TEST REPORT

Report no.:
300-KLAB-23-039-16-V2

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Customer:	Company:	GD MIDEA HEATING & VENTILATING EQUIPMENT CO., LTD.
	Address:	Penglai Industry Road, Beijiao
	City:	Shunde, Foshan, Guangdong, 528311, China
	Tel.:	+86 13902810522
Unit tested:	Brand:	Midea
	Type:	Air to water heat pump (mono block)
	Model:	MHC-V16W/D2RN8-B
	Series no.:	541K8144802381901000003
	Prod. year:	Outdoor unit: N/A
Dates:	Test period:	December 2023 – January 2024
Brand name:	Brand:	GALMET
	Type:	Air to water heat pump (mono block)
	Model:	Prima 3F 16GT

Procedures See objective (page 2) for list of standards.

Remarks: The unit was delivered by the customer. The installation and test settings were done according to the customers instructions. Between each test condition the customer changed various parameters like compressor speed, expansion valve, fan speed, pump speed, defrost time, heating time. The report for the tested unit is named 300-KLAB-23-039 issued 2024.03.21 Also see appendix 2. This test report replaces test report 300-KLAB-23-039-16 issued 2024.05.16. The reason for the revision is that no units of identical design is mentioned in this report.

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Division/Centre: Danish Technological Institute
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DIGITALLY SIGNED DOCUMENT
18 June 2024
DANISH TECHNOLOGICAL INSTITUTE

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Test Reg. nr. 300

Objective

The objective of this report is to document the following:

The Seasonal Coefficient of Performance (SCOP) at low and medium temperature application for average climate according to EN 14825:2022.

In order to calculate the SCOP, tests were carried out at the part load conditions stated in the tables on page 5 and 6.

SCOP part load test in conditions $SCOP_B$ and $SCOP_C$ at low temperature application for warmer climate according to EN 14825:2022.

SCOP part load test conditions $SCOP_A$ and $SCOP_{F/G}$ at low temperature application for colder climate according to EN 14825:2022.

COP test standard rating conditions A7/W35 and A7/W55 according to EN 14511:2022.

Operating requirements according to EN 14511-4:2022
- 4.2.1 Starting and operating tests
- 4.5 Shutting of the heat transfer medium flows
- 4.6 Complete power supply failure

Sound power measurements according to EN 12102-1:2022.

All tests are done according to EHP-QL test regulation V2.4

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Test conditions

SCOP test conditions for low temperature – EN 14825

Part load conditions for reference SCOP and reference SCOPon calculation of air to water units for low temperature application for the reference heating season;
"A" = average, "W" = warmer, and "C" = colder.

	Part load ratio in %				Outdoor heat exchanger		Indoor heat exchanger			
					Dry (wet) bulb temperature °C		Fixed outlet °C	Variable outlet[d] °C		
	Formula	Average	Warmer	Colder	Outdoor air	Exhaust air	All climates	Average	Warmer	Colder
A	$(-7 - 16) / (T_{designh} - 16)$	88,46	n.a.	60,53	-7(-8)	20(12)	[a] / 35	[a] / 34	n.a.	[a] / 30
B	$(+2 - 16) / (T_{designh} - 16)$	53,85	100,00	36,84	2(1)	20(12)	[a] / 35	[a] / 30	[a] / 35	[a] / 27
C	$(+7 - 16) / (T_{designh} - 16)$	34,62	64,29	23,68	7(6)	20(12)	[a] / 35	[a] / 27	[a] / 31	[a] / 25
D	$(+12 - 16) / (T_{designh} - 16)$	15,38	28,57	10,53	12(11)	20(12)	[a] / 35	[a] / 24	[a] / 26	[a] / 24
E	$(TOL$[e] $- 16) / (T_{designh} - 16)$				TOL[e]	20(12)	[a] / 35	[a] / [b]	[a] / [b]	[a] / [b]
F	$(T_{biv} - 16) / (T_{designh} - 16)$				T_{biv}	20(12)	[a] / 35	[a] / [c]	[a] / [c]	[a] / [c]
G	$(-15 - 16) / (T_{designh} - 16)$	n.a.	n.a.	81,58	-15	20(12)	[a] / 35	n.a.	n.a.	[a] / 32

Additional information

Climate	$T_{designh}$ [°C]	$T_{bivalent}$ [°C]	TOL [°C]	Outlet temperature	Flow rate
Average	-10	-7	-10	Variable	Variable
Colder	-22	-15	-22	Variable	Variable
Warmer	2	7	2	Variable	Variable

SCOP test conditions for medium temperature – EN 14825

Part load conditions for reference SCOP and reference SCOPon calculation of air to water units for medium temperature application for the reference heating season;
"A" = average, "W" = warmer, and "C" = colder.

	Part load ratio in %				**Outdoor heat exchanger**		**Indoor heat exchanger**			
					Dry (wet) bulb temperature °C		Fixed outlet °C	Variable outlet[d] °C		
	Formula	Average	Warmer	Colder	Outdoor air	Exhaust air	All climates	Average	Warmer	Colder
A	$(-7 - 16) / (T_{designh} - 16)$	88,46	n.a.	60,53	−7(−8)	20(12)	[a] / 55	[a] / 52	n.a.	[a] / 44
B	$(+2 - 16) / (T_{designh} - 16)$	53,85	100	36,84	2(1)	20(12)	[a] / 55	[a] / 42	[a] / 55	[a] / 37
C	$(+7 - 16) / (T_{designh} - 16)$	34,62	64,29	23,68	7(6)	20(12)	[a] / 55	[a] / 36	[a] / 46	[a] / 32
D	$(+12 - 16) / (T_{designh} - 16)$	15,38	28,57	10,53	12(11)	20(12)	[a] / 55	[a] / 30	[a] / 34	[a] / 28
E	$(TOL^{e} - 16) / (T_{designh} - 16)$				TOL^{e}	20(12)	[a] / 55	[a] / [b]	[a] / [b]	[a] / [b]
F	$(T_{biv} - 16) / (T_{designh} - 16)$				T_{biv}	20(12)	[a] / 55	[a] / [c]	[a] / [c]	[a] / [c]
G	$(-15 - 16) / (T_{designh} - 16)$	n.a.	n.a.	81,58	−15	20(12)	[a] / 55	n.a.	n.a.	[a] / 49

Additional information

Climate	$T_{designh}$ [°C]	$T_{bivalent}$ [°C]	TOL [°C]	Outlet temperature	Flow rate
Average	-10	-7	-10	Variable	Variable

COP test conditions - low temperature – EN 14511

N#	Heat source		Heat sink	
	Inlet dry bulb temperature (°C)	Inlet wet bulb temperature (°C)	Inlet temperature (°C)	Outlet temperature (°C)
1S	7	6	30	35

S: Standard rating condition

COP test conditions - medium temperature – EN 14511

N#	Heat source		Heat sink	
	Inlet dry bulb temperature (°C)	Inlet wet bulb temperature (°C)	Inlet temperature (°C)	Outlet temperature (°C)
1S	7	6	47	55

S: Standard rating condition

Test conditions for operating requirements – EN 14511-4

N#	Heat source		Heat sink	Water flow rate at indoor heat exchanger	Test
	Inlet dry bulb temperature (°C)	Inlet wet bulb temperature (°C)	Inlet temperature (°C)		
1	-25	-	12	800 L/h	Starting
2	-25	-	38	710 L/h	Operating

Test conditions for shutting off the heat transfer medium – EN 14511-4

N#	Heat source		Heat sink		Heat exchanger
	Inlet dry bulb temperature (°C)	Inlet wet bulb temperature (°C)	Inlet temperature (°C)	Outlet temperature (°C)	
1	7	6	47	55	Indoor
2	7	6	47	55	Outdoor

Test conditions for complete power supply failure – EN 14511-4

N#	Heat source		Heat sink	
	Inlet dry bulb temperature (°C)	Inlet wet bulb temperature (°C)	Inlet temperature (°C)	Outlet temperature (°C)
1	7	6	47	55

Test conditions for sound power measurements – EN 12102-1

N#	Test condition		Heat pump setting			
	Outdoor heat exchanger (dry bulb/ wet bulb) (°C)	Indoor heat exchanger (inlet/ outlet) (°C)	Compressor speed (Hz)	Fan speed outdoor (rpm)	Heating capacity (kW)	Power input (kW)
1[F]	7/6	30/35	64	730	15.70	3.49
2[P]	7/6	30/35	24	400	5.67	1.16
3[F]	7/6	47/55	72	650	16.14	5.65
4[E]	7/6	47/55	32	450	7.10	2.34

F) Full load, P) part load and E) ErP labelling

Test results

Test results of SCOP test at low temperature - heating season average – EN 14825

Model (Outdoor)	MHC-V16W/D2RN8-B
Air-to-water heat pump mono bloc	Y
Low-temperature heat pump	N
Equipped with supplementary heater	Y
Heat pump combination heater	N
Reversible	Y

Rated heat output[1)]	P_{rated}	**15.2** [kW]
Seasonal space heating energy efficiency	η_s	**184.1** [%]
	SCOP	**4.68** [-]

Measured capacity for heating for part load at outdoor temperature Tj	Average Climate - Low temperature application	Tj=-15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	13.27 [kW]
		Tj=2 °C	Pdh	8.24 [kW]
		Tj=7 °C	Pdh	6.26 [kW]
		Tj=12 °C	Pdh	7.26 [kW]
		Tj=bivalent temperature	Pdh	13.27 [kW]
		Tj=operation limit	Pdh	12.62 [kW]

Measured coefficient of performance at outdoor temperature Tj	Average Climate - Low temperature application	Tj=-15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2.64 [-]
		Tj=2 °C	COPd	4.59 [-]
		Tj=7 °C	COPd	6.62 [-]
		Tj=12 °C	COPd	8.13 [-]
		Tj=bivalent temperature	COPd	2.64 [-]
		Tj=operation limit	COPd	2.51 [-]

Bivalent temperature	Tbivalent	-7 [°C]
Operation limit	TOL	-10 [°C]
temperatures	WTOL	- [°C]
Degradation coefficient	Cdh	0.97 [-]

Power consumption in modes other than active mode	Off mode	P_{OFF}	0.021 [kW]
	Thermostat-off mode	P_{TO}	0.026 [kW]
	Standby mode	P_{SB}	0.021 [kW]
	Crankcase heater mode [2)]	P_{CK}	0.021 [kW]
Supplementary heater[1)]	Rated heat output	P_{SUP}	2.58 [kW]
	Type of energy input		Electrical

Other items	Capacity control		Variable
	Water flow control		Variable
	Water flow rate		-
	Annual energy consumption	Q_{HE}	6712 [kWh]

[1)] For heat pump space heaters and heat pump combination heaters, the rated heat output, Prated, is equal to the design load for heating, Pdesignh, and the rated heat output of a supplementary heater, Psup, is equal to the supplementary capacity for heating, sup(Tj).

[2)] For SCOP calculation the value PCK - PSB is used. See page 15

Test results of SCOP test at medium temperature - heating season average – EN 14825

Model (Outdoor)	MHC-V16W/D2RN8-B
Air-to-water heat pump mono bloc	Y
Low-temperature heat pump	N
Equipped with supplementary heater	Y
Heat pump combination heater	N
Reversible	Y

Rated heat output[1)]	P_{rated}	**13** [kW]
Seasonal space heating energy efficiency	η_s	**137.3** [%]
	SCOP	**3.51** [-]

Measured capacity for heating for part load at outdoor temperature Tj	Average Climate - Medium temperature application	Tj=-15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	11.68 [kW]
		Tj=2 °C	Pdh	7.29 [kW]
		Tj=7 °C	Pdh	6.03 [kW]
		Tj=12 °C	Pdh	6.89 [kW]
		Tj=bivalent temperature	Pdh	11.68 [kW]
		Tj=operation limit	Pdh	10.53 [kW]

Measured coefficient of performance at outdoor temperature Tj	Average Climate - Medium temperature application	Tj=-15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2.02 [-]
		Tj=2 °C	COPd	3.42 [-]
		Tj=7 °C	COPd	4.93 [-]
		Tj=12 °C	COPd	6.02 [-]
		Tj=bivalent temperature	COPd	2.02 [-]
		Tj=operation limit	COPd	1.82 [-]

Bivalent temperature	Tbivalent	-7 [°C]
Operation limit	TOL	-10 [°C]
temperatures	WTOL	- [°C]
Degradation coefficient	Cdh	0.98 [-]

Power consumption in modes other than active mode	Off mode	P_{OFF}	0.021 [kW]
	Thermostat-off mode	P_{TO}	0.026 [kW]
	Standby mode	P_{SB}	0.021 [kW]
	Crankcase heater mode	P_{CK}	0.021 [kW]
Supplementary heater[1)]	Rated heat output	P_{SUP}	2.47 [kW]
	Type of energy input		Electrical

Other items	Capacity control		Variable
	Water flow control		Variable
	Water flow rate		-
	Annual energy consumption	Q_{HE}	7655 [kWh]

[1)]For heat pump space heaters and heat pump combination heaters, the rated heat output, Prated, is equal to the design load for heating, Pdesignh, and the rated heat output of a supplementary heater, Psup, is equal to the supplementary capacity for heating, sup(Tj).

[*)] For SCOP calculation the value PCK - PSB is used. See page 17

Test results for warmer climate, low temperature according to EN14825

N°	Test condition	Heating capacity [kW]	COP
1	B	13.106	3.508
2	Tbivalent F and C	8.750	5.514

Test results for colder climate, low temperature according to EN14825

N°	Test condition	Heating capacity [kW]	COP
1	A	8.383	3.315
2	Tbivalent F and G	11.301	2.497

COP test results - low temperature – EN 14511

N#	Test conditions	Heating capacity [kW]	COP
1	A7/W35	15.707	4.498

COP test results - medium temperature – EN 14511

N#	Test conditions	Heating capacity [kW]	COP
1	A7/W55	16.139	2.854

Test results for starting and operating test - EN 14511-4

N#	Test conditions air/water inlet [°C]	Test validation
Starting	A-25/W18	Passed
Operating	A-25/W38	Passed

Test results for shutting off the heat transfer medium – EN 14511-4

N#	Heat exchanger	Test validation
1	Indoor	Passed
2	Outdoor	Passed

Test results for complete power supply failure – EN 14511-4

N#	Test validation
1	Passed

Test results of sound power measurements – EN 12102-1

N#	Test conditions	Sound power level LW(A) [dB re 1pW]	Uncertainty σ_{tot} [dB]
1F	A7/W35	66.5	1.6
2P	A7/W35	51.5	1.6
3F	A7/W55	65.2	1.6
4E	A7/55	55.6	1.6

F) Full load, P) part load and E) ErP labelling

The A-weighted total sound power level is determined for the measured frequency range from 100 Hz to 10 kHz. For the calculation of uncertainty, see appendix 1.

The sound power measurements are carried out by Kamalathasan Arumugam (KAMA) and co-read by Patrick Glibert (PGL), Danish Technological Institute.

Photos

Rating plate

Outdoor unit

SCOP - detailed calculation

Detailed SCOP calculation of low temperature and average climate conditions – EN 14825

Calculation of reference SCOP

$$SCOP = \frac{P_{designh} \times H_{he}}{\frac{P_{designh} \times H_{he}}{SCOP_{on}} + H_{TO} \times P_{TO} + H_{SB} \times P_{SB} + H_{CK} \times P_{CK} + H_{OFF} \times P_{OFF}}$$

Where

P_{design} =	Heating load of the building at design temperature, kW
H_{he} =	Number of equivalent heating hours, 2066 h
H_{TO}, H_{SB}, H_{CK}, H_{OFF} =	Number of hours for which the unit is considered to work in thermostat off mode, standby mode, crankcase heater mode and off mode, h, respectively
P_{TO}, P_{SB}, P_{CK}, P_{OFF} =	Electricity consumption during thermostat off mode, standby mode, crankcase heater mode and off mode, kW, respectively

Data for SCOP

	Outdoor temperature [°C]	Part load ratio [%]	Part load [kW]	Declared capacity [kW]	Declared COP [-]	cdh [-]	CR [-]	COPbin [-]
A	-7	88	13.45	13.27	2.64	0.99	1.00	2.64
B	2	54	8.18	8.24	4.59	0.99	1.00	4.59
C	7	35	5.26	6.26	6.62	0.97	0.84	6.58
D	12	15	2.34	7.26	8.13	0.97	0.32	7.66
E	-10	100	15.20	12.62	2.51	0.99	1.00	2.51
F - BIV	-7	88	13.45	13.27	2.64	0.99	1.00	2.64

Energy consumption for thermostat off, standby, off mode, crankcase heater mode

	Hours [h]	Power input [kW]	Applied to SCOP calculation [kW]	Energy consumption [kWh]
Off mode	0	0.02097	0.02097	0
Thermostat off	178	0.02612	0.02612	4.64936
Standby	0	0.02097	0.02097	0
Crankcase heater	178	0.02111	0.00014	0.02492

Calculation Bin for SCOPon

	Bin [-]	Outdoor temperature [°C]	Hours [h]	Heat load [kW]	Heat load covered by heat pump [kW]	Electrical back up heater [kW]	Annual backup heater energy input [kWh]	COPbin [-]	Annual heating demand [kWh]	Annual energy input [kWh]	Net annual heating capacity [kWh]	Net annual power input [kWh]
E	21	-10	1	15.20	12.62	2.58	2.58	2.51	15.20	7.61	12.62	5.03
	22	-9	25	14.62	12.84	1.78	44.46	2.55	365.38	170.15	320.93	125.69
	23	-8	23	14.03	13.05	0.98	22.47	2.60	322.71	138.05	300.24	115.58
A / F - BIV	24	-7	24	13.45	13.27	0.00	0.00	2.64	322.71	122.15	322.71	122.15
	25	-6	27	12.86	12.71	0.00	0.00	2.86	347.26	121.49	347.26	121.49
	26	-5	68	12.28	12.14	0.00	0.00	3.07	834.83	271.52	834.83	271.52
	27	-4	91	11.69	11.58	0.00	0.00	3.29	1064.00	323.31	1064.00	323.31
	28	-3	89	11.11	11.01	0.00	0.00	3.51	988.58	281.86	988.58	281.86
	29	-2	165	10.52	10.45	0.00	0.00	3.72	1736.31	466.29	1736.31	466.29
	30	-1	173	9.94	9.88	0.00	0.00	3.94	1719.35	436.38	1719.35	436.38
	31	0	240	9.35	9.31	0.00	0.00	4.16	2244.92	540.12	2244.92	540.12
	32	1	280	8.77	8.75	0.00	0.00	4.37	2455.38	561.53	2455.38	561.53
B	33	2	320	8.18	8.18	0.00	0.00	4.59	2619.08	570.73	2619.08	570.73
	34	3	357	7.60	7.60	0.00	0.00	4.99	2713.20	544.02	2713.20	544.02
	35	4	356	7.02	7.02	0.00	0.00	5.39	2497.48	463.73	2497.48	463.73
	36	5	303	6.43	6.43	0.00	0.00	5.78	1948.52	336.88	1948.52	336.88
	37	6	330	5.85	5.85	0.00	0.00	6.18	1929.23	312.06	1929.23	312.06
C	38	7	326	5.26	5.26	0.00	0.00	6.58	1715.26	260.66	1715.26	260.66
	39	8	348	4.68	4.68	0.00	0.00	6.80	1627.57	239.46	1627.57	239.46
	40	9	335	4.09	4.09	0.00	0.00	7.01	1370.92	195.48	1370.92	195.48
	41	10	315	3.51	3.51	0.00	0.00	7.23	1104.92	152.84	1104.92	152.84
	42	11	215	2.92	2.92	0.00	0.00	7.45	628.46	84.41	628.46	84.41
D	43	12	169	2.34	2.34	0.00	0.00	7.66	395.20	51.58	395.20	51.58
	44	13	151	1.75	1.75	0.00	0.00	7.88	264.83	33.61	264.83	33.61
	45	14	105	1.17	1.17	0.00	0.00	8.09	122.77	15.17	122.77	15.17
	46	15	74	0.58	0.58	0.00	0.00	8.31	43.26	5.21	43.26	5.21

SUM	31397.35	6706.27	31327.85	6636.77
SCOPon		4.68	**SCOPnet**	4.72

Detailed SCOP calculation of medium temperature and average climate conditions – EN 14825

Calculation of reference SCOP

$$SCOP = \frac{P_{designh} \times H_{he}}{\frac{P_{designh} \times H_{he}}{SCOP_{on}} + H_{TO} \times P_{TO} + H_{SB} \times P_{SB} + H_{CK} \times P_{CK} + H_{OFF} \times P_{OFF}}$$

Where

P_{design} =	Heating load of the building at design temperature, kW
H_{he} =	Number of equivalent heating hours, 2066 h
H_{TO}, H_{SB}, H_{CK}, H_{OFF} =	Number of hours for which the unit is considered to work in thermostat off mode, standby mode, crankcase heater mode and off mode, h, respectively
P_{TO}, P_{SB}, P_{CK}, P_{OFF} =	Electricity consumption during thermostat off mode, standby mode, crankcase heater mode and off mode, kW, respectively

Data for SCOP

	Outdoor temperature [°C]	Part load ratio [%]	Part load [kW]	Declared capacity [kW]	Declared COP [-]	cdh [-]	CR [-]	COPbin [-]
A	-7	88	11.50	11.68	2.02	1.00	1.00	2.02
B	2	54	7.00	7.29	3.42	0.99	1.00	3.42
C	7	35	4.50	6.03	4.93	0.98	0.75	4.90
D	12	15	2.00	6.89	6.02	0.98	0.29	5.70
E	-10	100	13.00	10.53	1.82	1.00	1.00	1.82
F - BIV	-7	88	11.50	11.68	2.02	1.00	1.00	2.02

Energy consumption for thermostat off, standby, off mode, crankcase heater mode

	Hours [h]	Power input [kW]	Applied to SCOP calculation [kW]	Energy consumption [kWh]
Off mode	0	0.02097	0.02097	0
Thermostat off	178	0.02612	0.02612	4.64936
Standby	0	0.02097	0.02097	0
Crankcase heater	178	0.02111	0.00014	0.02492

Calculation Bin for $SCOP_{on}$

	Bin [-]	Outdoor temperature [°C]	Hours [h]	Heat load [kW]	Heat load covered by heat pump [kW]	Electrical back up heater [kW]	backup heater energy input [kWh]	COP_{bin} [-]	Annual heating demand [kWh]	Annual energy input [kWh]	Net annual heating capacity [kWh]	Net annual power input [kWh]
E	21	-10	1	13.00	10.53	2.47	2.47	1.82	13.00	8.26	10.53	5.79
	22	-9	25	12.50	10.85	1.65	41.15	1.89	312.50	185.05	271.35	143.90
	23	-8	23	12.00	11.18	0.82	18.93	1.95	276.00	150.54	257.07	131.61
A / F - BIV	24	-7	24	11.50	11.50	0.00	0.00	2.02	276.00	136.57	276.00	136.57
	25	-6	27	11.00	11.00	0.00	0.00	2.18	297.00	136.46	297.00	136.46
	26	-5	68	10.50	10.50	0.00	0.00	2.33	714.00	306.19	714.00	306.19
	27	-4	91	10.00	10.00	0.00	0.00	2.49	910.00	365.85	910.00	365.85
	28	-3	89	9.50	9.50	0.00	0.00	2.64	845.50	319.93	845.50	319.93
	29	-2	165	9.00	9.00	0.00	0.00	2.80	1485.00	530.69	1485.00	530.69
	30	-1	173	8.50	8.50	0.00	0.00	2.95	1470.50	497.86	1470.50	497.86
	31	0	240	8.00	8.00	0.00	0.00	3.11	1920.00	617.54	1920.00	617.54
	32	1	280	7.50	7.50	0.00	0.00	3.26	2100.00	643.27	2100.00	643.27
B	33	2	320	7.00	7.00	0.00	0.00	3.42	2240.00	654.97	2240.00	654.97
	34	3	357	6.50	6.50	0.00	0.00	3.72	2320.50	624.49	2320.50	624.49
	35	4	356	6.00	6.00	0.00	0.00	4.01	2136.00	532.45	2136.00	532.45
	36	5	303	5.50	5.50	0.00	0.00	4.31	1666.50	386.89	1666.50	386.89
	37	6	330	5.00	5.00	0.00	0.00	4.60	1650.00	358.44	1650.00	358.44
C	38	7	326	4.50	4.50	0.00	0.00	4.90	1467.00	299.45	1467.00	299.45
	39	8	348	4.00	4.00	0.00	0.00	5.06	1392.00	275.13	1392.00	275.13
	40	9	335	3.50	3.50	0.00	0.00	5.22	1172.50	224.62	1172.50	224.62
	41	10	315	3.00	3.00	0.00	0.00	5.38	945.00	175.64	945.00	175.64
	42	11	215	2.50	2.50	0.00	0.00	5.54	537.50	97.01	537.50	97.01
D	43	12	169	2.00	2.00	0.00	0.00	5.70	338.00	59.29	338.00	59.29
	44	13	151	1.50	1.50	0.00	0.00	5.86	226.50	38.64	226.50	38.64
	45	14	105	1.00	1.00	0.00	0.00	6.02	105.00	17.44	105.00	17.44
	46	15	74	0.50	0.50	0.00	0.00	6.18	37.00	5.98	37.00	5.98

SUM	26853.00	7648.65	26790.45	7586.11
$SCOP_{on}$		3.51	**$SCOP_{net}$**	3.53

Detailed test results

Detailed SCOP part load test results - low temperature application, average climate – EN 14825

Detailed result for 'EN14825:2022' Average Low (A and F) A -7 /W34		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		A and F
Condition temperature:	°C	-7
Part load:	%	88%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	15.20
Heating demand:	kW	13.45
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**13.271**
COP	-	**2.642**
Power consumption	kW	**5.023**
Measured		
Heating capacity	kW	13.299
COP	-	2.630
Power consumption	kW	5.057
During heating		
Air temperature dry bulb	°C	-7.16
Air temperature wet bulb	°C	-8.12
Inlet temperature	°C	29.15
Outlet temperature	°C	34.06
Outlet temperature (Time averaged)	°C	**34.06**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	9410
Calculated Hydraulic power	W	7
Calculated global efficiency	η	0.19
Calculated Capacity correction	W	27
Calculated Power correction	W	34
Water Flow	m^3/s	0.000694

Detailed result for 'EN14825:2022' Average Low (B) A 2 /W30		
Tested according to:	EN14511:2022 and	EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		B
Condition temperature:	°C	2
Part load:	%	54%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	15.20
Heating demand:	kW	8.18
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**8.235**
COP	-	**4.589**
Power consumption	kW	**1.795**
Measured		
Heating capacity	kW	8.249
COP	-	4.556
Power consumption	kW	1.810
During heating		
Air temperature dry bulb	°C	1.95
Air temperature wet bulb	°C	0.92
Inlet temperature	°C	24.97
Outlet temperature	°C	30.08
Outlet temperature (Time averaged)	°C	**30.08**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	5256
Calculated Hydraulic power	W	2
Calculated global efficiency	η	0.14
Calculated Capacity correction	W	13
Calculated Power correction	W	16
Water Flow	m^3/s	0.000417

Detailed result for 'EN14825:2022' Average Low (C) A 7 /W27		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		C
Condition temperature:	°C	7
Part load:	%	35%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	15.20
Heating demand:	kW	5.26
CR:	-	0.8
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**6.264**
COP	-	**6.615**
Power consumption	kW	**0.947**
Measured		
Heating capacity	kW	6.266
COP	-	6.601
Power consumption	kW	0.949
During heating		
Air temperature dry bulb	°C	7.04
Air temperature wet bulb	°C	6.02
Inlet temperature	°C	22.80
Outlet temperature	°C	27.77
Outlet temperature (Time averaged)	°C	**26.98**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	874
Calculated Hydraulic power	W	0
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	2
Calculated Power correction	W	2
Water Flow	m^3/s	0.000303

Detailed result for 'EN14825:2022' Average Low (D) A 12 /W24		
Tested according to:	EN14511:2022 and	EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		D
Condition temperature:	°C	12
Part load:	%	15%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	15.20
Heating demand:	kW	2.34
CR:	-	0.3
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**7.265**
COP	-	**8.134**
Power consumption	kW	**0.893**
Measured		
Heating capacity	kW	7.271
COP	-	8.081
Power consumption	kW	0.900
During heating		
Air temperature dry bulb	°C	12.00
Air temperature wet bulb	°C	10.92
Inlet temperature	°C	22.38
Outlet temperature	°C	27.40
Outlet temperature (Time averaged)	°C	**23.99**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	2308
Calculated Hydraulic power	W	1
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	6
Calculated Power correction	W	7
Water Flow	m^3/s	0.000348

Detailed result for 'EN14825:2022' Average Low (E) A -10 /W35		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Low
Condition name:		E
Condition temperature:	°C	-10
Part load:	%	100%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	15.20
Heating demand:	kW	15.20
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**12.620**
COP	-	**2.509**
Power consumption	kW	**5.030**
Measured		
Heating capacity	kW	12.640
COP	-	2.501
Power consumption	kW	5.055
During heating		
Air temperature dry bulb	°C	-10.23
Air temperature wet bulb	°C	-11.37
Inlet temperature	°C	29.94
Outlet temperature	°C	35.02
Outlet temperature (Time averaged)	°C	**35.02**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	6527
Calculated Hydraulic power	W	4
Calculated global efficiency	η	0.16
Calculated Capacity correction	W	21
Calculated Power correction	W	25
Water Flow	m^3/s	0.000619

Detailed SCOP part load test results - medium temperature application, average climate – EN 14825

Detailed result for 'EN14825:2022' Average Medium (A and F) A -7 /W52		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		A and F
Condition temperature:	°C	-7
Part load:	%	88%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	13.00
Heating demand:	kW	11.50
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**11.680**
COP	-	**2.012**
Power consumption	kW	**5.805**
Measured		
Heating capacity	kW	11.694
COP	-	2.009
Power consumption	kW	5.821
During heating		
Air temperature dry bulb	°C	-7.05
Air temperature wet bulb	°C	-8.07
Inlet temperature	°C	44.07
Outlet temperature	°C	52.29
Outlet temperature (Time averaged)	°C	**52.29**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	6527
Calculated Hydraulic power	W	2
Calculated global efficiency	η	0.14
Calculated Capacity correction	W	14
Calculated Power correction	W	17
Water Flow	m^3/s	0.000361

Detailed result for 'EN14825:2022' Average Medium (B) A 2 /W42			
Tested according to:	EN14511:2022		EN14825:2022
Climate zone:			Average
Temperature application:			Medium
Condition name:			B
Condition temperature:		°C	2
Part load:		%	54%
Chosen Tbivalent		°C	-7
Tdesign		°C	-10
Pdesign		kW	13.00
Heating demand:		kW	7.00
CR:		-	1.0
Minimum flow reached:		-	No
Measurement type:			Transient
Integrated circulation pump:			Yes
Included corrections (Final result)			
Heating capacity		kW	**7.291**
COP		-	**3.420**
Power consumption		kW	**2.132**
Measured			
Heating capacity		kW	7.296
COP		-	3.414
Power consumption		kW	2.137
During heating			
Air temperature dry bulb		°C	1.91
Air temperature wet bulb		°C	0.91
Inlet temperature		°C	34.04
Outlet temperature		°C	42.18
Outlet temperature (Time averaged)		°C	**42.18**
Circulation pump			
Measured: Static differential pressure, liquid pump		Pa	2485
Calculated Hydraulic power		W	1
Calculated global efficiency		η	0.12
Calculated Capacity correction		W	4
Calculated Power correction		W	5
Water Flow		m^3/s	0.000231

Detailed result for 'EN14825:2022' Average Medium (C) A 7 /W36			
Tested according to:	EN14511:2022		EN14825:2022
Climate zone:			Average
Temperature application:			Medium
Condition name:			C
Condition temperature:		°C	7
Part load:		%	35%
Chosen Tbivalent		°C	-7
Tdesign		°C	-10
Pdesign		kW	13.00
Heating demand:		kW	4.50
CR:		-	0.7
Minimum flow reached:		-	No
Measurement type:			Steady State
Integrated circulation pump:			Yes
Included corrections (Final result)			
Heating capacity		kW	**6.028**
COP		-	**4.935**
Power consumption		kW	**1.222**
Measured			
Heating capacity		kW	6.041
COP		-	4.884
Power consumption		kW	1.237
During heating			
Air temperature dry bulb		°C	6.99
Air temperature wet bulb		°C	6.03
Inlet temperature		°C	29.90
Outlet temperature		°C	37.90
Outlet temperature (Time averaged)		°C	**35.87**
Circulation pump			
Measured: Static differential pressure, liquid pump		Pa	11703
Calculated Hydraulic power		W	2
Calculated global efficiency		η	0.14
Calculated Capacity correction		W	13
Calculated Power correction		W	15
Water Flow		m^3/s	0.000182

Detailed result for 'EN14825:2022' Average Medium (D) A 12 /W30		
Tested according to:	EN14511:2022	EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		D
Condition temperature:	°C	12
Part load:	%	15%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	13.00
Heating demand:	kW	2.00
CR:	-	0.3
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**6.889**
COP	-	**6.019**
Power consumption	kW	**1.145**
Measured		
Heating capacity	kW	6.893
COP	-	6.001
Power consumption	kW	1.149
During heating		
Air temperature dry bulb	°C	12.01
Air temperature wet bulb	°C	11.00
Inlet temperature	°C	27.71
Outlet temperature	°C	35.68
Outlet temperature (Time averaged)	°C	**30.03**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	2265
Calculated Hydraulic power	W	0
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	4
Calculated Power correction	W	4
Water Flow	m^3/s	0.000208

Detailed result for 'EN14825:2022' Average Medium (E) A -10 /W55		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		E
Condition temperature:	°C	-10
Part load:	%	100%
Chosen Tbivalent	°C	-7
Tdesign	°C	-10
Pdesign	kW	13.00
Heating demand:	kW	13.00
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**10.531**
COP	-	**1.818**
Power consumption	kW	**5.792**
Measured		
Heating capacity	kW	10.545
COP	-	1.816
Power consumption	kW	5.807
During heating		
Air temperature dry bulb	°C	-10.00
Air temperature wet bulb	°C	-11.08
Inlet temperature	°C	47.07
Outlet temperature	°C	55.07
Outlet temperature (Time averaged)	°C	**55.07**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	6527
Calculated Hydraulic power	W	2
Calculated global efficiency	η	0.14
Calculated Capacity correction	W	13
Calculated Power correction	W	15
Water Flow	m^3/s	0.000329

Detailed SCOP part load test results - low temperature application - warmer climate – EN 14825

Detailed result for 'EN14825:2022' Warmer Low (B) A 2 /W35		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Warmer
Temperature application:		Low
Condition name:		B
Condition temperature:	°C	2
Part load:	%	100%
Chosen Tbivalent	°C	2
Tdesign	°C	2
Pdesign	kW	13.10
Heating demand:	kW	13.10
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**13.106**
COP	-	**3.508**
Power consumption	kW	**3.736**
Measured		
Heating capacity	kW	13.134
COP	-	3.482
Power consumption	kW	3.772
During heating		
Air temperature dry bulb	°C	2.08
Air temperature wet bulb	°C	0.83
Inlet temperature	°C	30.07
Outlet temperature	°C	35.08
Outlet temperature (Time averaged)	°C	**35.08**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	10206
Calculated Hydraulic power	W	7
Calculated global efficiency	η	0.20
Calculated Capacity correction	W	29
Calculated Power correction	W	36
Water Flow	m^3/s	0.000709

Detailed result for 'EN14825:2022' Warmer Low (C) A 7 /W31		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Warmer
Temperature application:		Low
Condition name:		C
Condition temperature:	°C	7
Part load:	%	64%
Chosen Tbivalent	°C	2
Tdesign	°C	2
Pdesign	kW	13.10
Heating demand:	kW	8.42
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated circulation pump:		No
Included corrections (Final result)		
Heating capacity	kW	**8.750**
COP	-	**5.514**
Power consumption	kW	**1.587**
Measured		
Heating capacity	kW	8.737
COP	-	5.557
Power consumption	kW	1.572
During heating		
Air temperature dry bulb	°C	6.99
Air temperature wet bulb	°C	6.01
Inlet temperature	°C	26.03
Outlet temperature	°C	31.04
Outlet temperature (Time averaged)	°C	**31.04**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	4732
Calculated Hydraulic power	W	2
Calculated global efficiency	η	0.14
Calculated Capacity correction	W	-12
Calculated Power correction	W	-14
Water Flow	m^3/s	0.000419

Detailed SCOP part load test results - low temperature application - colder climate – EN 14825

Detailed result for 'EN14825:2022' Colder Low (A) A -7 /W30		
Tested according to:		EN14511:2022 and EN14825:2022
Climate zone:		Colder
Temperature application:		Low
Condition name:		A
Condition temperature:	°C	-7
Part load:	%	61%
Chosen Tbivalent	°C	-15
Tdesign	°C	-22
Pdesign	kW	13.70
Heating demand:	kW	8.29
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Transient
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**8.383**
COP	-	**3.315**
Power consumption	kW	**2.529**
Measured		
Heating capacity	kW	8.386
COP	-	3.312
Power consumption	kW	2.532
During heating		
Air temperature dry bulb	°C	-6.91
Air temperature wet bulb	°C	-8.13
Inlet temperature	°C	25.01
Outlet temperature	°C	30.13
Outlet temperature (Time averaged)	°C	**30.13**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	694
Calculated Hydraulic power	W	0
Calculated global efficiency	η	0.12
Calculated Capacity correction	W	2
Calculated Power correction	W	2
Water Flow	m^3/s	0.000411

Detailed result for 'EN14825:2018' Colder Low (F and G) A -15 /W32		
Tested according to:		EN14825:2018
Climate zone:		Colder
Temperature application:		Low
Condition name:		F and G
Condition temperature:	°C	-15
Part load:	%	82%
Chosen Tbivalent	°C	-15
Tdesign	°C	-22
Pdesign	kW	13.70
Heating demand:	kW	11.18
CR:	-	1.0
Minimum flow reached:	-	No
Measurement type:		Steady State
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**11.301**
COP	-	**2.497**
Power consumption	kW	**4.526**
Measured		
Heating capacity	kW	11.328
COP	-	2.484
Power consumption	kW	4.560
During heating		
Air temperature dry bulb	°C	-15.10
Air temperature wet bulb	°C	-14.89
Inlet temperature	°C	27.01
Outlet temperature	°C	32.09
Outlet temperature (Time averaged)	°C	**32.09**
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	12070
Calculated Hydraulic power	W	6
Calculated global efficiency	η	0.19
Calculated Capacity correction	W	27
Calculated Power correction	W	34
Water Flow	m^3/s	0.000536

Detailed COP test results - low temperature – EN 14511

Detailed result for 'EN14511:2022' A7/W35		
Tested according to:		EN14511:2022
Minimum flow reached:		No
Measurement type:		Steady State
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**15.707**
COP	-	**4.498**
Power consumption	kW	**3.492**
Measured		
Heating capacity	kW	15.749
COP	-	4.438
Power consumption	kW	3.549
During heating		
Air temperature dry bulb	°C	6.98
Air temperature wet bulb	°C	5.85
Inlet temperature	°C	29.99
Outlet temperature	°C	34.96
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	20390
Calculated Hydraulic power	W	16
Calculated global efficiency	η	0.27
Calculated Capacity correction	W	41
Calculated Power correction	W	57
Water Flow	m^3/s	0.000763

Detailed COP test results - medium temperature – EN 14511

Detailed result for 'EN14511:2022' A7/W55		
Tested according to:		EN14511:2022
Minimum flow reached:		No
Measurement type:		Steady State
Integrated circulation pump:		Yes
Included corrections (Final result)		
Heating capacity	kW	**16.139**
COP	-	**2.854**
Power consumption	kW	**5.654**
Measured		
Heating capacity	kW	16.152
COP	-	2.849
Power consumption	kW	5.669
During heating		
Air temperature dry bulb	°C	6.92
Air temperature wet bulb	°C	5.91
Inlet temperature	°C	47.01
Outlet temperature	°C	54.85
Circulation pump		
Measured: Static differential pressure, liquid pump	Pa	4062
Calculated Hydraulic power	W	2
Calculated global efficiency	η	0.14
Calculated Capacity correction	W	13
Calculated Power correction	W	15
Water Flow	m^3/s	0.000500

Detailed test results of sound power measurement – Test N#1

ilac-MRA DANAK TEST Reg. nr. 300

Sound power levels according to ISO 3743-1:2010

TEKNOLOGISK INSTITUT

Engineering method for small, movable sources in reverberant fields - Comparison method for hard-w alled test rooms

Client:	Midea
Date of test:	18-01-2024
Object:	Type: Mono Air to w ater heat pump, Model: MHC-V16W/D2RN8-BER90
Mounting conditions:	The outdoor unit is mounted on the supporting metal support frame using six vibration insulatores and placed on four pices of concrete tiles (20x20x2.5 cm). All of these are placed in a w ater drop dray on tw o pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2.
Operating conditions:	A7/W35, Compressor speed: 64[Hz], Fan speed: 730[rpm], Pump speed: 80 [%], EXV1(P): 138, Heating capacity: 15.7 [kW], Pow er_input: 3.49 [kW], Water flow rate: 2720 [l/h]

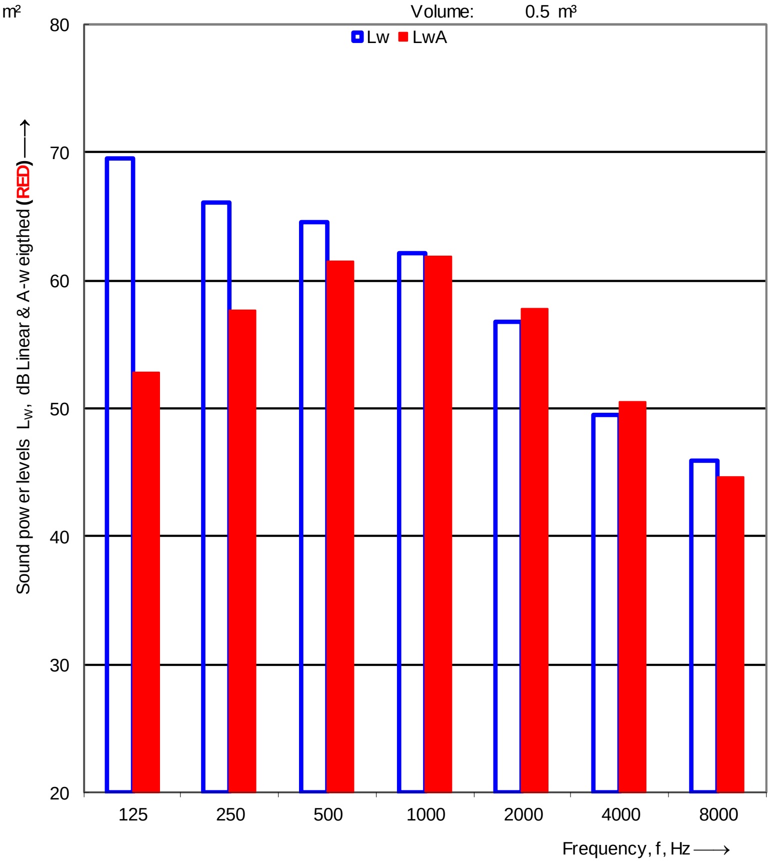
Static pressure:	995	hPa
Air temperature:	7.0	°C
Relative air humidity:	84.0	%
Test room volume:	102.8	m³
Area, S, of test room:	138.9	m²

Room: Room 2

Reference box:

L1:	1.4	m
L2:	0.4	m
L3:	0.9	m
Volume:	0.5	m³

Frequency f [Hz]	L_W 1/3 octave [dB]	L_W 1/1 oct [dB]
100	67.3	
125	62.7	69.5
160	62.4	
200	61.6	
250	61.3	66.0
315	60.9	
400	59.8	
500	59.3	64.5
630	60.1	
800	59.5	
1000	56.5	62.2
1250	54.9	
1600	53.6	
2000	51.8	56.7
2500	49.4	
3150	46.6	
4000	44.4	49.4
5000	41.7	
6300	40.4	
8000	41.1	45.9
10000	41.7	



Sound power level L_W(A): 66.5 dB [re 1pW], Uncertainty σtot: 1.6 dB

Name of test institute:	DTI
Date:	18-01-2024
No. of test report:	300-KLAB-23-039

Measurements are in full conformity w ith ISO 3743-1

Detailed test results of sound power measurement – Test N#2

DANAK TEST Reg. nr. 300

Sound power levels according to ISO 3743-1:2010

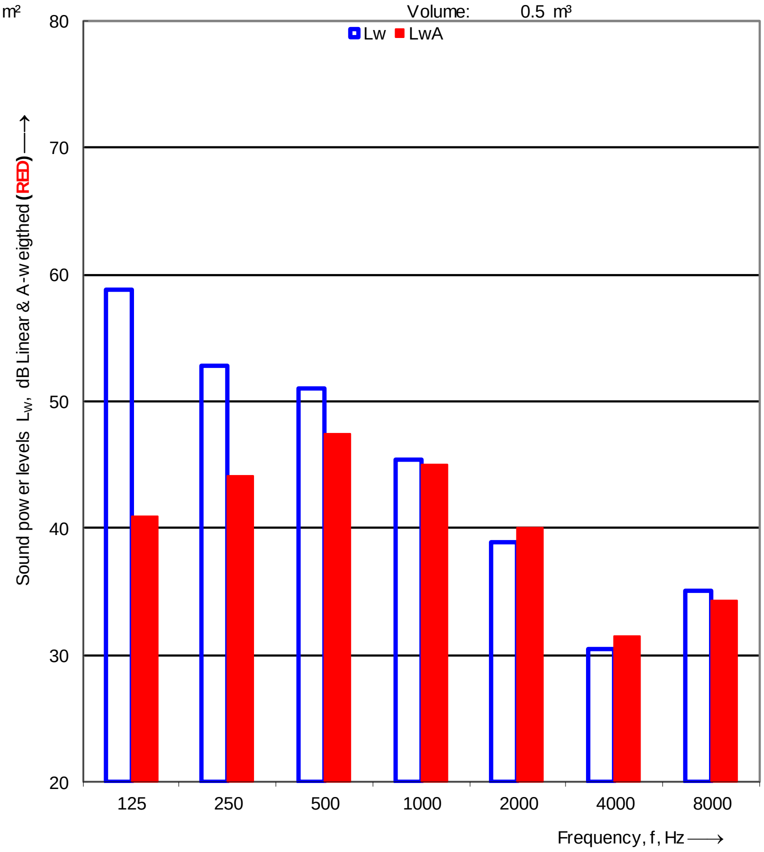
TEKNOLOGISK INSTITUT

Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms

Client:	Midea	Date of test:	18-01-2024
Object:	Type: Mono Air to water heat pump, Model: MHC-V16W/D2RN8-BER90		
Mounting conditions:	The outdoor unit is mounted on the supporting metal support frame using six vibration insulatores and placed on four pices of concrete tiles (20x20x2.5 cm). All of these are placed in a water drop dray on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2.		
Operating conditions:	A7/W35, Compressor speed: 24[Hz], Fan speed: 400[rpm], Pump speed: 50 [%], EXV1(P): 94, Heating capacity: 5.67 [kW], Power_input: 1.16 [kW], Water flow rate: 980 [l/h]		

Static pressure:	995 hPa			Reference box:	
Air temperature:	7.0 °C			L1:	1.4 m
Relative air humidity:	84.0 %			L2:	0.4 m
Test room volume:	102.8 m³	Room:	Room 2	L3:	0.9 m
Area, S, of test room:	138.9 m²			Volume:	0.5 m³

Frequency f [Hz]	L_W 1/3 octave [dB]	1/1 oct [dB]
100	57.9	
125	49.8	58.8
160	47.2	
200	48.9	
250	47.8	52.7
315	47.0	
400	47.4	
500	46.2	50.9
630	44.4	
800	43.1	
1000	39.5	45.4
1250	37.1	
1600	36.0	
2000	34.2	38.9
2500	30.5	
3150	27.2	
4000	25.5	30.4
5000	23.5	
6300	31.4	
8000	31.4	35.0
10000	26.3	



Sound power level L_W(A): 51.5 dB [re 1pW], Uncertainty σtot: 1.6 dB

Name of test institute:	DTI	Date:	18-01-2024
No. of test report:	300-KLAB-23-039		

Measurements are in full conformity with ISO 3743-1

Detailed test results of sound power measurement – Test N#3

Sound power levels according to ISO 3743-1:2010

TEKNOLOGISK INSTITUT

Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms

Client: Midea — Date of test: 18-01-2024

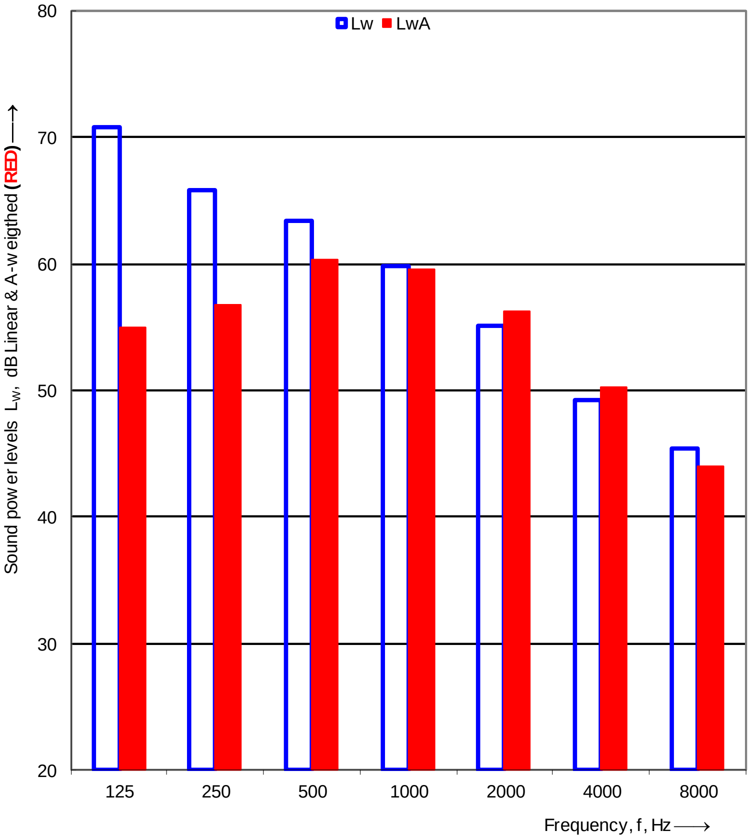
Object: Type: Mono Air to water heat pump, Model: MHC-V16W/D2RN8-BER90

Mounting conditions: The outdoor unit is mounted on the supporting metal support frame using six vibration insulatores and placed on four pices of concrete tiles (20x20x2.5 cm). All of these are placed in a water drop dray on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2.

Operating conditions: A7/W55, Compressor speed: 72[Hz], Fan speed: 650[rpm], Pump speed: 50 [%], EXV1(P): 128, Heating capacity: 16.14 [kW], Power_input: 5.65 [kW], Water flow rate: 1790 [l/h]

Static pressure:	996 hPa			Reference box:	
Air temperature:	7.0 °C			L1:	1.4 m
Relative air humidity:	84.0 %			L2:	0.4 m
Test room volume:	102.8 m³	Room:	Room 2	L3:	0.9 m
Area, S, of test room:	138.9 m²			Volume:	0.5 m³

Frequency f [Hz]	L_W 1/3 octave [dB]	1/1 oct [dB]
100	67.3	
125	64.4	70.8
160	66.0	
200	63.1	
250	59.5	65.8
315	59.2	
400	58.6	
500	57.4	63.4
630	59.6	
800	57.1	
1000	54.4	59.8
1250	52.4	
1600	51.6	
2000	49.8	55.1
2500	49.1	
3150	46.3	
4000	44.9	49.2
5000	39.9	
6300	38.9	
8000	40.7	45.4
10000	41.7	



Sound power level L_W(A): 65.2 dB [re 1pW], Uncertainty σtot: 1.6 dB

Name of test institute: DTI — Date: 18-01-2024

No. of test report: 300-KLAB-23-039

Measurements are in full conformity with ISO 3743-1

Detailed test results of sound power measurement – Test N#4

ilac-MRA DANAK TEST Reg. nr. 300

Sound power levels according to ISO 3743-1:2010

TEKNOLOGISK INSTITUT

Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms

Client: Midea — Date of test: 18-01-2024

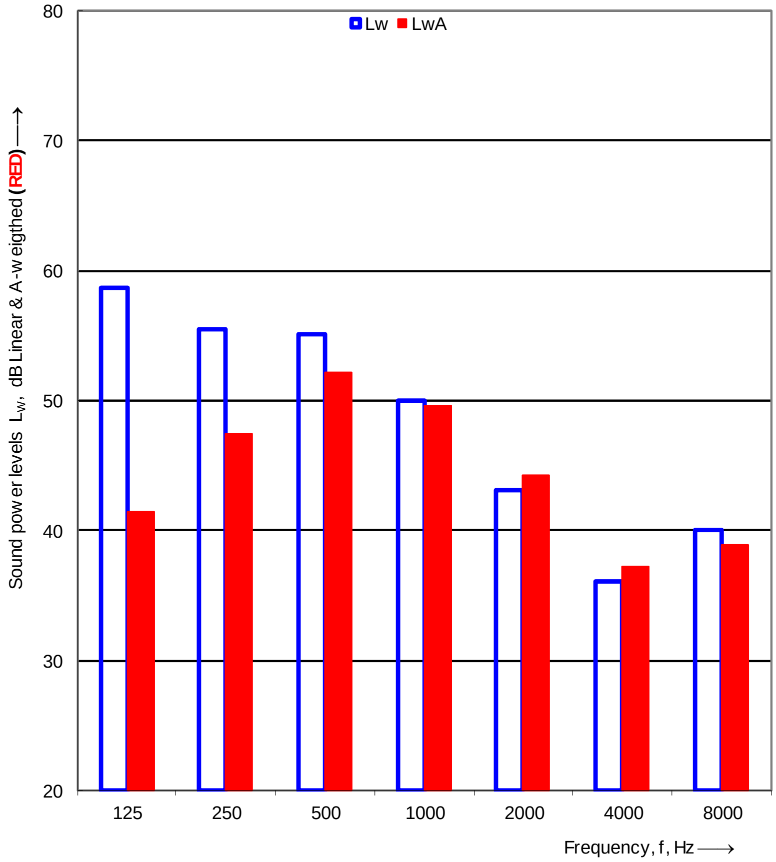
Object: Type: Mono Air to water heat pump, Model: MHC-V16W/D2RN8-BER90

Mounting conditions: The outdoor unit is mounted on the supporting metal support frame using six vibration insulatores and placed on four pices of concrete tiles (20x20x2.5 cm). All of these are placed in a water drop dray on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2.

Operating conditions: A7/W55, Compressor speed: 32[Hz], Fan speed: 450[rpm], Pump speed: 30 [%], EXV1(P): 92, Heating capacity: 7.1 [kW], Power_input: 2.34 [kW], Water flow rate: 765 [l/h]

Static pressure:	996 hPa			Reference box:		
Air temperature:	7.0 °C			L1:	1.4 m	
Relative air humidity:	84.0 %			L2:	0.4 m	
Test room volume:	102.8 m³	Room:	Room 2	L3:	0.9 m	
Area, S, of test room:	138.9 m²			Volume:	0.5 m³	

Frequency f [Hz]	L_W 1/3 octave [dB]	1/1 oct [dB]
100	56.7	
125	52.6	58.6
160	49.0	
200	49.5	
250	51.4	55.5
315	51.1	
400	50.1	
500	48.9	55.1
630	51.5	
800	47.8	
1000	44.0	50.0
1250	41.7	
1600	40.2	
2000	38.5	43.1
2500	34.5	
3150	33.5	
4000	30.9	36.1
5000	27.9	
6300	35.1	
8000	35.7	40.0
10000	35.0	



Sound power level L_W(A): 55.6 dB [re 1pW], Uncertainty σtot: 1.6 dB

Name of test institute: DTI — Date: 18-01-2024

No. of test report: 300-KLAB-23-039

Measurements are in full conformity with ISO 3743-1

ilac-MRA DANAK Test Reg. nr. 300

Appendix 1

Unit specification

Type of unit: Mono air to water heat pump
Manufacturer: Midea
Size of the heat pump: 0.4 x 0.9 x 1.3m (W x L x H)
Year of production: n/a.

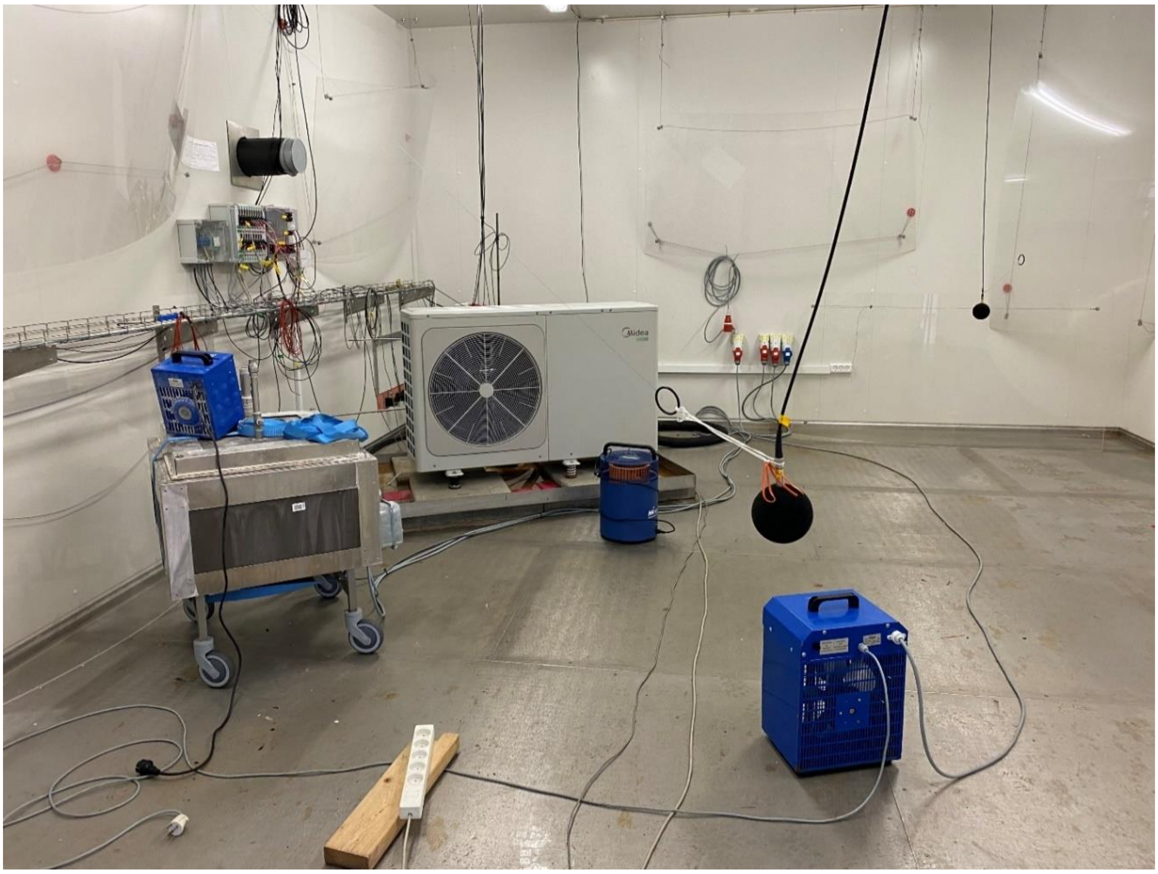
Operating conditions and environment

The operating conditions of the unit under test fulfill the requirements for Class A.

The acoustic test chamber is a hard wall reverberant room (103 m^3 and equipped with relevant sound diffusing reflector panels. The acoustical test chamber fulfils the requirements of ISO3743-1 accuracy grade 2 (engineering grade).

The measurements of the average sound pressure levels in 1/3 octave frequency bands are carried out using three microphones in the test chamber. During the measurements, the microphones are traversed up and down for one meter in the arc of a quarter circle.

The picture below shows the installation of the unit during test, position of microphones, sound diffusing reflector panels, and the reference sound source.



Measurement instruments

Id nr.	Manufacturer	Description	Calibration company
100864	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 1	Norsonic A/S, Norway
100865	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 1	Norsonic A/S, Norway
100866	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 1	Norsonic A/S, Norway
100867*	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 2	Norsonic A/S, Norway
100868*	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 2	Norsonic A/S, Norway
100869*	GRAS	Gras 40AE_26CA, ½" free field microphone, Room 2	Norsonic A/S, Norway
100870	GRAS	Gras 40AE_26CA, ½" free field microphone, Roof monitor	Norsonic A/S, Norway
100873*	Brüel & Kjær	Acoustical calibrator, Brüel & Kjær 4231	Element Metech, Denmark
100859	Norsonic	Reference sound source, Norsonic Nor278 Room 1	RISE, Sweden
100872*	Norsonic	Reference sound source, Norsonic Nor278 Room 2	RISE, Sweden
100620*	Norsonic	Multi-channel measurement system Nor850	Norsonic A/S, Norway

*Instruments are used for the actual measurements for the calculation of the test results.

The other instruments are used for control measurements.
All microphones are equipped with windshields.

Test Procedure

The measurements of the emitted sound power level from the heat pump are carried out according to the following standard:

- DS/EN 14511:2022
- EN 12102-1:2022
- ISO/EN 3743-1:2010

The basic acoustic measurement standard DS/EN 3743-1 is a comparison method using a calibrated reference sound source. Two series of sound pressure measurements are made under exactly the same acoustic conditions, e.g., the same microphone positions, temperature and air humidity. The calibrated sound power levels are known for the reference sound source at each frequency band, and they are used in the estimation of the acoustical correction factor for the calculation of the sound power emitted from the unit under test. The background noise levels are measured and used for relevant corrections.

The final total A-weighted sound power level is based on measurements and calculations in 1/3-octave levels, which then are summed into 1/1-octave levels. The A-weighted total sound power level is determined for the measured frequency range from 100 Hz to 10 kHz.

The actual microphone positions and correction values are saved in data files linked to the complete project documentation according to the DANAK-accreditation.

The complete measurement system is documented and regularly calibrated according to DANAK.

The detailed description of the measurement method is given in Danish in the quality database system "QA Web" at Danish Technological Institute, which is accessible by DANAK.

Measurement uncertainty

The uncertainty of sound power level in decibel is determined in accordance with ISO 3743-1, equation 22 $\sigma_{tot} = \sqrt{\sigma_{RO}{}^2 + \sigma_{omc}{}^2}$ where:

- σ_{RO} is the standard deviation of the reproducibility of the method
- σ_{omc} is the standard deviation describing the uncertainty associated with the instability of the operating and mounting conditions for the particular noise source during test.

σ_{RO} expresses the uncertainty in test results delivered by the different accredited test laboratories due to different instrumentation and implementation of measurement procedure as well different radiation characteristics of the noise source during test.

σ_{omc} expresses the uncertainty associated with the instability of the operating and mounting conditions for the particular noise source during test. The mounting and installation conditions in two DTI acoustical test chambers are well defined in the test procedure. Possible instability of the operating conditions is monitored and assessed prior to each noise test.

The test uncertainty σ_{omc} is calculated according to ISO3743-1 Annex C formula C.1 and is typically below 0.5dB. However, the uncertainty is rounded up to the nearest 0.5dB increment in the report. As pr. Table C.1 (accuracy grade 2), the uncertainty σ_{RO} is set to 1.5.

The expanded uncertainty U is calculated according to ISO 3743-1 equation 23:
$U = k\ \sigma_{tot}$ where k = 2 for 95% confidence.

EXAMPLE: $\sigma_{tot}: \sqrt{1.5^2 + 0.5^2} = 1.6\ dB$ and $U(95\%) = 3.2\ dB$

Note: The expanded uncertainty does not include the standard deviation of production which is used in ISO4871 for the purpose of making noise declaration for batches of machines.

Appendix 2

Authorization Letter

This declaration of conformity is issued under the sole responsibility of

Manufacturer's Name: GD Midea HEATING&VENTILATING Equipment Co.,Ltd.
Manufacturer's Address: Midea Industrial City, Shunde, Foshan, Guangdong, P.R. China

We declare that the following Heat pump product we produced for GALMET SP. Z O. O." SP. K. **are identical to our following models**

Master company(Midea) model	Galmet model
MHC-V6W/D2N8-BE30	Prima 6GT
MHC-V8W/D2N8-BE30	Prima 8GT
MHC-V10W/D2N8-BE30	Prima 10GT
MHC-V12W/D2RN8-BER90	Prima 3F 12GT
MHC-V16W/D2RN8-BER90	Prima 3F 16GT

Company name: GALMET SP. Z O. O." SP. K.

Tradename /-mark: GALMET

Address: 48-100 GŁUBCZYCE, ul. Raciborska 36, Poland

Note: This declaration becomes invalid if technical or operational modifications are introduced without the manufacturer' s consent.

Production year: 2021~2023

Date : 20/03/2024

Authorization

POŚWIADCZONE TŁUMACZENIE Z JĘZYKA ANGIELSKIEGO

[tłumaczenie wyłącznie wybranych stron raportu]---

RAPORT Z BADAŃ---

Nr raportu: 300-KLAB-23-039-16-V2---

Duński Instytut Technologiczny, Teknologiparken, Kongsvang Allé 29, DK-8000 Aarhus C, +45 72 20 20 00, Info@teknologisk.dk, www.teknologisk.dk---

Strona 1 z 42---

Podpis.: PRES/RTHI---

Sygnatura: 226006---

Liczba załączników: 2---

Zleceniodawca:---

Nazwa firmy: GD MIDEA HEATING & VENTILATING EQUIPMENT CO., LTD.---

Adres: Penglai Industry Road, Beijiao---

Miejscowość: Shunde, Foshan, Guangdong, 528311, Chiny---

Tel.: + 86 13902810522---

Urządzenie poddane badaniom:---

Marka: Midea---

Typ: pompa ciepła powietrze-woda (monoblok)---

Model: MHC-V16W/D2RN8-B---

Nr seryjny: 541K814480238190100003---

Rok produkcji: jednostka zewnętrzna: nie dotyczy---

Daty:---

Okres testowy: grudzień 2023 - styczeń 2024---

Nazwa marki:---

Marka: Galmet---

Typ: pompa ciepła powietrze-woda (monoblok)---

Model: Prima 3F 16GT---

Procedury: wykaz norm w części raportu pt. cel (str. 2)---

Uwagi---

PIOTR DZIĘCIOŁOWSKI TŁUMACZ PRZYSIĘGŁY JĘZYKA ANGIELSKIEGO NR TP/72/18

Piotr Dzięciołowski
45-471 Opole
ul. Sarnia 3
tel. + 48604241308
e-mail: piotr.dzieciolowski@przekładnia.com.pl

Urządzenie zostało dostarczone przez zleceniodawcę. Instalację oraz konfigurację do badań przeprowadzono zgodnie z instrukcjami zleceniodawcy. Pomiędzy poszczególnymi warunkami testowymi zleceniodawca dokonywał zmiany poszczególnych parametrów, takich jak prędkość sprężarki, zawór rozprężny, prędkość wentylatora, prędkość pompy, czas rozmrażania i czas nagrzewania. Raport dla przetestowanego urządzenia ma oznaczenie 300-KLAB-23-039 i został wydany 21.03.2024. Zob. również załącznik 2. Niniejszy raport zastępuje raport z badań nr 300-KLAB-23-039-16 wydany 16.05.2024. Powodem zmiany jest fakt, iż w niniejszym raporcie nie wymieniono jednostek o identycznej konstrukcji.---

Warunki:---

Badanie przeprowadzono w ramach akredytacji, zgodnie z międzynarodowymi wymogami (ISO/IEC 17025:2017) oraz zgodnie z Ogólnymi Warunkami Duńskiego Instytutu Technologicznego. Wyniki badań odnoszą się wyłącznie do przetestowanego urządzenia. Treść niniejszego raportu można cytować we fragmentach wyłącznie za pisemną zgodą Duńskiego Instytutu Technologicznego.---

Zleceniodawcy nie przysługuje prawo do powoływania się na Duński Instytut Technologiczny lub jego pracowników w celach reklamowych lub marketingowych bez uzyskania, każdorazowo, pisemnej zgody Instytutu.---

Oddział/Placówka: Duński Instytut Technologiczny, Oddział ds. Energii i Klimatu, Laboratorium pomp ciepła, Aarhus---

Data: 18.06.2024---

Podpis: Preben Eskerod, B.TecMan & MarEng [stopień licencjata w zakresie zarządzania technologią i techniki morskiej]---

Sprawdził: Rasmus Thisgaard, B.TecMan & MarEng---

Nr w rejestrze badań: 300---

Piotr Dzięciołowski
45-471 Opole
ul. Sarnia 3
tel. + 48604241308
e-mail: piotr.dzieciolowski@przekladnia.com.pl

Duński Instytut Technologiczny---

Strona 2 z 44---

300-KLAB-23-039-16---

Cel---

Celem niniejszego raportu jest udokumentowanie:---

Sezonowego współczynnika wydajności (SCOP) dla zastosowania przy niskiej i średniej temperaturze dla średniego klimatu według normy EN 14825:2022.---

W celu wyznaczenia współczynnika SCOP przeprowadzono testy w warunkach obciążenia częściowego wskazanych w tabelach na stronie 5 i 6.---

Testu współczynnika SCOP przy obciążeniu częściowym w warunkach $SCOP_B$ oraz $SCOP_C$ przy niskiej temperaturze dla cieplejszego klimatu zgodnie z normą EN 14825:2022.---

Warunków $SCOP_A$ oraz $SCOP_{F/G}$ testu współczynnika SCOP przy obciążeniu częściowym przy niskiej temperaturze dla zimniejszego klimatu zgodnie z normą EN 14825:2022.---

Standardowych warunków wzorcowania A7/W35 oraz A7/W55 współczynnika wydajności COP zgodnie z normą EN 14511:2022.---

Wymagań eksploatacyjnych zgodnie z normą EN 14511-4:2022---

- 4.2.1 Testu rozruchu i pracy---
- 4.5 Zamknięcia przepływów medium wymiany ciepła---
- 4.6 Całkowitego zaniku zasilania---

Pomiaru mocy akustycznej zgodnie z normą EN 12102-1:2022.---

Wszystkie testy przeprowadzono zgodnie z regulaminem testu EHP-QL V.2.4.---

Nr w rejestrze badań: 300---

Duński Instytut Technologiczny

Strona 4 z 42---

300-KLAB-23-039-16---

Warunki testowe---

Warunki testowe badania współczynnika SCOP dla niskiej temperatury - EN 14825---

Warunki częściowego obciążenia dla referencyjnego współczynnika SCOP oraz referencyjnego współczynnika SCOP według obliczeń dla jednostek powietrze-woda dla zastosowania w niskiej temperaturze dla referencyjnego sezonu grzewczego;---

A = średni, W = cieplejszy oraz C = zimniejszy.---

	Współczynnik obciążenia częściowego w %				Zewnętrzny wymiennik ciepła		Wewnętrzny wymiennik ciepła			
					Temperatura termometru suchego (mokrego) °C		Stała temp. na wyjściu °C	Zmienna temp. na wyjściu[d] °C		
	Wzór	Średni	Cieplejszy	Zimniejszy	Powietrze na zewnątrz	Powietrze wywiewane	Wszystkie klimaty	Średni	Cieplejszy	Zimniejszy
A	$(-7-16)/(T_{designh}-16)$	88,46	nie dot.	60,53	-7(-8)	20(12)	a/35	a/34	nie dot.	a/30
B	$(+2-16)/(T_{designh}-16)$	53.85	100,00	36,84	2(1)	20(12)	a/35	a/30	a/35	a/27
C	$(+7-16)/(T_{designh}-16)$	34,62	64,29	23,68	7(6)	20(12)	a/35	a/27	a/31	a/25
D	$(+12-16)/(T_{designh}-16)$	15,38	28,57	10,53	12(11)	20(12)	a/35	a/24	a/26	a/24
E	$(TOL_e-16)/(T_{designh}-16)$				TOL_e	20(12)	a/35	a/b	a/b	a/b
F	$(T_{biv}-16)/(T_{designh}-16)$				T_{biv}	20(12)	a/35	a/c	a/c	a/c
G	$(-15-16)/(T_{designh}-16)$	nie dot.	nie dot.	81,58	-15	20(12)	a/35	nie dot.	nie dot.	a/32

Informacje dodatkowe---

Klimat	$T_{designh}$ [°C]	$T_{bivalent}$ [°C]	TOL [°C]	Temperatura na wyjściu	Natężenie przepływu
Średni	-10	-7	-10	Zmienna	Zmienne
Zimniejszy	-22	-15	-22	Zmienna	Zmienne
Cieplejszy	2	7	2	Zmienna	Zmienne

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Strona 5 z 42---

300-KLAB-23-039-16---

Warunki testowe badania współczynnika SCOP dla średniej temperatury - EN 14825---

Warunki częściowego obciążenia dla referencyjnego współczynnika SCOP oraz referencyjnego współczynnika SCOP według obliczeń dla jednostek powietrze-woda dla zastosowania w średniej temperaturze dla referencyjnego sezonu grzewczego;---

A = średni, W = cieplejszy oraz C = zimniejszy.---

	Współczynnik obciążenia częściowego w %				Zewnętrzny wymiennik ciepła		Wewnętrzny wymiennik ciepła			
					Temperatura termometru suchego (mokrego) °C		Stała temp. na wyjściu °C	Zmienna temp. na wyjściu[d] °C		
	Wzór	Średni	Cieplejszy	Zimniejszy	Powietrze na zewnątrz	Powietrze wywiewane	Wszystkie klimaty	Średni	Cieplejszy	Zimniejszy
A	$(-7-16)/(T_{designh}-16)$	88,46	nie dot.	60,53	-7(-8)	20(12)	a/55	a/52	nie dot.	a/44
B	$(+2-16)/(T_{designh}-16)$	53.85	100,00	36,84	2(1)	20(12)	a/55	a/42	a/55	a/37
C	$(+7-16)/(T_{designh}-16)$	34,62	64,29	23,68	7(6)	20(12)	a/55	a/36	a/46	a/32
D	$(+12-16)/(T_{designh}-16)$	15,38	28,57	10,53	12(11)	20(12)	a/55	a/30	a/34	a/28
E	$(TOL_e - 16) / (T_{designh} -16)$				TOL_e	20(12)	a/55	a/b	a/b	a/b
F	$(T_{biv} - 16) / (T_{designh} -16)$				T_{biv}	20(12)	a/55	a/c	a/c	a/c
G	$(-15-16) / (T_{designh}-16)$	nie dot.	nie dot.	81,58	-15	20(12)	a/55	nie dot.	nie dot.	a/49

Informacje dodatkowe---

Klimat	$T_{designh}$ [°C]	$T_{bivalent}$ [°C]	TOL [°C]	Temperatura na wyjściu	Natężenie przepływu
Średni	-10	-7	-10	Zmienna	Zmienne

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Warunki testowe badania współczynnika COP - niska temperatura - EN 14511---

Nr	Źródło ciepła		Radiator	
	Temp. termometru suchego na wejściu (°C)	Temp. termometru mokrego na wejściu (°C)	Temp. na wejściu (°C)	Temperatura na wyjściu (°C)
1^S	7	6	30	35

S: standardowy warunek wzorcowania---

Warunki testowe badania współczynnika COP - średnia temperatura - EN 14511---

Nr	Źródło ciepła		Radiator	
	Temp. termometru suchego na wejściu (°C)	Temp. termometru mokrego na wejściu (°C)	Temp. na wejściu (°C)	Temperatura na wyjściu (°C)
1^S	7	6	47	55

S: standardowy warunek wzorcowania---

Warunki testowe dla wymagań eksploatacyjnych - EN 14511-4---

Nr	Źródło ciepła		Radiator	Natężenie przepływu wody przy wewnętrznym wymienniku ciepła	Test
	Temp. termometru suchego na wejściu (°C)	Temp. termometru mokrego na wejściu (°C)	Temp. na wejściu (°C)		
1	-25	-	12	800 l/h	Rozruch
2	-25	0	38	710 l/h	Praca

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Warunki testowe dla zamknięcia przepływu medium wymiany ciepła - EN 14511-4---

Nr	Źródło ciepła		Radiator		Wymiennik ciepła
	Temp. termometru suchego na wejściu (°C)	Temp. termometru mokrego na wejściu (°C)	Temp. na wejściu (°C)	Temp. na wyjściu (°C)	
1	7	6	47	55	Wewnętrzny
2	7	6	47	55	Zewnętrzny

Warunki testowe dla całkowitego zaniku zasilania - EN 14511-4---

Nr	Źródło ciepła		Radiator	
	Temp. termometru suchego na wejściu (°C)	Temp. termometru mokrego na wejściu (°C)	Temp. na wejściu (°C)	Temp. na wyjściu (°C)
1	7	6	47	55

Warunki testowe dla pomiarów mocy akustycznej - EN 12102-1---

Nr	Warunek testowy		Nastawa pompy ciepła			
	Zewnętrzny wymiennik ciepła (termometr suchy/mokry) (°C)	Wewnętrzny wymiennik ciepła (wejście/wyjście) (°C)	Prędkość sprężarki (Hz)	Prędkość wentylatora na zewnątrz (obr./min)	Moc grzewcza (kW)	Pobór mocy (kW)
1F	7/6	30/35	64	730	15,70	3,49
2P	7/6	30/35	24	400	5,67	1,16
3F	7/6	47/55	72	650	16,14	5,65
4E	7/6	47/55	32	450	7,10	2,34

F) Pełne obciążenie, P) częściowe obciążenie oraz E) etykieta energetyczna ErP---

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Wyniki testów---

Wyniki testów współczynnika SCOP w niskiej temperaturze - średnia sezonu grzewczego - EN 14825---

Model (zewnętrzny)	MHC-V16W/D2RN8-B
Pompa ciepła powietrze-woda monoblok	T
Pompa ciepła niskotemperaturowa	N
Wyposażona w dodatkowy element grzejny	T
Grzejnik połączony z pompą ciepła	N
Odwracalna	T

Znamionowa moc cieplna[1)]	P_{rated}	15,2 [kW]
Sezonowej efektywność energetyczna ogrzewania pomieszczeń	n_s	184,1 [%]
	SCOP	4,68 [-]

Zmierzona wydajność dla ogrzewania dla częściowego obciążenia przy temp. zewnętrznej Tj	Średni klimat - Zastosowanie w niskiej temperaturze	Tj = -15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	13,27 [kW]
		Tj = 2 °C	Pdh	8,24 [kW]
		Tj=7 °C	Pdh	6,26 [kW]
		Tj = 12 °C	Pdh	7,26 [kW]
		Tj= punkt biwalentny	Pdh	13,27 [kW]
		Tj= eksploatacyjna wartość graniczna	Pdh	12,62 [kW]

Zmierzony współczynnik wydajności przy temperaturze zewnętrznej Tj	Średni klimat - Zastosowanie w niskiej temperaturze	Tj = -15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2,64 [-]
		Tj=2 °C	COPd	4,59 [-]
		Tj = 7 °C	COPd	6,62 [-]
		Tj = 12 °C	COPd	8,13 [-]
		Tj= punkt biwalentny	COPd	2,64 [-]
		Tj= eksploatacyjna wartość graniczna	COPd	2,51 [-]

Punkt biwalentny	Tbivalent	-7 [°C]
Eksploatacyjna wartość graniczna	TOL	-10 [°C]
Wartość temp.	WTOL	- [°C]
Współczynnik degradacji	Cdh	0,97 [-]

Pobór mocy w trybach innych niż tryb aktywny	Tryb wył.	P_{OFF}	0,021 [kW]
	Tryb termostat wył.	P_{TO}	0,026 [kW]
	Tryb gotowości	P_{SB}	0,021 [kW]
	Tryb grzałki skrzyni korbowej [2)]	P_{CK}	0,021 [kW]
Dodatkowy element grzejny[1)]	Znamionowa moc grzewcza	Psup	2,58 [kW]
	Zasilanie		Elektryczne

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Pozostałe pozycje	Sterowanie wydajnością		Zmienne
	Sterowanie przepływem wody		Zmienne
	Natężenie przepływu wody		-
	Roczne zużycie energii	QhE	6712 [kWh]

[1] W przypadku ogrzewaczy pomieszczeń korzystających z pompy ciepła oraz grzejników połączonych z pompą ciepła znamionowa moc grzewcza, P_{rated}, jest równa projektowemu obciążeniu cieplnemu, natomiast znamionowa moc grzewcza dodatkowego elementu grzejnego, P_{SUP}, jest równa dodatkowej wydajności grzewczej, sup(Tj).

[2] Dla wyznaczenia wartości SCOP przyjęto wartość PCK - PSB, zob. str. 15

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Wyniki testów współczynnika SCOP w średniej temperaturze - średnia sezonu grzewczego - EN 14825---

Model (zewnętrzny)	MHC-V16W/D2RN8-B
Pompa ciepła powietrze-woda monoblok	T
Pompa ciepła niskotemperaturowa	N
Wyposażona w dodatkowy element grzejny	T
Grzejnik połączony z pompą ciepła	N
Odwracalna	T

Znamionowa moc cieplna[1]	P_{rated}	13 [kW]
Sezonowej efektywność energetyczna ogrzewania pomieszczeń	n_s	137,3 [%]
	SCOP	3,51 [-]

Zmierzona wydajność dla ogrzewania dla częściowego obciążenia przy temp. zewnętrznej Tj	Średni klimat - Zastosowanie w średniej temperaturze	Tj = -15 °C	Pdh	- [kW]
		Tj=-7 °C	Pdh	11,68 [kW]
		Tj = 2 °C	Pdh	7,29 [kW]
		Tj=7 °C	Pdh	6,03 [kW]
		Tj = 12 °C	Pdh	6,89 [kW]
		Tj= punkt biwalentny	Pdh	11,68[kW]
		Tj= eksploatacyjna wartość graniczna	Pdh	10,53 [kW]

Zmierzony współczynnik wydajności przy temperaturze zewnętrznej Tj	Średni klimat - Zastosowanie w średniej temperaturze	Tj = -15 °C	COPd	- [-]
		Tj=-7 °C	COPd	2,02 [-]
		Tj=2 °C	COPd	3,42 [-]
		Tj = 7 °C	COPd	4,93 [-]
		Tj = 12 °C	COPd	6,02 [-]
		Tj= punkt biwalentny	COPd	2,02 [-]
		Tj= eksploatacyjna wartość graniczna	COPd	1,82 [-]

Punkt biwalentny	Tbivalent	-7 [°C]
Eksploatacyjna wartość graniczna	TOL	-10 [°C]
Wartość temp.	WTOL	- [°C]
Współczynnik degradacji	Cdh	0,98 [-]

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Pobór mocy w trybach innych niż tryb aktywny	Tryb wył.	P_{OFF}	0,021 [kW]
	Tryb termostat wył.	P_{TO}	0,026 [kW]
	Tryb gotowości	P_{SB}	0,021 [kW]
	Tryb grzałki skrzyni korbowej [2]	P_{CK}	0,021 [kW]
Dodatkowy element grzejny[1]	Znamionowa moc grzewcza	Psup	2,47 [kW]
	Zasilanie		Elektryczne

Pozostałe pozycje	Sterowanie wydajnością		Zmienne
	Sterowanie przepływem wody		Zmienne
	Natężenie przepływu wody		-
	Roczne zużycie energii	QhE	7655 [kWh]

[1]W przypadku ogrzewaczy pomieszczeń korzystających z pompy ciepła oraz grzejników połączonych z pompą ciepła znamionowa moc grzewcza, P_{rated}, jest równa projektowemu obciążeniu cieplnemu, natomiast moc grzewcza dodatkowego elementu grzejnego, P_{SUP}, jest równa dodatkowej wydajności grzewczej, sup(Tj).

[2] Dla wyznaczenia wartości SCOP przyjęto wartość PCK - PSB, zob. str. 17

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Wyniki testu dla cieplejszego klimatu, niska temperatura zgodnie z normą EN 14825---

Nr	Warunek testowy	Moc grzewcza [kW]	COP
1	B	13,106	3,508
2	Punk biwalentny F i C	8,750	5,514

Wyniki testu dla zimniejszego klimatu, niska temperatura zgodnie z normą 14825---

Nr	Warunek testowy	Moc grzewcza [kW]	COP
1	A	8,383	3,315
2	Punk biwalentny F i G	11,301	2,497

Wyniki testu współczynnika COP - niska temperatura - EN 14511---

Nr	Warunki testowe	Moc grzewcza [kW]	COP
1	A7/W35	15,707	4,498

Wyniki testu współczynnika COP - średnia temperatura - EN 14511---

Nr	Warunki testowe	Moc grzewcza [kW]	COP
1	A7/W55	16,139	2,854

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Wyniki testu dla rozruchu i pracy urządzenia - EN 14511-4---

Nr	Warunki testowe powietrze/woda wejście [°C]	Potwierdzenie testu
Rozruch	A-25/W18	Zaliczony
Praca	A-25/W38	Zaliczony

Wyniki testu dla zamknięcia przepływu medium wymiany ciepła - EN 14511-4---

Nr	Wymiennik ciepła	Potwierdzenie testu

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1	Wewnętrzny	Zaliczony
2	Zewnętrzny	Zaliczony

Wyniki testu całkowitego zaniku zasilania - EN 14511-4---

Nr	Potwierdzenie testu
1	Zaliczony

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Wyniki testu dla pomiarów mocy akustycznej - EN 12102-1---

Nr	Warunki testowe	Poziom mocy akustycznej LW (A) [dB Re 1pW]	Niepewność σ_{tot} [dB]
1^F	A7/W35	66,5	1,6
2^P	A7/W35	51,5	1,6
3^F	A7/W55	65,2	1,6
4^E	A7/W55	55,6	1,6

F) Pełne obciążenie, P) częściowe obciążenie oraz E) etykieta energetyczna ErP---

Całkowity poziom mocy akustycznej A wyznacza się dla zmierzonego zakresu częstotliwości od 100 Hz do 10 kHz. Wyznaczenie niepewności zob. załącznik 1.---

Pomiary mocy akustycznej wykonuje Kamalathasan Arumugam (KAMA), a sprawdza je Patrick Glibert (PGL), Duński Instytut Technologiczny.---

Ja, niżej podpisany, tłumacz przysięgły języka angielskiego z siedzibą w Opolu (Ministerstwo Sprawiedliwości, nr rej. TP/72/18), niniejszym oświadczam, że powyższy tekst jest wiernym tłumaczeniem przedstawionego mi elektronicznego dokumentu sporządzonego w języku angielskim. Na świadectwo powyższego składam podpis i pieczęć urzędu dnia 19 czerwca 2024 roku.
Repertorium: 71/2024

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Piotr Dzięciołowski

OŚWIADCZENIE

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

1) Prima 3F 12GT; Nr.kat.: 09-401210
Oznaczenie/typ/identyfikator modelu

2) Prima 3F 14GT; Nr.kat.: 09-401410
Oznaczenie/typ/identyfikator modelu

3) Prima 3F 16GT; Nr.kat.: 09-401610
Oznaczenie/typ/identyfikator modelu

4)
Oznaczenie/typ/identyfikator modelu

5)
Oznaczenie/typ/identyfikator modelu

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

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

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inż. Marek Balicz
Product Manager
produkcji pomp ciepła

Głubczyce, 07.06.2024
Miejscowość, data

Podpis osoby upoważnionej