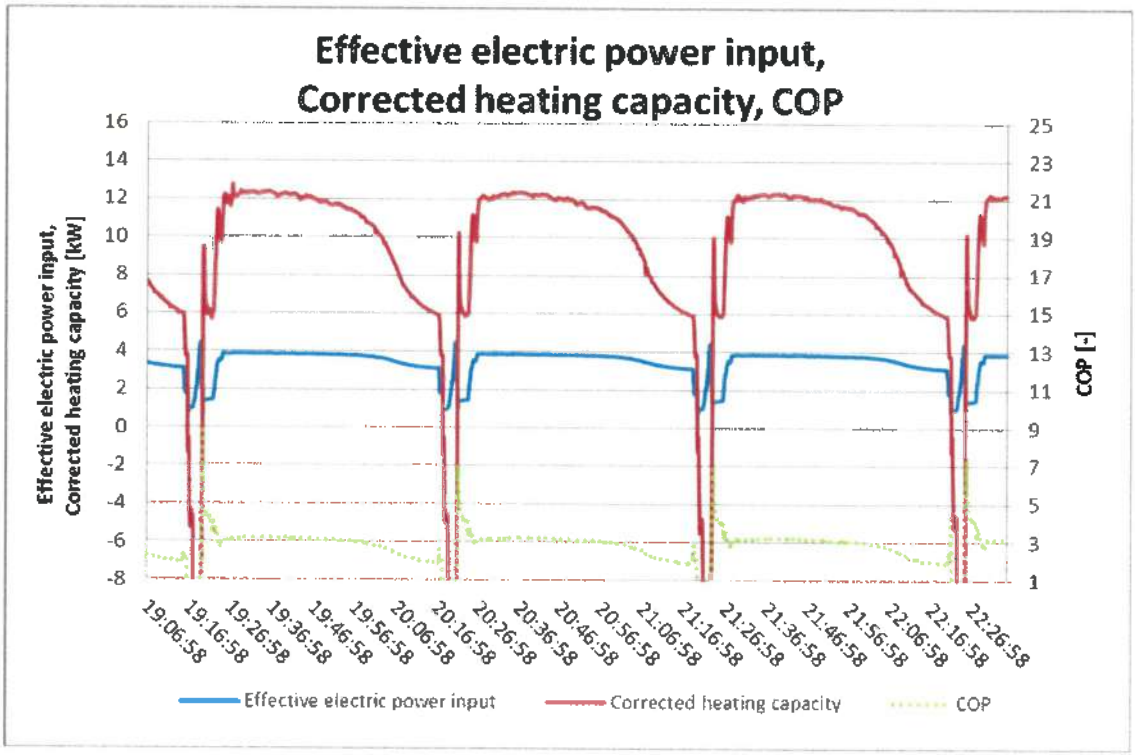
Heat Pump **AWM1501.090.XB12.H00.C11**: A-7/W34 (100 Hz)



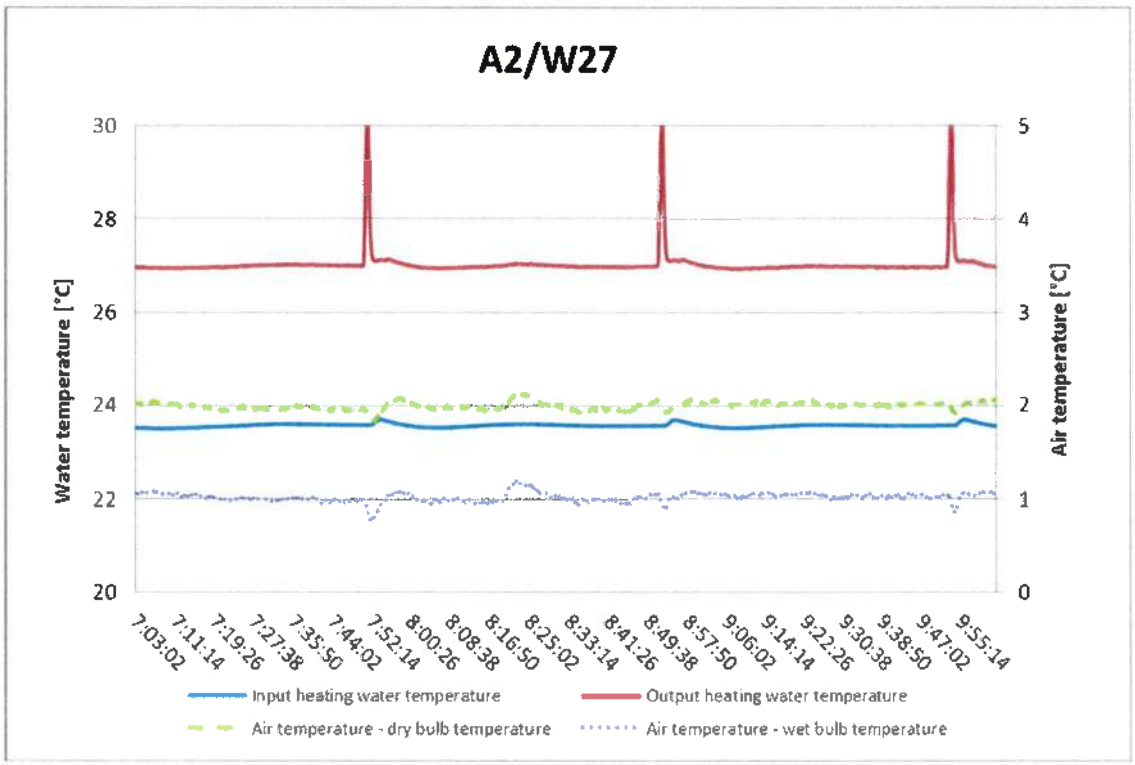


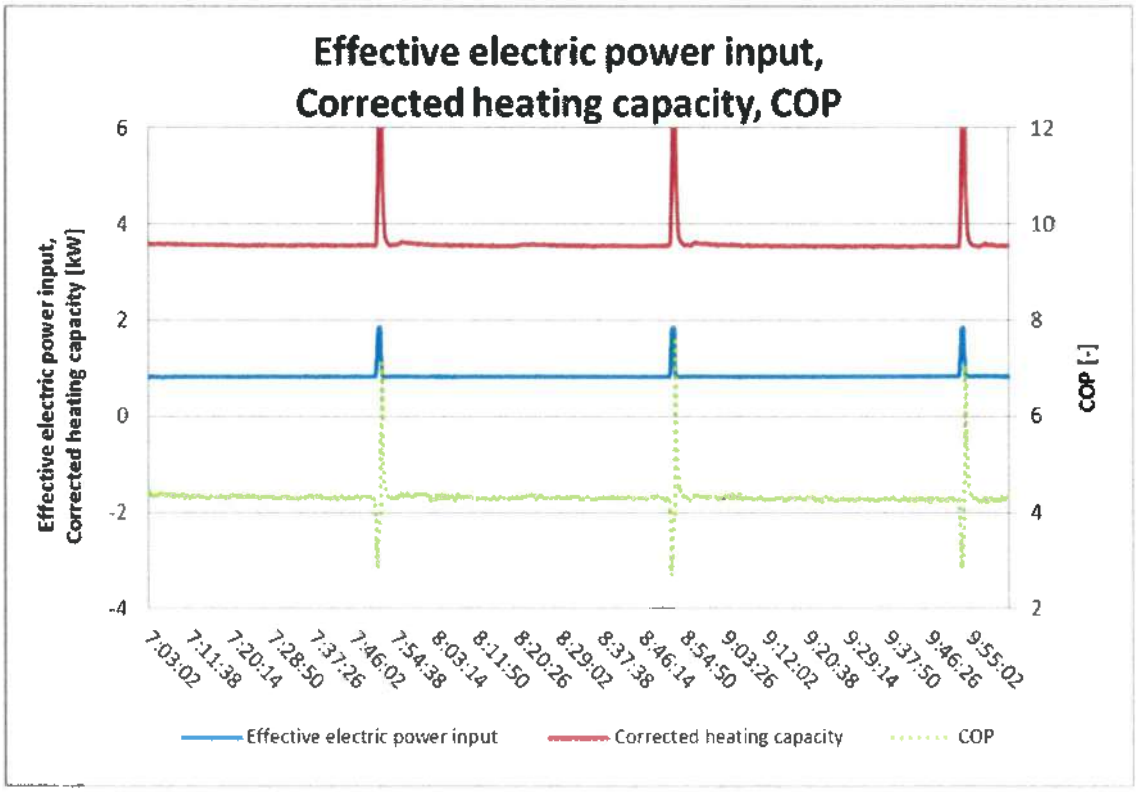
Heat Pump **AWM1501.090.XB12.H00.C11**: A2/W35 (100 Hz)



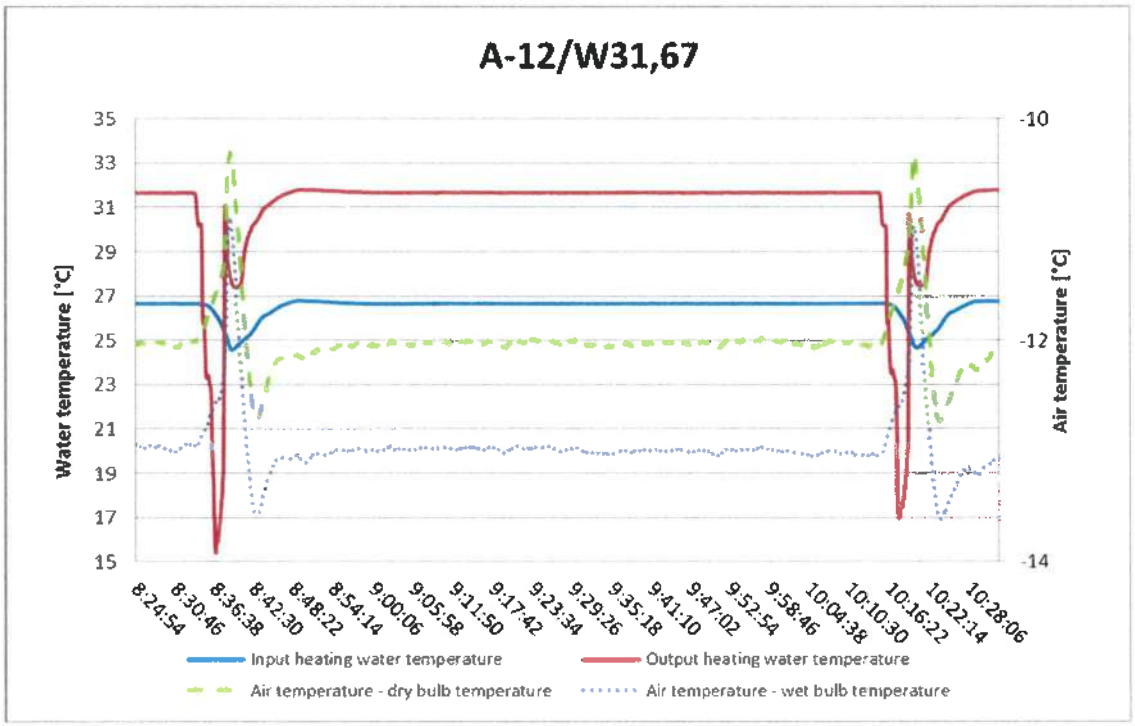


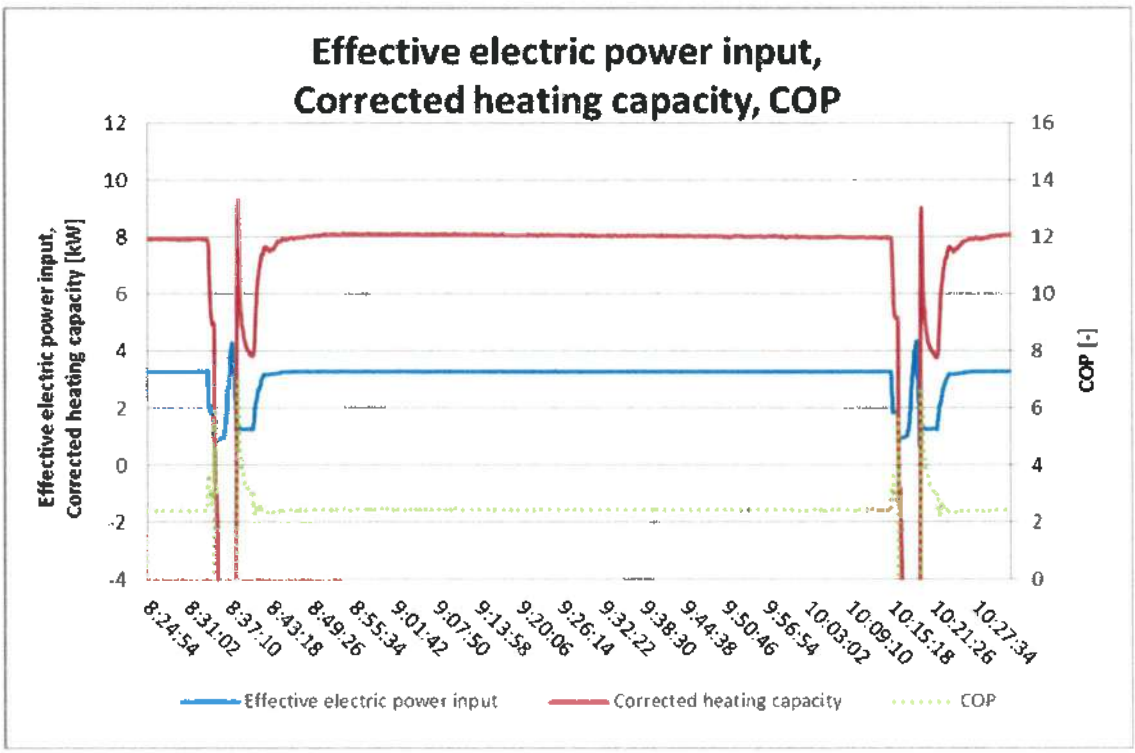
Heat Pump **AWM1501.090.XB12.H00.C11**: A2/W27 (30 Hz)



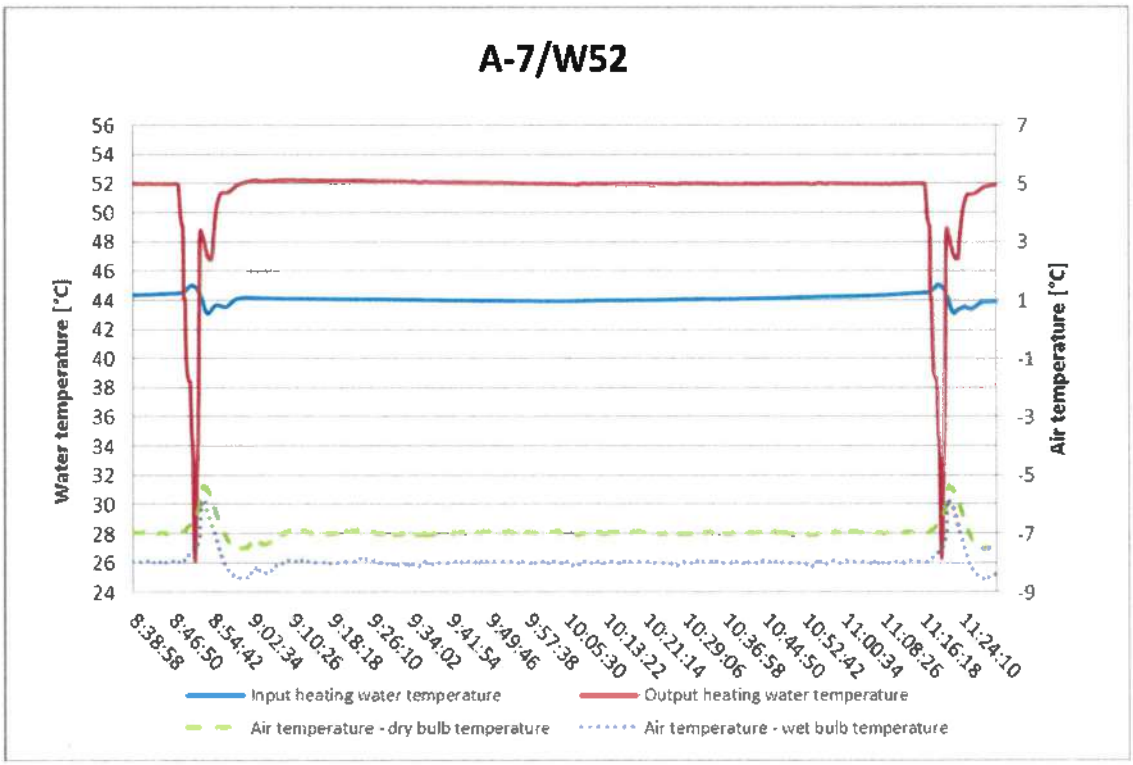


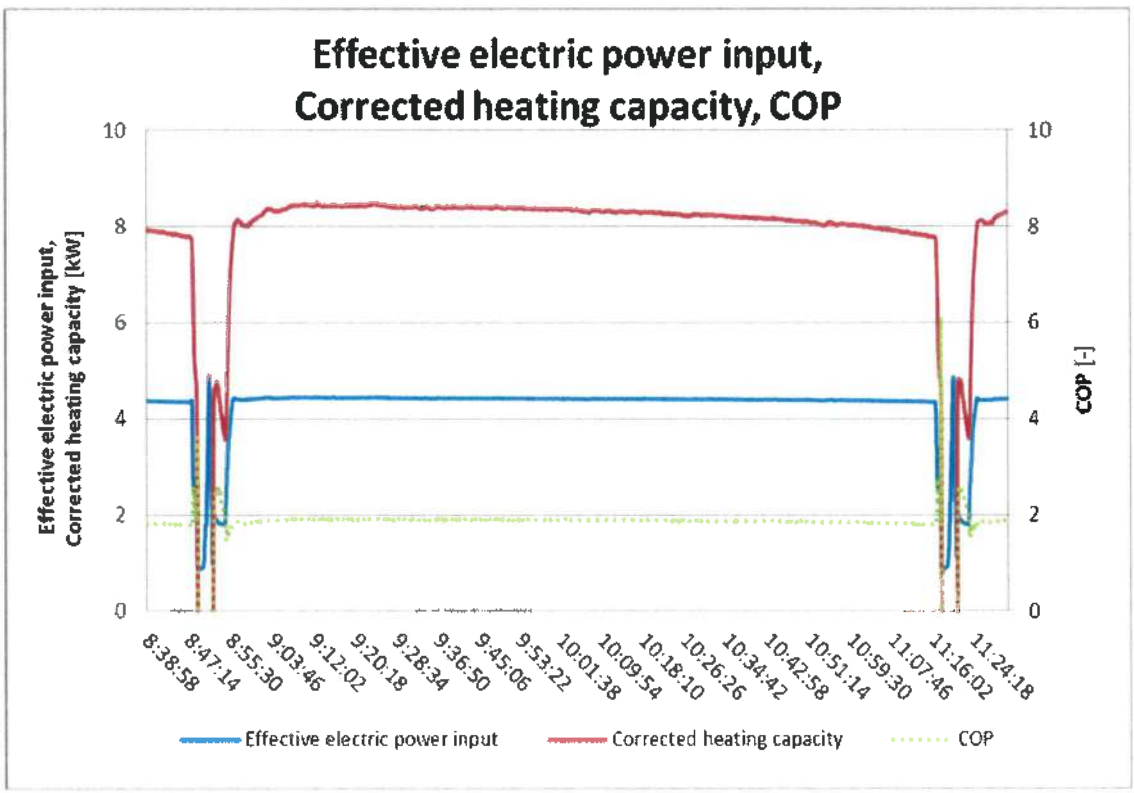
Heat Pump **AWM1501.090.XB12.H00.C11**: A-12/W31.67 (100 Hz)



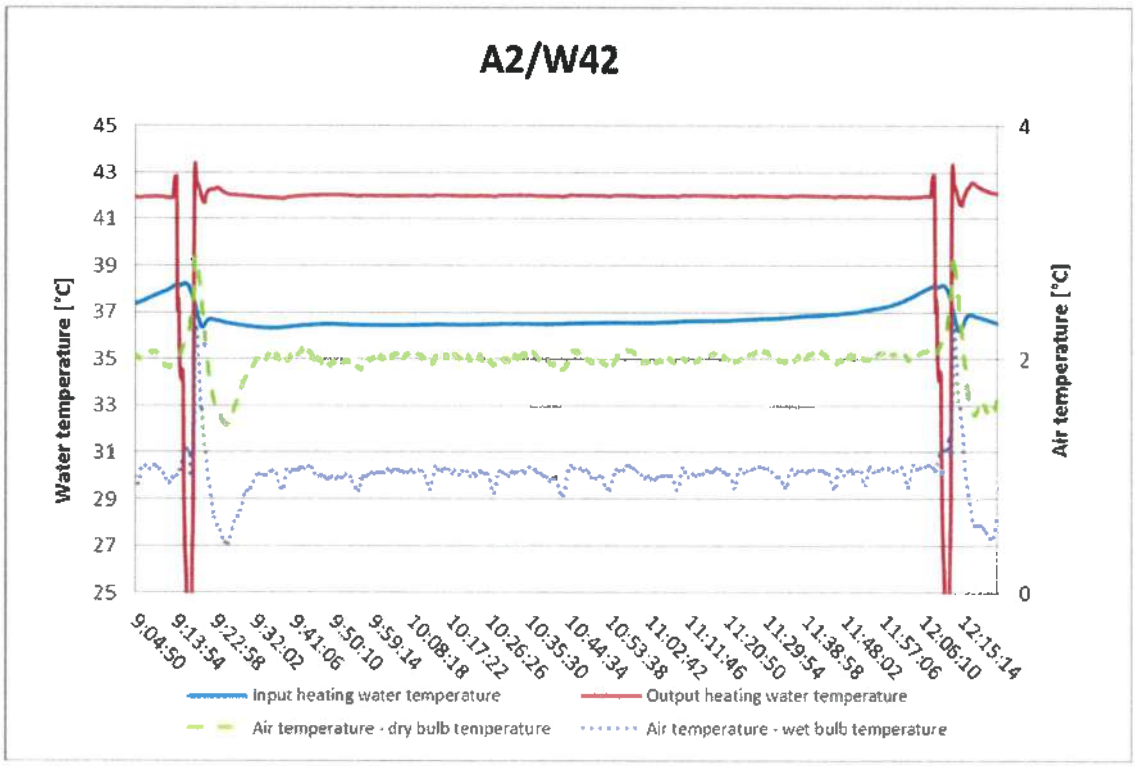


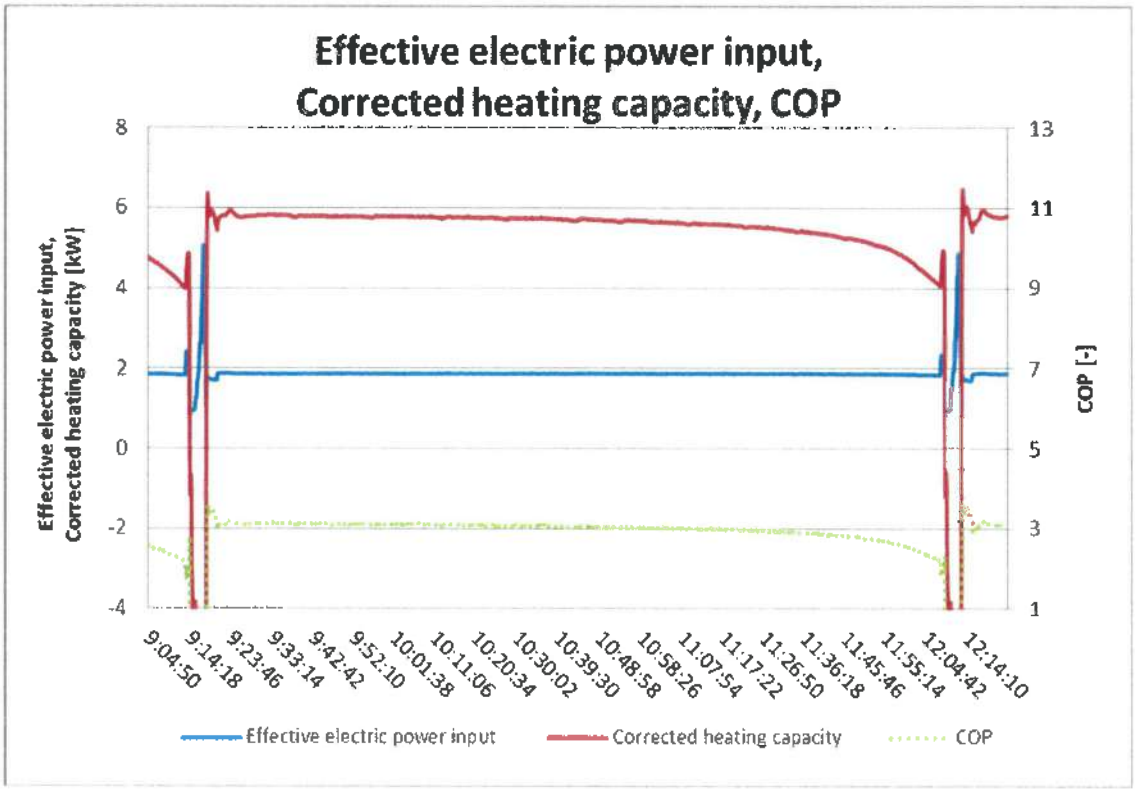
Heat Pump **AWM1501.090.XB12.H00.C11**: A-7/W52 (100 Hz)



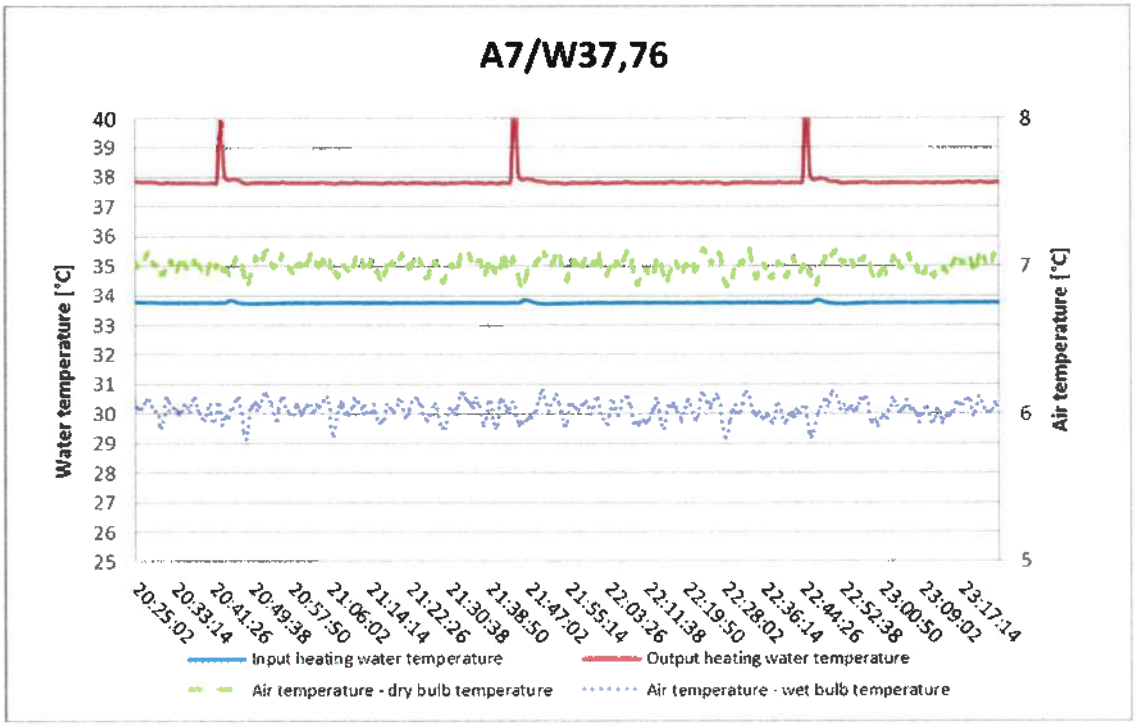


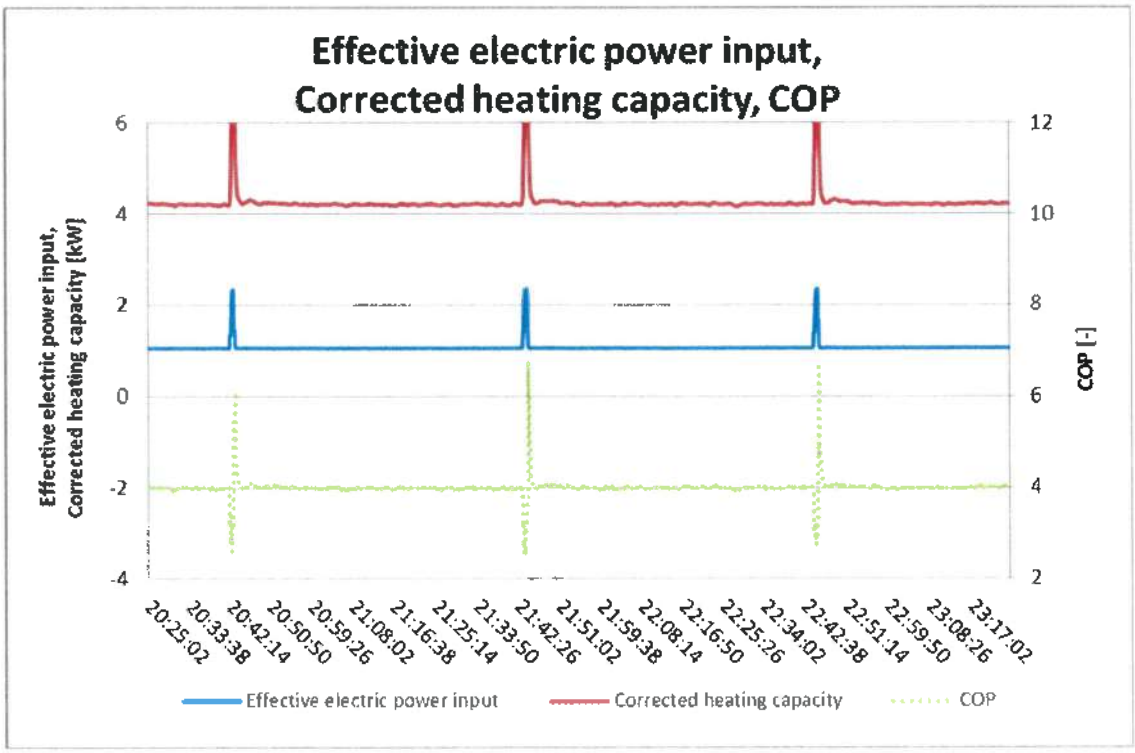
Heat Pump **AWM1501.090.XB12.H00.C11**: A2/W42 (48 Hz)



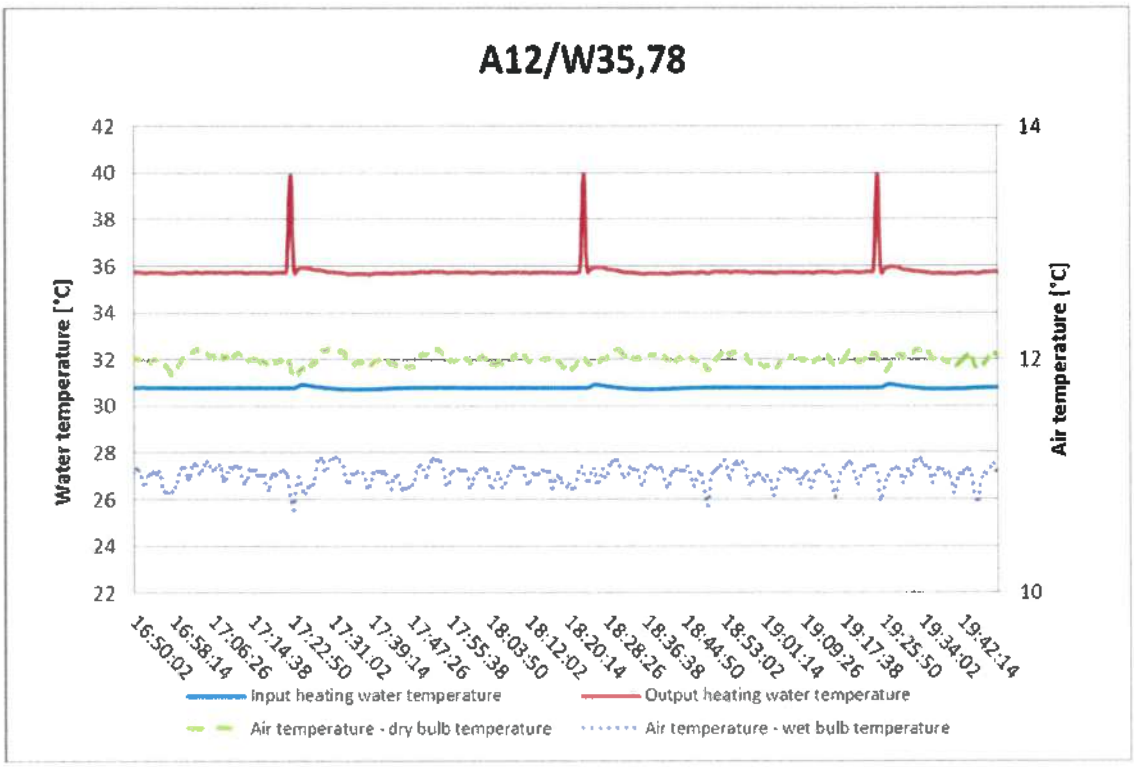


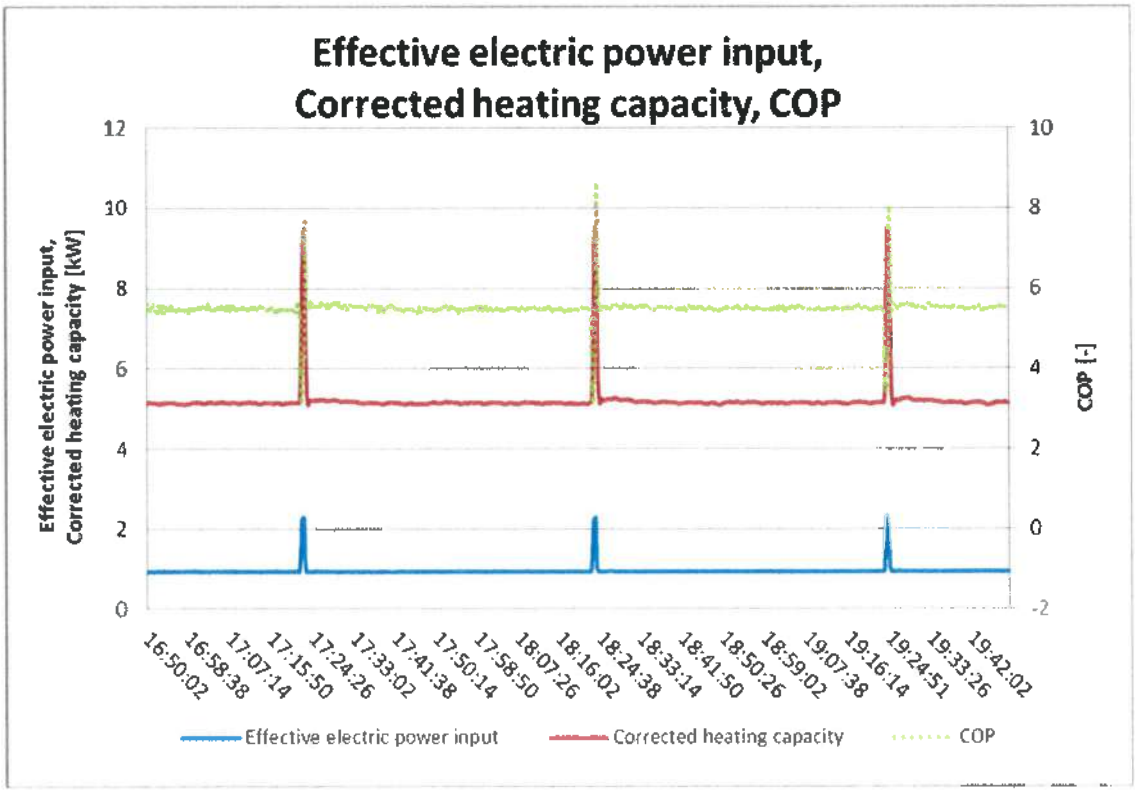
Heat Pump **AWM1501.090.XB12.H00.C11**: A7/W37.76 (100 Hz)



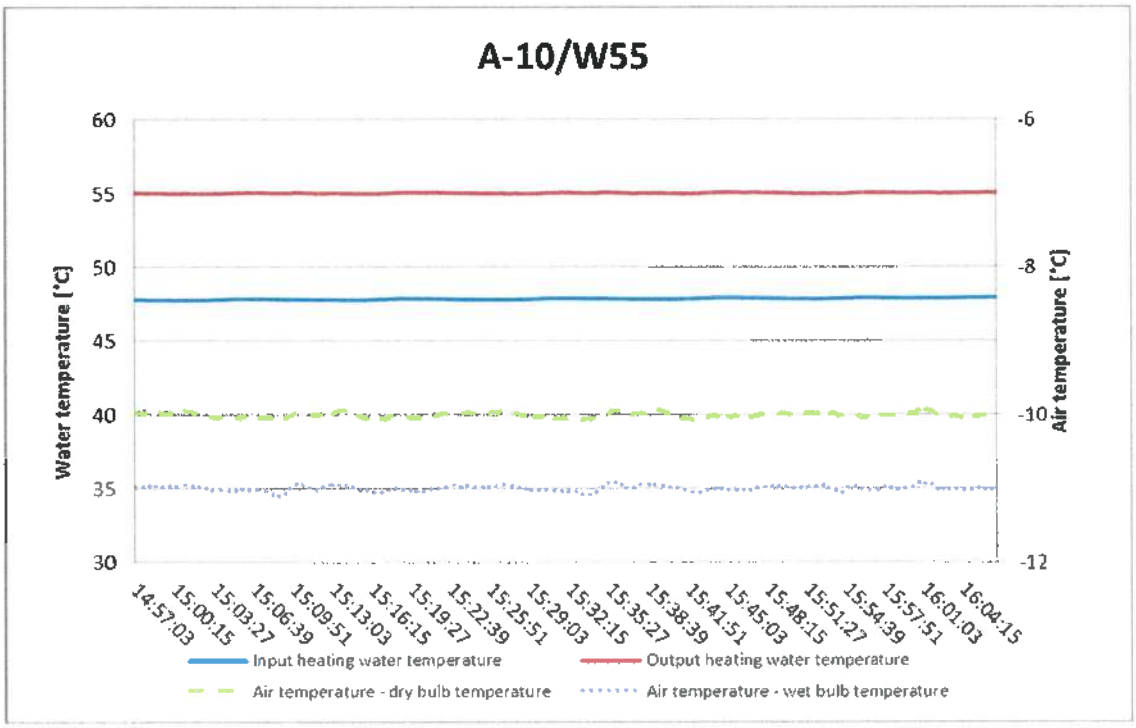


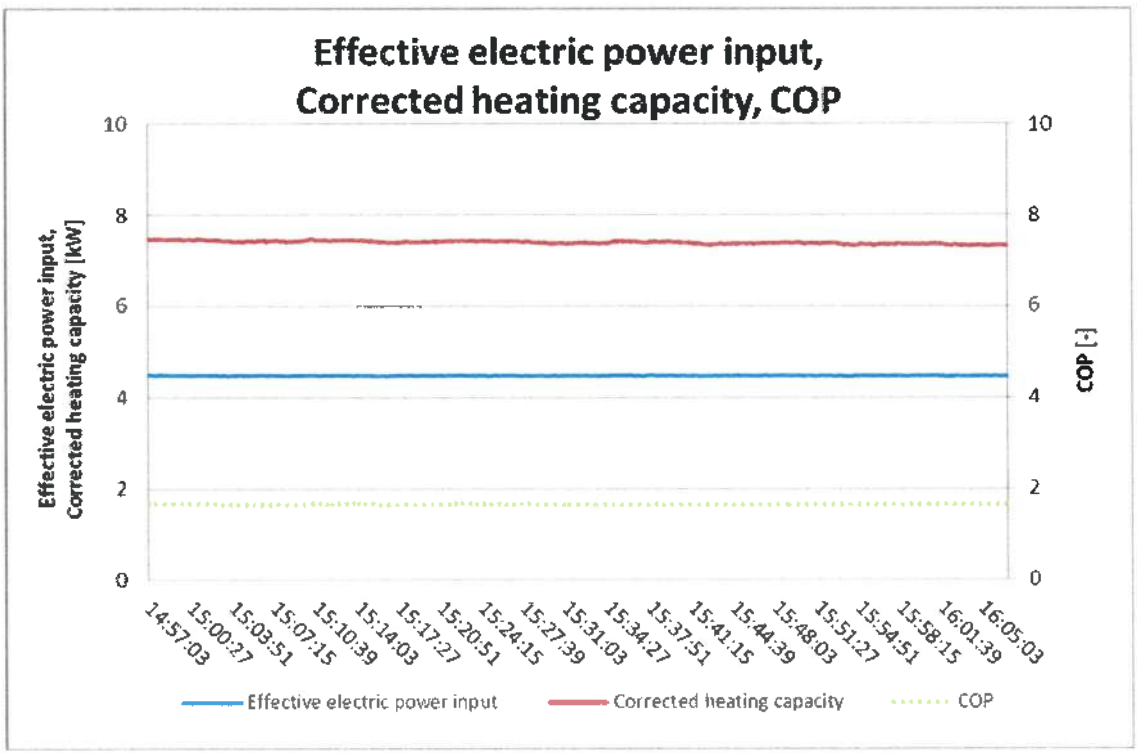
Heat Pump **AWM1501.090.XB12.H00.C11**: A12/W35.78 (30 Hz)



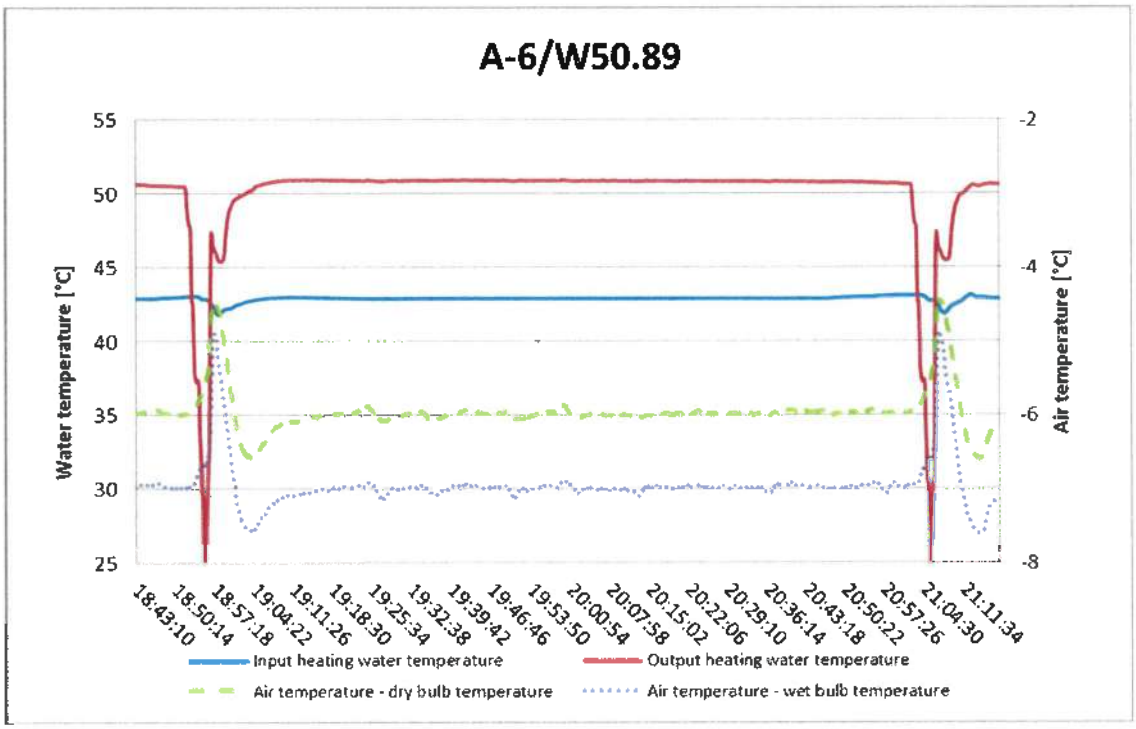


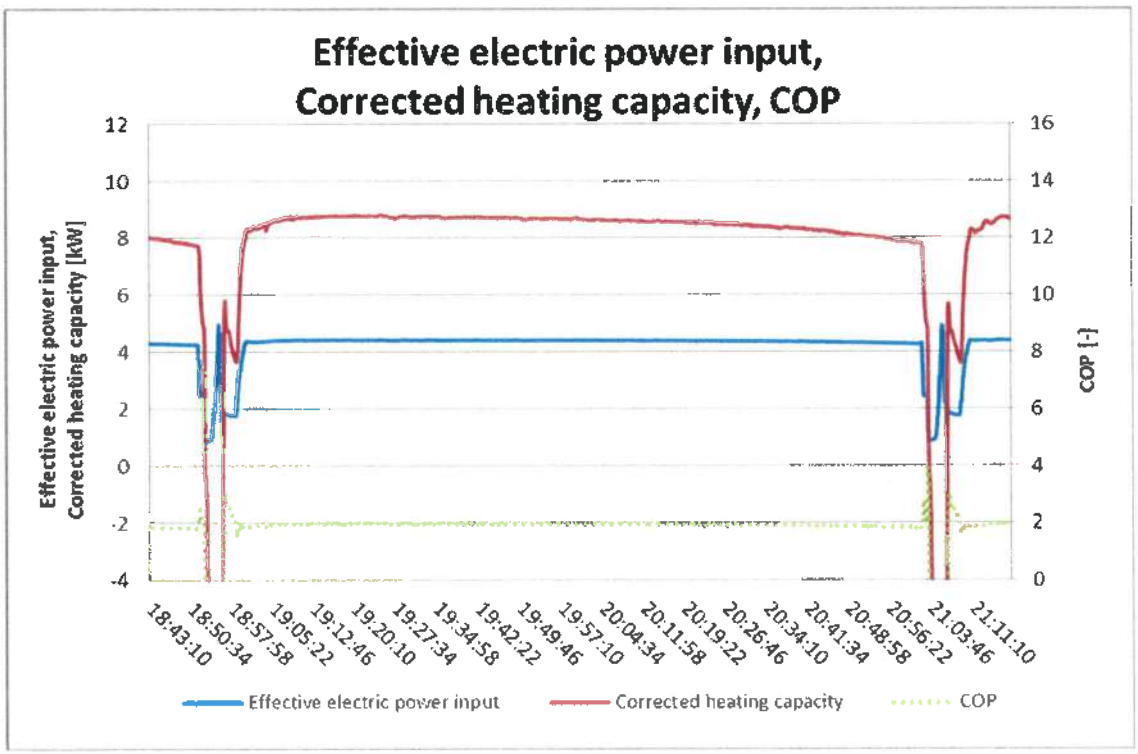
Heat Pump **AWM1501.090.XB12.H00.C11**: A-10/W55 (100 Hz)



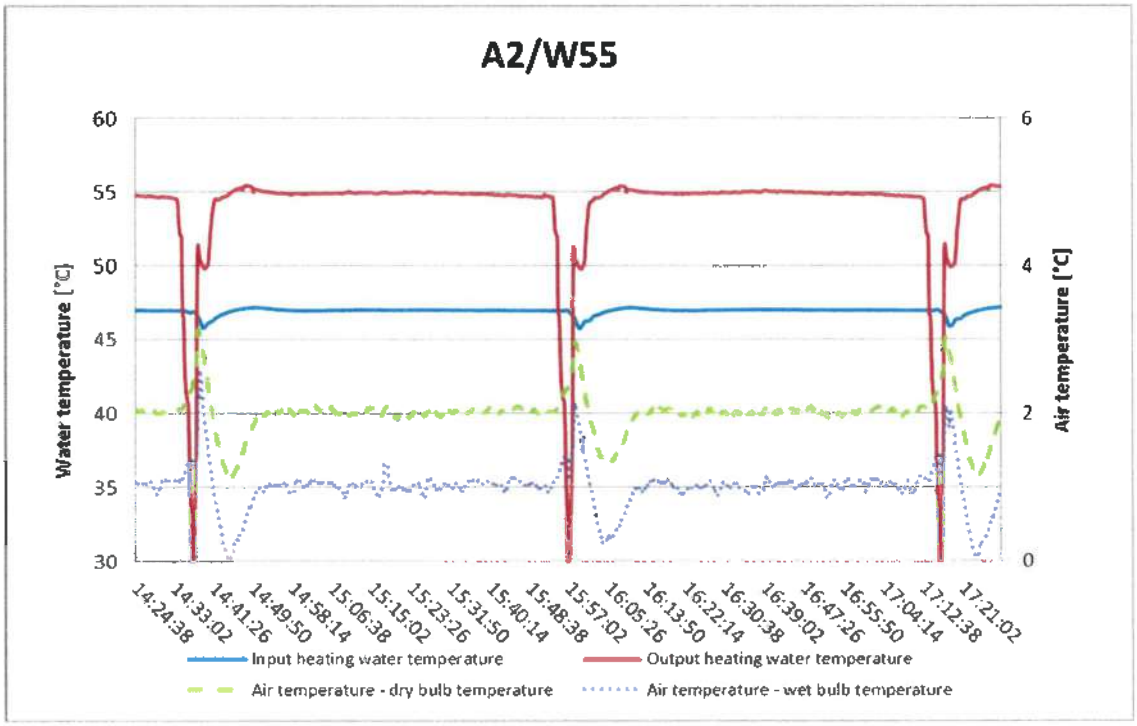


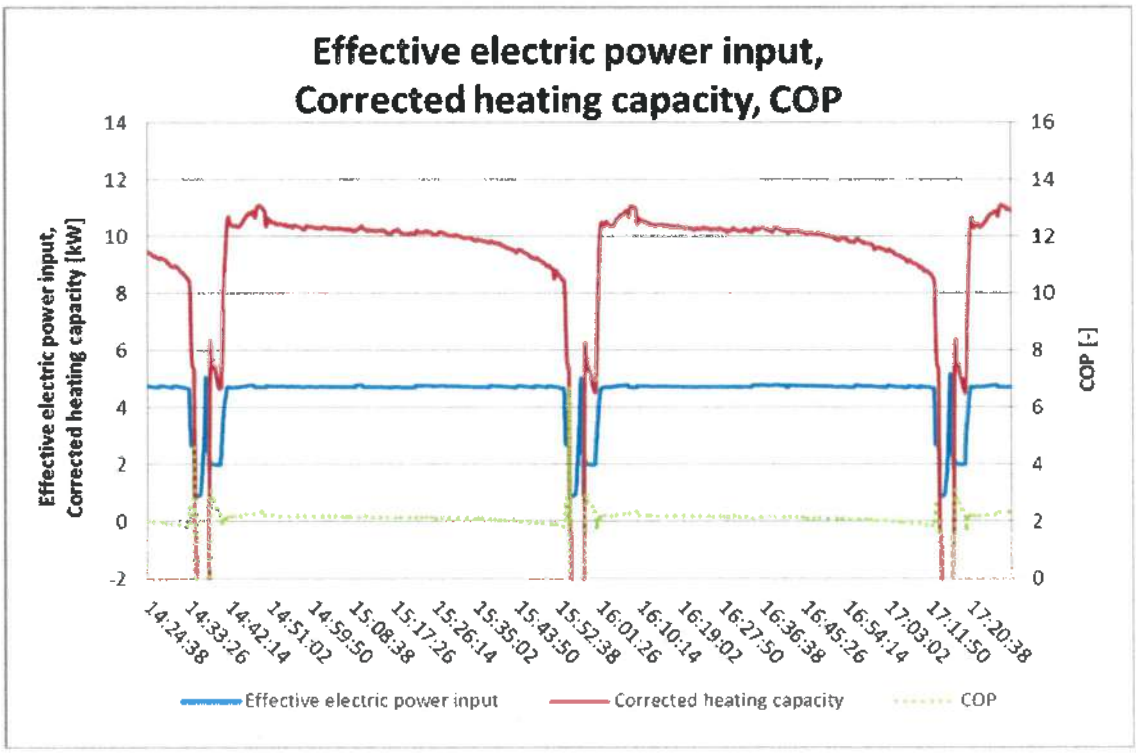
Heat Pump **AWM1501.090.XB12.H00.C11**: A-6/W50.89 (100 Hz)



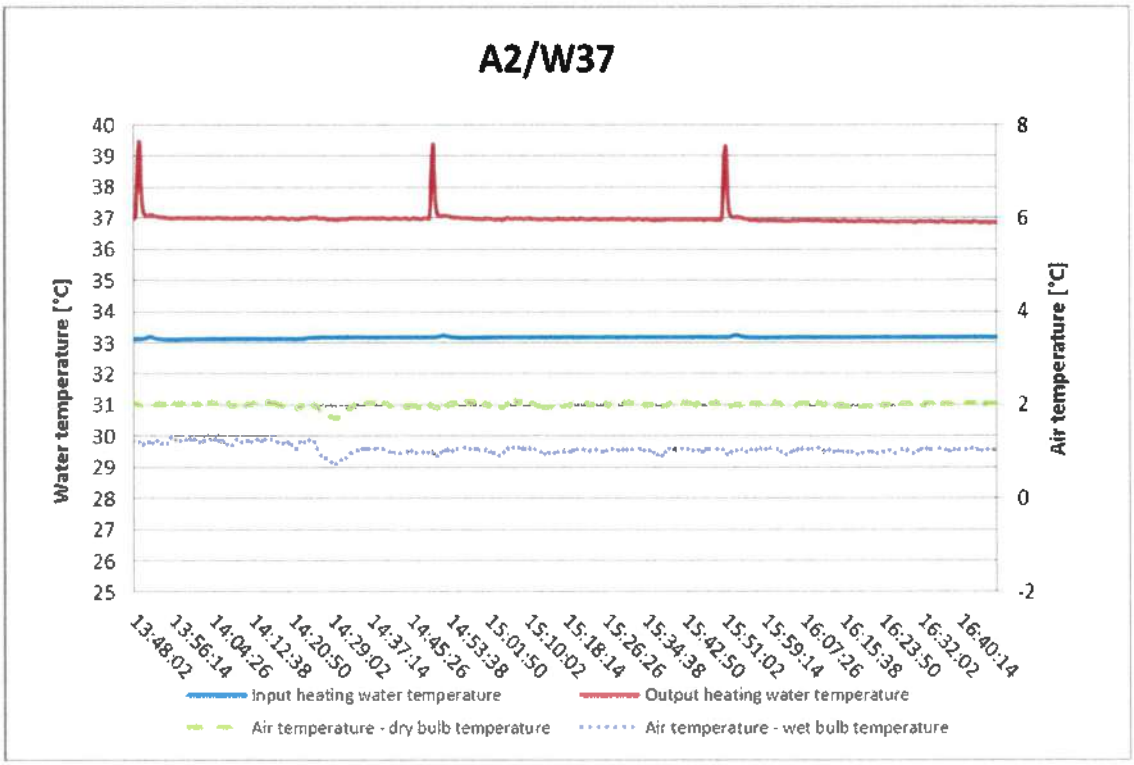


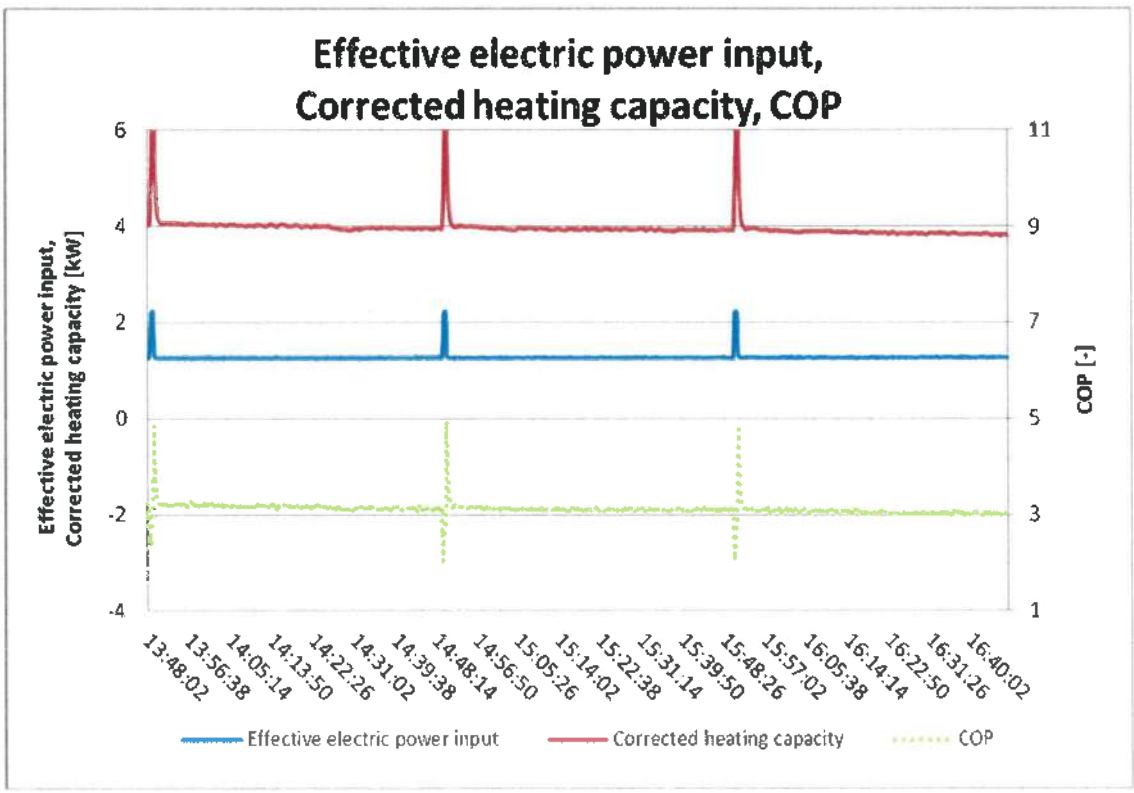
Heat Pump **AWM1501.090.XB12.H00.C11**: A2/W55 (100 Hz)



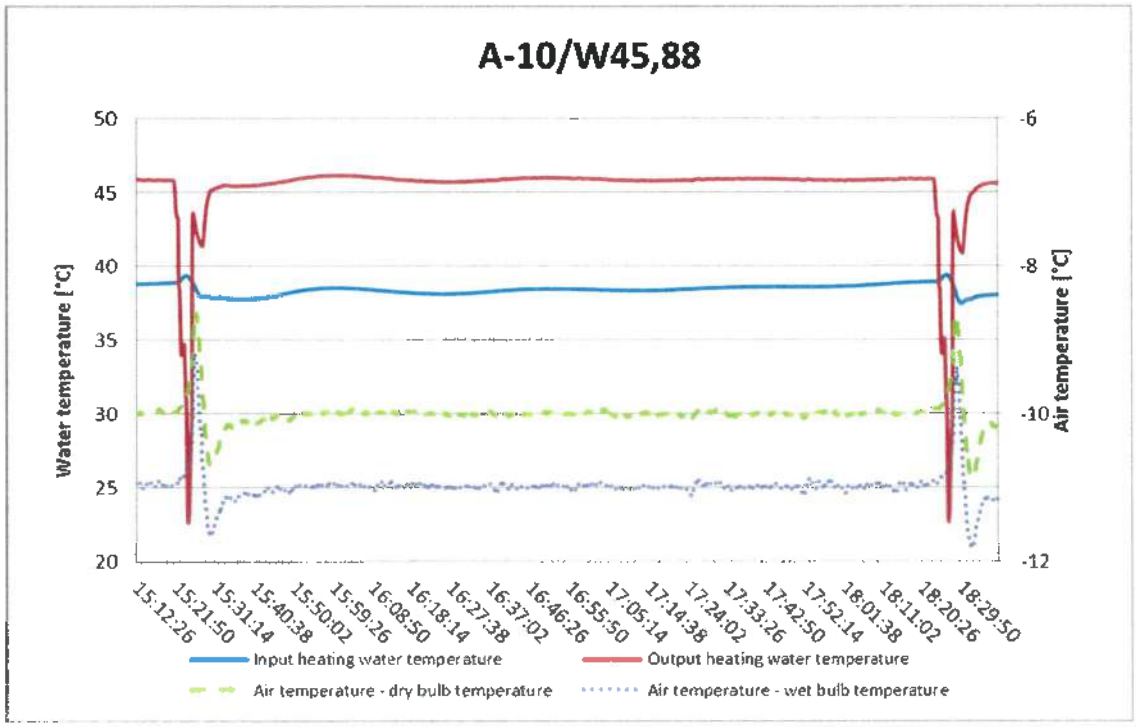


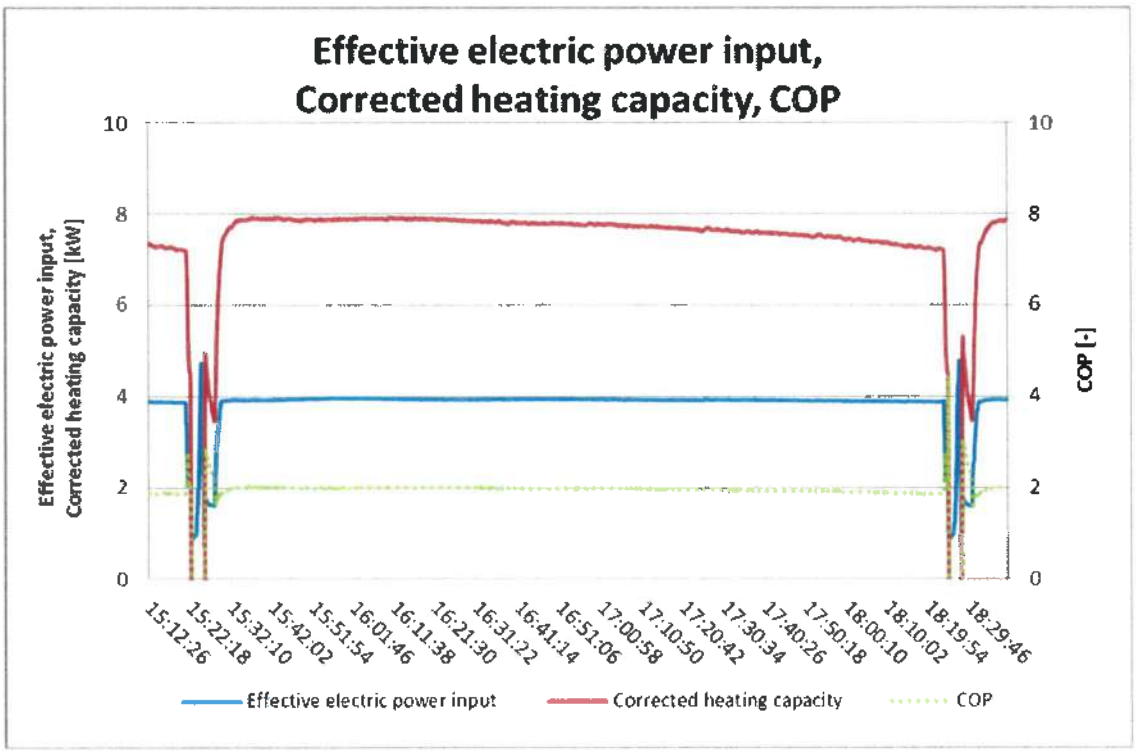
Heat Pump **AWM1501.090.XB12.H00.C11**: A2/W37 (37 Hz)





Heat Pump **AWM1501.090.XB12.H00.C11**: A-10/W45.88 (100 Hz)





VII. A list of referenced documents

- Order of 2021-08-20 (Order reg. no. B-74036, received on 2021-08-31)
- Contract B-74036/31
- Amendments to Contract and changes of implementation date:
  - B-74036.D1 of 2021-11-16
  - B-74036.D2 of 2022-01-03
  - B-74036.D3 of 2022-02-04
  - B-74036.D4 of 2022-03-25
  - B-74036.D5 of 2022-03-31

- ČSN EN 14511-2:2019 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 2: Test conditions
- ČSN EN 14511-3:2019 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling a process chillers with electrically driven compressors - Part 3: Test methods
- ČSN EN 14511-4:2019 - Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 4: Requirements
- ČSN EN 14825:2020 - Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance
- EHPA Testing regulation – Testing of Air/Water Heat Pumps – Version 2.4a
- ČSN EN 12102-1:2018 - Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors - Determination of the sound power level - Part 1: Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers

Test Report compiled by: Ing. Dominik Šedivý

Test Report approved by:

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

– End of Test Report –

TŁUMACZENIE POŚWIADCZONE Z JĘZYKA ANGIELSKIEGO

[Na prośbę Zlecającego, tłumaczeniu podlega jedynie wskazana część dokumentu.]

[strona 1:]

Laboratorium Testujące 1045.1 akredytowane przez Czeski Instytut Akredytujący na podstawie ČSN EN ISO/IEC 17025:2018

Strojírenský zkušební ústav s.p. Zkušební laboratoř

(Instytut Badań Inżynieryjnych, Przedsiębiorstwo Publiczne, Laboratorium Testujące)

Hudcova 424/56b, Mediánky, 621 00 Brno

[dwa znaki graficzne]

SPRAWOZDANIE Z TESTÓW

31-10708/1/T

Produkt:	Zewnętrzna pompa ciepła powietrze/woda – typu split
Oznaczenie typu:	**AWM1501.090.XB12.H00.C11**
Klient:	W&H ELECTRIC POLSKA Sp. z o.o. (Znak towarowy: BeGreen) ul. Biecka 21A 38-300 Gorlice POLSKA
Producent:	W&H ELECTRIC POLSKA Sp. z o.o. (Znak towarowy: BeGreen) ul. Biecka 21A 38-300 Gorlice POLSKA
Odpowiedzialny pracownik:	inż. Mario Jankola
Data wydania sprawozdania:	2022-04-08
Lista dystrybucyjna:	1 egzemplarz dla Klienta 1 egzemplarz dla Instytutu Badań Inżynieryjnych

[strona 8:]

a) **Warunki oceny:**

Wyniki badań: Pompa ciepła **AWM1501.090.XB12.H00.C11**

Numer badania		1	2
Warunek oceny		**Warunki oceny**	
Specyfikacja warunku oceny*		**A7/W35**	**A7/W55**
Data badania		**2022-01-05**	**2022-01-05**
Procedura badania przejściowego	TAK/NIE	NIE	NIE
Średni czas odmrażania 1 cyklu	[min]	--	--
Średni czas 1 cyklu	[min]	--	--
Czas obliczeń	[min]	70,0	70,0
Woda grzewcza wyjściowa - obliczenie temperatury	[°C]	35,06	54,97
Woda grzewcza wejściowa - obliczanie temperatury	[°C]	29,99	46,99
Temperatura wody grzewczej wyjściowej	[°C]	35,06	54,97
Temperatura wody grzewczej wejściowej	[°C]	29,99	46,99
Temperatura powietrza - temperatura suchego termometru	[°C]	7,00	7,00
Temperatura powietrza - temperatura mokrego termometru	[°C]	6,01	6,01
Wilgotność względna	[%]	87,00	87,00
Ciśnienie barometryczne	[kPa]	97,003	97,154
Temperatura otoczenia	[°C]	20,98	20,89
Różnica ciśnień w obwodzie wtórnym	[kPa]	7,385	7,707
Sprawność pompy cieczy wtórnej	[--]	0,161	0,144
Objętościowe natężenie przepływu wody grzewczej	$[m^3 \cdot h^{-1}]$	1,8404	1,1427
Gęstość wody grzewczej	$[kg \cdot m^{-3}]$	993,9	985,8
Właściwa moc cieplna wody grzewczej	$[kJ \cdot kg^{-1} \cdot K^{-1}]$	4,180	4,180
Napięcie	[V]	230,68	230,79
Łącznie prąd	[A]	11,68	17,22
Całkowity pobór mocy	[kW]	2,636	3,890
Korekta mocy pompy cieczy wtórnej	[W]	19,715	14,575
Korekta poboru mocy pompy cieczy wtórnej	[W]	23,49	17,02
Moc grzewcza – woda grzewcza	[kW]	10,746	10,423
Skorygowana moc grzewcza – woda grzewcza	**[kW]**	**10,726**	**10,408**
Niepewność skorygowanej mocy grzewczej	[kW]	± 0,182	± 0,116
Efektywny pobór mocy elektrycznej	**[kW]**	**2,612**	**3,873**
COP	**[--]**	**4,106**	**2,688**
Niepewność COP	[--]	± 0,070	± 0,030
Ustawienia sterowania	**[Hz]**	**70**	**75**
Ustawienia pompy cyrkulacyjnej — woda grzewcza	[%]	59	45

*Komentarz do skróconego oznakowania: np. A7/W35
A (powietrze) 7 (powietrze wejściowe, temperatura suchego termometru w °C) / W (woda), 35 (temperatura wyjściowej wody grzewczej w °C)

VII. Wykaz wymienionych dokumentów

- Zamówienie z dnia 2021-08-20 (Nr zamówienia w rej. B-74036, data otrzymania 2021-08-31)
- Umowa B-74036/31
- Aneksy do Umowy i zmiany daty wdrożenia:
  - B-74036.D1 z dnia 2021-11-16
  - B-74036.D2 z dnia 2022-01-03
  - B-74036.D3 z dnia 2022-02-04
  - B-74036.D4 z dnia 2022-03-25
  - B-74036.D5 z dnia 2022-03-31

- ČSN EN ISO 14511-2:2019 - Klimatyzatory, ziębiarki cieczy i pompy ciepła do ogrzewania i chłodzenia oraz ziębiarki do procesów przemysłowych, ze sprężarkami o napędzie elektrycznym - Część 2: Warunki badania
- ČSN EN ISO 14511-3:2019 - Klimatyzatory, ziębiarki cieczy i pompy ciepła do ogrzewania i chłodzenia oraz ziębiarki do procesów przemysłowych, ze sprężarkami o napędzie elektrycznym - Część 3: Metody badania
- ČSN EN ISO 14511-4:2019 - Klimatyzatory, ziębiarki cieczy i pompy ciepła do ogrzewania i chłodzenia oraz ziębiarki do procesów przemysłowych, ze sprężarkami o napędzie elektrycznym - Część 4: Wymagania
- ČSN EN ISO 14825-2:2020 - Klimatyzatory, ziębiarki cieczy i pompy ciepła, ze sprężarkami o napędzie elektrycznym, do ogrzewania i chłodzenia – Testowanie i ocena w warunkach częściowo obciążonych i obliczenie efektywności sezonowej
- Rozporządzenie dotyczące testowania EHPA – Testowanie pomp ciepła powietrze/woda – Wersja 2.4a
- ČSN EN ISO 12102-1:2018 - Klimatyzatory, ziębiarki cieczy, pompy ciepła, ziębiarki do procesów przemysłowych i osuszacze z elektrycznie napędzanymi sprężarkami – Ustalenie gwarantowanego poziomu mocy akustycznej - Część 1: Klimatyzatory, ziębiarki cieczy, pompy ciepła do ogrzewania i chłodzenia, osuszacze i ziębiarki do procesów przemysłowych

Sprawozdanie z badań sporządził/a: inż. Dominik Šedivý

Sprawozdanie z badań zatwierdził/a:

[odręczny podpis]
Milan Holomek
Kierownik ds. Sprzętu Grzewczego i Przyjaznego Środowisku Stacja Badawcza

[okrągła, czerwona pieczęć o treści:] Akredytowane Laboratorium Badawcze Nr 1045.1 STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV s.p.

- Koniec Sprawozdania z Badań -

SP-2021-000012_1_2_Protokol_ZL_2022_AKR_EN

Niniejszym poświadczam zgodność powyższego tłumaczenia ze skanem dokumentu w języku angielskim.
Magdalena Sezgin, tłumacz przysięgły języka angielskiego, wpisana na listę tłumaczy przysięgłych, prowadzoną przez Ministra Sprawiedliwości pod numerem TP/30/17.
Nr Repertorium 317/2024.
Katowice, dnia 29 marca 2024 r.

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

TEST CERTIFICATE

Number **O-B-00653-22 rev.2**

Customer	W&H ELECTRIC POLSKA Sp. z.o.o. (Trade Mark: BeGreen) ul. Biecka 21A 38-300 Gorlice POLAND
Product	Outdoor Air/water heat pump – split
Type designation / Trade mark	**AWM1501.060.XB08.H00.C11** **AWM1001.060.XB08.H00.C11** **AWM1501.060.XB10.H00.C11** **AWM1001.060.XB10.H00.C11** **AWM1501.090.XB12.H00.C11** **AWM1001.090.XB12.H00.C11** **AWM1501.090.XB14.H00.C13** **AWM1001.090.XB14.H00.C13** **AWM1501.090.XB17.H00.C13** **AWM1001.090.XB17.H00.C13**
Test methods	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14511-4:2019, ČSN EN 12102-1:2018, EHPA Testing regulation – Testing of Air/Water Heat Pumps, version 2.4a
Basis of certificate	Test reports: 31-10708/1/T of 2022-04-08, 31-10708/2/T of 2022-04-08 31-10708/1/H of 2022-03-28, 31-10708/2/H of 2022-03-28 Technical documents of W&H ELECTRIC POLSKA Sp. z.o.o. (Trade Mark: BeGreen) Declaration of difference of 2022-09-15
Temperature application	**LOW TEMPERATURE,** (Reference water temperature 35 °C) **MEDIUM TEMPERATURE** (Reference water temperature 55 °C)

Specification of conditions:

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

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:

Model names			**AWM1501.060.XB08.H00.C11**	**AWM1501.060.XB10.H00.C11**	**AWM1501.090.XB12.H00.C11**	**AWM1501.090.XB14.H00.C13**	**AWM1501.090.XB17.H00.C13**
			AWM1001.060.XB08.H00.C11	**AWM1001.060.XB10.H00.C11**	**AWM1001.090.XB12.H00.C11**	**AWM1001.090.XB14.H00.C13.**	**AWM1001.090.XB17.H00.C13**
Outdoor units			OU.H.071.A11	OU.H.090.A11	OU.H.105.A11	OU.H.125.A13	OU.H.160.A13
Indoor units			IU.AWM1501.060.XB10.H00	IU.AWM1501.060.XB10.H00	IU.AWM1501.090.XB12.H00	IU.AWM1501.090.XB17.H00	IU.AWM1501.090.XB17.H00
			IU.AWM1001.060.XB10.H00	IU.AWM1001.060.XB10.H00	IU.AWM1001.090.XB12.H00	IU.AWM1001.090.XB17.H00	IU.AWM1001.090.XB17.H00
Temperature condition*			(Not tested)	(Not tested)	(Tested)	(Not tested)	(Tested)
A7/W35	Corrected heat capacity	[kW]	6.527	7.730	10.726	11.130	13.193
	Effective power input	[kW]	1.580	1.881	2.612	2.619	3.279
	Coefficient of performance	[–]	4.131	4.110	4.106	4.250	4.023
	Control settings	[rps]	58	68	70	58	55
A7/W55	Corrected heat capacity	[kW]	6.210	7.280	10.408	9.100	10.165
	Effective power input	[kW]	2.556	3.021	3.872	4.155	4.993
	Coefficient of performance	[–]	2.430	2.410	2.688	2.190	2.036
	Control settings	[rps]	65	75	75	65	65
Sound power level at condition A7/W55*:							
L_{WA}	Indoor unit	[dB(A)]	32.8 ± 1.5	32.8 ± 1.5	32.8 ± 1.5	41.3 ± 1.5	41.3 ± 1.5
	Outdoor unit	[dB(A)]	61.1 ± 1.5	61.1 ± 1.5	61.1 ± 1.5	70.8 ± 1.5	70.8 ± 1.5
Accuracy class	Indoor unit				Engineering (2)		
	Outdoor unit				Engineering (2)		

(*) Comment to abbreviated marking e.g. A7W35:

„A" air, „7" inlet temperature (dry-bulb temperature) in °C, „W" water, „35" outlet 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, 2022-09-30

Milan Holomek

Head of Heat and Environment-Friendly Equipment Test Station

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

– 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

TŁUMACZENIE POŚWIADCZONE Z JĘZYKA ANGIELSKIEGO

[logo i tekst w j. obcym]
Instytut Badań Inżynierskich, Przedsiębiorstwo Państwowe, Brno, Republika Czeska

CERTYFIKAT Z TESTÓW
Numer **O-B-00653-22 wer. 2**

Klient	W&H ELECTRIC POLSKA Sp. z o.o. (Znak towarowy: BeGreen) ul. Biecka 21A 38-300 Gorlice POLSKA
Produkt	Zewnętrzna pompa ciepła powietrze/woda – typu split
Oznaczenie typu / Znak towarowy	**AWM1501.060.XB08.H00.C11, AWM1001.060.XB08.H00.C11** **AWM1501.060.XB10.H00.C11, AWM1001.060.XB10.H00.C11** **AWM1501.090.XB12.H00.C11, AWM1001.090.XB12.H00.C11** **AWM1501.090.XB14.H00.C13, AWM1001.090.XB14.H00.C13** **AWM1501.090.XB17.H00.C13, AWM1001.090.XB17.H00.C13**
Metody testu	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14511-4:2019, ČSN EN 12102-1:2018, Rozporządzenie dotyczące testów EHPA – Testowanie pomp ciepła powietrze/woda, wersja 2.4a
Podstawa wydania certyfikatu	Raporty z badania: 31-10708/1/T z dnia 2022-04-08, 31-10708/2/T z dnia 2022-04-08 31-10708/1/H z dnia 2022-03-28, 31-10708/2/H z dnia 2022-03-28 Dokumenty techniczne W&H ELECTRIC POLSKA Sp. z o.o. (Znak towarowy: BeGreen) Deklaracja różnicy z dnia 2022-09-15
Zastosowanie temperatury	**NISKA TEMPERATURA** (Referencyjna temperatura wody 35 °C) **ŚREDNIA TEMPERATURA** (Referencyjna temperatura wody 55 °C)

Specyfikacja warunków:

Kontrola prędkości kompresora	**Zmienna**	Przepustowość wody grzewczej (wewnętrzny wymiennik ciepła)	**Zmienna**
Temperatura wody wylotowej (wewnętrzny wymiennik ciepła)	**Zmienna**	Przepustowość źródłowego płynu (zewnętrzny wymiennik ciepła)	-
Funkcja	**Odwracalna**		

[czerwona, okrągła pieczęć o treści:] STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

[tekst w j. obcym]
Instytut Badań Inżynierskich, przedsiębiorstwo państwowe, Hudcova 424/56b, 621 00 Brno, Republika Czeska
www.szutest.cz
[okrągły hologram]

[logo]

Wyniki:

Nazwy modeli			**AWM1501. 060.XB08. H00.C11** **AWM1001. 060.XB08. H00.C11**	**AWM1501. 060.XB10. H00.C11** **AWM1001. 060.XB10. H00.C11**	**AWM1501. 090.XB12. H00.C11** **AWM1001. 090.XB12. H00.C11**	**AWM1501. 090.XB14. H00.C13** **AWM1001. 090.XB14. H00.C13**	**AWM1501. 090.XB17. H00.C13** **AWM1001. 090.XB17. H00.C13**
Jednostki zewnętrzne			OU.H.071.A11	OU.H.090.A11	OU.H.105.A11	OU.H.125.A13	OU.H.160.A13
Jednostki wewnętrzne			IU.AWM1501.0 60.XB10.H00 IU.AWM1001.0 60.XB10.H00	IU.AWM1501.0 60.XB10.H00 IU.AWM1001.0 60.XB10.H00	IU.AWM1501.0 90.XB12.H00 IU.AWM1001.0 90.XB12.H00	IU.AWM1501.0 90.XB17.H00 IU.AWM1001.0 90.XB17.H00	IU.AWM1501.0 90.XB17. H00 IU.AWM1001.0 90.XB17.H00
Warunki temperaturowe*			(Nie zbadane)	(Nie zbadane)	(Zbadane)	(Nie zbadane)	(Zbadane)
A7/W35	Skorygowana moc cieplna	[kW]	6,527	7,730	10,726	11,130	13,193
	Efektywny pobór mocy	[kW]	1,580	1,881	2,612	2,619	3,279
	Współczynnik efektywności	[-]	4,131	4,110	4,106	4,250	4,023
	Ustawienia sterowania	[rps]	58	68	70	58	55
A7/W55	Skorygowana moc cieplna	[kW]	6,210	7,280	10,408	9,100	10,165
	Efektywny pobór mocy	[kW]	2,556	3,021	3,872	4,155	4,993
	Współczynnik efektywności	[-]	2,430	2,410	2,688	2,190	2,036
	Ustawienia sterowania	[rps]	65	75	75	65	65
			Poziom mocy akustycznej w warunkach A7/W55*:				
L_{WA}	Jednostka wewnętrzna	[dB(A)]	32,8 ± 1,5	32,8 ± 1,5	32,8 ± 1,5	41,3 ± 1,5	41,3 ± 1,5
	Jednostka zewnętrzna	[dB(A)]	61,1 ± 1,5	61,1 ± 1,5	61,1 ± 1,5	70,8 ± 1,5	70,8 ± 1,5
Klasa dokładności	Jednostka wewnętrzna				Inżynieria (2)		
	Jednostka zewnętrzna				Inżynieria (2)		

(*) Uwaga do skróconego znaku, np. A7W35:
„A" powietrze, „7" temperatura wlotowa (temperatura suchego termometru) w °C, „W" woda, „35" temperatura wylotowa w °C.

(Zbadane) Próbka testowa została przetestowana w Laboratorium Badawczym.
(Nie zbadane) Dane techniczne zostały zadeklarowane przez Producenta zgodnie ze specyfikacją zakresu modelu i nie zostały zbadane przez Laboratorium Badawcze.
Inżynierski Instytut Badawczy, Przedsiębiorstwo Publiczne, potwierdza niniejszym Certyfikatem z Testów, że badanie danego produktu zostało przeprowadzone z wynikami podanymi powyżej. Instytut Badań Inżynierskich, Przedsiębiorstwo Publiczne, jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-09-30

[odręczny podpis]
Milan Holomek
Kierownik Stacji Testów Sprzętu grzewczego i przyjaznego środowisku

[czerwona, okrągła pieczęć o treści:]
STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

- KONIEC CERTYFIKATU Z TESTÓW -

[tekst w j. obcym]
Instytut Badań Inżynierskich, przedsiębiorstwo państwowe, Hudcova 424/56b, 621 00 Brno, Republika Czeska
www.szutest.cz

Niniejszym poświadczam zgodność powyższego tłumaczenia ze skanem dokumentu w języku angielskim.
Magdalena Sezgin, tłumacz przysięgły języka angielskiego, wpisana na listę tłumaczy przysięgłych, prowadzoną przez Ministra Sprawiedliwości pod numerem TP/30/17.
Nr Repertorium 403/2024
Katowice, dnia 18 kwietnia 2024 r.

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

TEST CERTIFICATE

Number **O-B-00655-22 rev.2**

Customer	W&H ELECTRIC POLSKA Sp. z.o.o. (Trade Mark: BeGreen) ul. Biecka 21A 38-300 Gorlice POLAND
Product	Outdoor Air/water heat pump – split
Type designation / Trade mark	**AWM1501.060.XB08.H00.C11** **AWM1001.060.XB08.H00.C11** **AWM1501.060.XB10.H00.C11** **AWM1001.060.XB10.H00.C11** **AWM1501.090.XB12.H00.C11** **AWM1001.090.XB12.H00.C11** **AWM1501.090.XB14.H00.C13** **AWM1001.090.XB14.H00.C13** **AWM1501.090.XB17.H00.C13** **AWM1001.090.XB17.H00.C13**
Test methods	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14825:2020, EHPA Testing regulation – Testing of Air/Water Heat Pumps, version 2.4a
Basis of certificate	Test reports: 31-10708/1/T of 2022-04-08 31-10708/2/T of 2022-04-08 Technical documents of W&H ELECTRIC POLSKA Sp. z.o.o. (Trade Mark: BeGreen) Declaration of difference of 2022-09-15
Temperature application	**MEDIUM TEMPERATURE** (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	**Variable**	Heating water volume flow rate (indoor heat exchanger)	**Variable**
Outlet water temperature (indoor heat exchanger)	**Variable**	Source liquid volume flow rate (outdoor heat exchanger)	**–**
Function	**Reversible**		

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ

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			**AWM1501.060.XB08.H00.C11**	**AWM1501.060.XB10.H00.C11**	**AWM1501.090.XB12.H00.C11**	**AWM1501.090.XB14.H00.C13**	**AWM1501.090.XB17.H00.C13**
			AWM1001.060.XB08.H00.C11	**AWM1001.060.XB10.H00.C11**	**AWM1001.090.XB12.H00.C11**	**AWM1001.090.XB14.H00.C13.**	**AWM1001.090.XB17.H00.C13**
Outdoor units			OU.H.071.A11	OU.H.090.A11	OU.H.105.A11	OU.H.125.A13	OU.H.160.A13
Indoor units			IU.AWM1501.060.XB10.H00	IU.AWM1501.060.XB10.H00	IU.AWM1501.090.XB12.H00	IU.AWM1501.090.XB17.H00	IU.AWM1501.090.XB17.H00
			IU.AWM1001.060.XB10.H00 (Not tested)	IU.AWM1001.060.XB10.H00 (Not tested)	IU.AWM1001.090.XB12.H00 (Tested)	IU.AWM1001.090.XB17.H00 (Not tested)	IU.AWM1001.090.XB17.H00 (Tested)
Full load heating	$P_{designh}$ [kW]	A	5.48	5.95	8.78	11.08	12.35
		W	6.98	6.98	9.02	12.83	12.83
		C	6.18	6.59	10.71	13.46	14.01
Bivalent temperature	$T_{bivalent}$ [°C]	A	-8	-7	-6	-8	-7
		W	2	2	2	2	2
		C	-12	-11	-10	-12	-11
Seasonal coefficient of performance	SCOP [–]	A	3.21	3.21	2.92	3.21	3.01
		W	3.37	3.37	3.38	3.53	3.53
		C	2.54	2.43	2.63	2.77	2.70
Seasonal Space heating energy efficiency	η_s [%]	A	125.5	125.2	113.6	125.3	117.4
		W	131.9	131.9	132.3	138.2	138.2
		C	98.7	94.1	102.3	107.8	104.9

(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, 2022-09-30

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

TŁUMACZENIE POŚWIADCZONE Z JĘZYKA ANGIELSKIEGO

[logo i tekst w j. obcym]
Instytut Badań Inżynierskich, Przedsiębiorstwo Państwowe, Brno, Republika Czeska

CERTYFIKAT Z TESTÓW
Numer **O-B-00655-22 wer. 2**

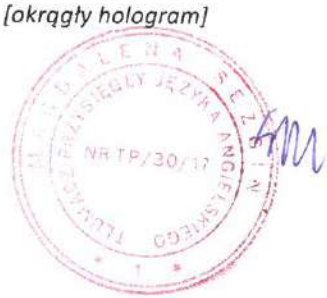
Klient	W&H ELECTRIC POLSKA Sp. z o.o. (Znak towarowy: BeGreen) ul. Biecka 21A 38-300 Gorlice POLSKA
Produkt	Zewnętrzna pompa ciepła powietrze/woda – typu split
Oznaczenie typu / Znak towarowy	**AWM1501.060.XB08.H00.C11** **AWM1001.060.XB08.H00.C11** **AWM1501.060.XB10.H00.C11** **AWM1001.060.XB10.H00.C11** **AWM1501.090.XB12.H00.C11** **AWM1001.090.XB12.H00.C11** **AWM1501.090.XB14.H00.C13** **AWM1001.090.XB14.H00.C13** **AWM1501.090.XB17.H00.C13** **AWM1001.090.XB17.H00.C13**
Metody testu	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14825:2020, Rozporządzenie dotyczące testów EHPA – Testowanie pomp ciepła powietrze/woda, wersja 2.4a
Podstawa wydania certyfikatu	Raporty z badania: 31-10708/1/T z dnia 2022-04-08 31-10708/2/T z dnia 2022-04-08 Dokumenty techniczne W&H ELECTRIC POLSKA Sp. z o.o. (Znak towarowy: BeGreen) Deklaracja różnicy z dnia 2022-09-15
Zastosowanie temperatury	**ŚREDNIA TEMPERATURA** (Referencyjna temperatura wody 55 °C)
Referencyjny sezon grzewczy	**„A" = średni / „W" = cieplejszy / „C" = zimniejszy** (Referencyjne warunki projektu dla ogrzewania $T_{designh}$ = -10 °C / +2 °C / -22 °C)

Specyfikacja warunków:

Kontrola prędkości kompresora	**Zmienna**	Przepustowość wody grzewczej (wewnętrzny wymiennik ciepła)	**Zmienna**
Temperatura wody wylotowej (wewnętrzny wymiennik ciepła)	**Zmienna**	Przepustowość źródłowego płynu (zewnętrzny wymiennik ciepła)	-
Funkcja	**Odwracalna**		

[czerwona, okrągła pieczęć o treści:] STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

[tekst w j. obcym]
Instytut Badań Inżynierskich, przedsiębiorstwo państwowe, Hudcova 424/56b, 621 00 Brno, Republika Czeska
www.szutest.cz
[okrągły hologram]



[logo]

Wyniki:

Zastosowanie średniej temperatury
(Referencyjna temperatura wody 55 °C)

Nazwy modeli			**AWM1501.060.XB08.H00.C11** **AWM1001.060.XB08.H00.C11**	**AWM1501.060.XB10.H00.C11** **AWM1001.060.XB10.H00.C11**	**AWM1501.090.XB12.H00.C11** **AWM1001.090.XB12.H00.C11**	**AWM1501.090.XB14.H00.C13** **AWM1001.090.XB14.H00.C13**	**AWM1501.090.XB17.H00.C13** **AWM1001.090.XB17.H00.C13**
Jednostki zewnętrzne			OU.H.071.A11	OU.H.090.A11	OU.H.105.A11	OU.H.125.A13	OU.H.160.A13
Jednostki wewnętrzne			IU.AWM1501.0 60.XB10.H00 IU.AWM1001.0 60.XB10.H00	IU.AWM1501.0 60.XB10.H00 IU.AWM1001.0 60.XB10.H00	IU.AWM1501.0 90.XB12.H00 IU.AWM1001.0 90.XB12.H00	IU.AWM1501.0 90.XB17.H00 IU.AWM1001.0 90.XB17.H00	IU.AWM1501.0 90.XB17. H00 IU.AWM1001.0 90.XB17.H00
			(Nie zbadane)	(Nie zbadane)	(Zbadane)	(Nie zbadane)	(Zbadane)
Ogrzewanie przy pełnym obciążeniu	$P_{designh}$ [kW]	A	5,48	5,95	8,78	11,08	12,35
		W	6,98	6,98	9,02	12,83	12,83
		C	6,18	6,59	10,71	13,46	14,01
Temperatura biwalentna	$T_{bivalent}$ [°C]	A	-8	-7	-6	-8	-7
		W	2	2	2	2	2
		C	-12	-11	-10	-12	-11
Sezonowy współczynnik wydajności	SCOP [-]	A	3,21	3,21	2,92	3,21	3,01
		W	3,37	3,37	3,38	3,53	3,53
		C	2,54	2,43	2,63	2,77	2,70
Sezonowy współczynnik energii grzewczej Przestrzeni	η_s [%]	A	125,5	125,2	113,6	125,3	117,4
		W	131,9	131,9	132,3	138,2	138,2
		C	98,7	94,1	102,3	107,8	104,9

(Zbadane) Próbka testowa została przetestowana w Laboratorium Badawczym.
(Nie zbadane) Dane techniczne zostały zadeklarowane przez Producenta zgodnie ze specyfikacją zakresu modelu i nie zostały zbadane przez Laboratorium Badawcze.
Inżynierski Instytut Badawczy, Przedsiębiorstwo Publiczne, potwierdza niniejszym Certyfikatem z Testów, że badanie danego produktu zostało przeprowadzone z wynikami podanymi powyżej. Instytut Badań Inżynierskich, Przedsiębiorstwo Publiczne, jest akredytowanym Laboratorium Badawczym 1045.1.

Brno, 2022-09-30

[odręczny podpis]
Milan Holomek
Kierownik Stacji Testów Sprzętu grzewczego i przyjaznego środowisku

[czerwona, okrągła pieczęć o treści:]
STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

- KONIEC CERTYFIKATU Z TESTÓW -

[tekst w j. obcym]
Instytut Badań Inżynierskich, przedsiębiorstwo państwowe, Hudcova 424/56b, 621 00 Brno, Republika Czeska
www.szutest.cz

Niniejszym poświadczam zgodność powyższego tłumaczenia ze skanem dokumentu w języku angielskim.
Magdalena Sezgin, tłumacz przysięgły języka angielskiego, wpisana na listę tłumaczy przysięgłych, prowadzoną przez Ministra Sprawiedliwości pod numerem TP/30/17.
Nr Repertorium 404/2024
Katowice, dnia 18 kwietnia 2024 r.

Wyjaśnienie do oświadczenia o identyfikacji modeli

Lista modeli obejmuje dwa typoszeregi i trzy podtypy: AirMaster 8, AirMaster 12, AirMaster 17 z których zgodnie z standardem EHPA były testowani podtypy Airmaster 12 model AWM1501.090.XB12.H00.C11 ta podtyp AirMaster 17 AWM1501.090.XB17.H00.C13

Do podtypu AirMaster 8 należą modele:

SOLA AirMaster 100, 150, 200:

AWM1001.060.XS08.H00.C11, AWM1001.060.XS10.H00.C11,
AWM1501.060.XS08.H00.C11, AWM1501.060.XS10.H00.C11,
HAWM2001.240.IS08.H00.C11, HAWM2001.240.IS10.H00.C11,
HAWM2001.240.TS08.H00.C11, HAWM2001.240.TS10.H00.C11

BeGreen AirMaster 100, 150, 200:

AWM1001.060.XB08.H00.C11, AWM1001.060.XB10.H00.C11,
AWM1501.060.XB08.H00.C11, AWM1501.060.XB10.H00.C11,
HAWM2001.240.IB08.H00.C11, HAWM2001.240.IB10.H00.C11,
HAWM2001.240.TB08.H00.C11, HAWM2001.240.TB10.H00.C11

Do podtypu Airmaster 12 należą modele:

SOLA AirMaster 100, 150, 200:

AWM1001.090.XS12.H00.C11, AWM1001.090.XS12.H00.C11,
HAWM2001.240.IS12.H00.C11, HAWM2001.240.TS12.H00.C11

BeGreen AirMaster 100, 150, 200:

AWM1001.090.XB12.H00.C11, AWM1001.090.XB12.H00.C11,
HAWM2001.240.IB12.H00.C11, HAWM2001.240.TB12.H00.C11

Do podtypu AirMaster 16 należą modele:

SOLA AirMaster 100, 150, 200:

AWM1001.090.XS14.H00.C13, AWM1001.090.XS17.H00.C13,
AWM1501.090.XS14.H00.C13, AWM1501.090.XS17.H00.C13,
HAWM2001.240.IS14.H00.C13, HAWM2001.240.IS17.H00.C13,
HAWM2001.240.TS14.H00.C13, HAWM2001.240.TS17.H00.C13

BeGreen AirMaster 100, 150, 200:

W&H ELECTRIC POLSKA Sp. z o.o.
ul. Biecka 21A, 38-300 GORLICE
POLAND NIP 7382165961

AWM1001.090.XB14.H00.C13, AWM1001.090.XB17.H00.C13,
AWM1501.090.XB14.H00.C13, AWM1501.090.XB17.H00.C13,
HAWM2001.240.IB14.H00.C13, HAWM2001.240.IB17.H00.C13,
HAWM2001.240.TB14.H00.C13, HAWM2001.240.TB17.H00.C13

Różnica między modelami polega w konstrukcję jednostek wewnętrznych:

AWM1001.0x0.Xxxx.H00.Cxx – model z manualnym panelem obsługi

AWM1501.0x0.Xxxx.H00.Cxx – model z dotykowym wyświetlaczem ta szklanym frontem

HAWM2001.240.Ixxx.H00.Cxx – model z dotykowym wyświetlaczem, szklanym frontem ta wbudowanym modułem gazowym z możliwością przygotowania cieplej wody w przeplywie.

HAWM2001.240.Txxx.H00.Cxx – model z dotykowym wyświetlaczem, szklanym frontem i wbudowanym modułem gazowym z możliwością dodatkowego dogrzewania zasobnika CWU.

Żadnej różnicy w budowie układów chłodniczych oprócz deklarowanej różnicy podtypów niema.

W&H ELECTRIC POLSKA Sp. z o.o.
ul. Biecka 21A, 38-300 GORLICE
POLAND NIP 7382165961

Dmytro Ghyshov

OŚWIADCZENIE

Producent **W&H Electric Polska sp. z o. o.** oświadcza, iż pompy ciepła:

1. AWM1501.060.XB08.H00.C11, AWM1501.060.XB10.H00.C11,
   AWM1001.060.XB08.H00.C11, AWM1001.060.XB10.H00.C11,
   AWM1501.060.XS08.H00.C11, AWM1501.060.XS10.H00.C11,
   AWM1001.060.XS08.H00.C11, AWM1001.060.XS10.H00.C11,
   HAWM2001.240.IB08.H00.C11, HAWM2001.240.IB10.H00.C11,
   HAWM2001.240.TB08.H00.C11, HAWM2001.240.TB10.H00.C11,
   HAWM2001.240.IS08.H00.C11, HAWM2001.240.IS10.H00.C11,
   HAWM2001.240.TS08.H00.C11, HAWM2001.240.TS10.H00.C11
   Oznaczenie/typ/identyfikator modelu

2. AWM1501.090.XB12.H00.C11, AWM1001.090.XB12.H00.C11,
   AWM1501.090.XS12.H00.C11, AWM1001.090.XS12.H00.C11,
   HAWM2001.240.IB12.H00.C11, HAWM2001.240.TB12.H00.C11,
   HAWM2001.240.IS12.H00.C11, HAWM2001.240.TS12.H00.C11
   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.

Gorlice 02.04.24
Miejscowość, data

Dariusz Słyszka
Podpis osoby upoważnionej

W&H ELECTRIC POLSKA Sp. z o.o.
ul. Biecka 21A, 38-300 GORLICE
POLAND NIP 7382165961

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

TEST CERTIFICATE

Number **O-B-00646-22**

Customer	W&H ELECTRIC POLSKA Sp. z.o.o. (Trade Mark: BeGreen) ul. Biecka 21A 38-300 Gorlice POLAND
Product	Outdoor Air/water heat pump – split
Type designation / Trade mark	**AWM1501.090.XB12.H00.C11**
Test methods	ČSN EN 14511-2:2019, ČSN EN 14511-3:2019, ČSN EN 14825:2020, ČSN EN 12102-1:2018, EHPA Testing regulation – Testing of Air/Water Heat Pumps, version 2.4a
Basis of certificate	Test reports: 31-10708/1/T of 2022-04-08 31-10708/1/H of 2022-03-28 Technical documents of W&H ELECTRIC POLSKA Sp. z.o.o. (Trade Mark: BeGreen)
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)		
9.39	**$P_{designh}$ [kW]** … Full load heating				**9.39**
4.02	**SCOP [–]** … Seasonal coefficient of performance				**2.92**
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	8.307	2.468	T_j = -7	7.769	1.810
T_j = +2	5.164	3.799	T_j = +2	5.233	2.798
T_j = +7	4.739	5.639	T_j = +7	4.266	3.985
T_j = +12	5.690	7.251	T_j = +12	5.212	5.459
T_j = TOL = -10	7.765	2.313	T_j = TOL = -10	7.396	1.653
T_j = $T_{bivalent}$ = -7	8.307	2.468	T_j = $T_{bivalent}$ = -6	7.947	1.869

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“:				
13.8	Off mode	P_{OFF}	[W]	**13.8**
13.8	Thermostat off mode	P_{TO}	[W]	**13.8**
13.8	Standby mode	P_{SB}	[W]	**13.8**
0	Crankcase heater mode	P_{CK}	[W]	**0**
Annual electricity consumption for heating according to:				
4828	ČSN EN 14825:2020	Q_{HE}	[kWh]	**6656**
Seasonal Space heating energy efficiency				
157.7	ČSN EN 14825:2020	η_s	[%]	**113.6**
Liquid flow rate in outdoor heating exchanger:				
–	Source liquid	Min/Max	[m^3/h]	–
Liquid flow rate in indoor heating exchanger:				
0.900 / 2.400	Heating water	Min/Max	[m^3/h]	**0.900 / 2.400**

Sound power level at condition A7W55* (at 30 %):

OU.H.105.A11 – outdoor unit –	L_{WA}	61.1 ± 1.5	dB(A)	Accuracy class 2 (Engineering)
IU.AWM1501.090.XB12.H00 – indoor unit –	L_{WA}	32.8 ± 1.5	dB(A)	Accuracy class 2 (Engineering)

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

Specification of conditions:

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

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

Brno, 2022-04-29

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