

# OŚWIADCZENIE

Producent DE DIETRICH oświadcza, iż pompy ciepła

- 1) MODENA 12T (MONO 2 AWHP 12TR)  
Oznaczenie/typ/identyfikator modelu
- 2) MODENA 16T (MONO 2 AWHP 16TR)  
Oznaczenie/typ/identyfikator modelu
- 3) \_\_\_\_\_  
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.

Wrocław, 12.06.2024

Miejscowość, data



Podpis osoby upoważnionej

BDR Thermea Poland Sp. z o.o.  
ul. Północna 15-19  
54-105 Wrocław  
NIP:895-16-25-689



**Wyniki badań**

**Wyniki badań testu SCOP w niskiej temperaturze – sezon grzewczy umiarkowany – EN 14825**

Model (zewnątrzny)	MHC-V16W/D2RN8-B
Pompa ciepła powietrze-woda monoblok	T
Niskotemperaturowa pompa ciepła	N
Wyposażony w dodatkową grzałkę	T
Wielofunkcyjne ogrzewacze z pompą ciepła	N
Odwracalna	T

Znamionowa moc cieplna <sup>1)</sup>	Prated	15.2 [kW]
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	$\eta_s$	184.1 [%]
	SCOP	4.68 [-]

Zmierzona wydajność grzewcza przy częściowym obciążeniu przy temperaturze zewnętrznej Tj	Klimat umiarkowany-zastosowania niskotemperaturowe	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= temperatura biwalentna	Pdh	13.27 [kW]
		Tj= graniczna temperatura robocza	Pdh	12.62 [kW]

Zmierzony współczynnik wydajności przy temperaturze zewnętrznej Tj	Klimat umiarkowany-zastosowania niskotemperaturowe	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= temperatura biwalentna	COPd	2.64 [-]
		Tj= graniczna temperatura robocza	COPd	2.51 [-]

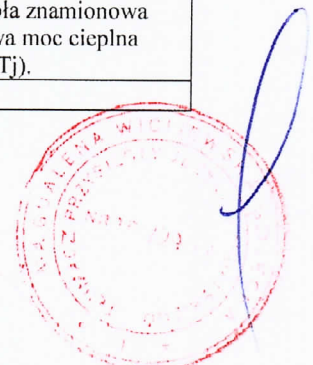
Temperatura biwalentna	Tbivalent	-7 °C]
Graniczna temperatura robocza	TOL	-10 [°C]
Temperatury	WTOL	- [°C]
Współczynnik degradacji	Cdh	0.97 [-]

Pobór mocy w trybach innych niż tryb aktywny	Tryb wyłączony	P <sub>OFF</sub>	0.021 [kW]
	Tryb wyłączenia termostatu	P <sub>TO</sub>	0.026 [kW]
	Tryb gotowości	P <sub>SB</sub>	0.021 [kW]
	Tryb grzałki karteru <sup>2)</sup>	P <sub>CK</sub>	0.021 [kW]
Dodatkowa grzałka <sup>1)</sup>	Znamionowa moc cieplna	P <sub>SUP</sub>	2.58 [kW]
	Rodzaj poboru energii		Elektryczna

Pozostałe parametry	Regulacja wydajności	Zmienna
	Regulacja przepływu wody	Zmienna
	Natężenie przepływu wody	-
	Roczne zużycie energii	Q <sub>HE</sub>

1) W przypadku ogrzewaczy pomieszczeń z pompą ciepła i wielofunkcyjnych ogrzewaczy z pompą ciepła znamionowa moc cieplna Prated jest równa obciążeniu obliczeniowemu dla trybu ogrzewania Pdesignh, a znamionowa moc cieplna ogrzewacza dodatkowego Psup jest równa dodatkowej wydajności grzewczej dla trybu ogrzewania sup(Tj).

2) Do obliczenia SCOP używana jest wartość PCK - PSB. Patrz strona 15



**Wyniki badań testu SCOP w średniej temperaturze – sezon grzewczy umiarkowany – EN 14825**

Model (zewnątrzny)	MHC-V16W/D2RN8-B
Pompa ciepła powietrze-woda monoblok	T
Niskotemperaturowa pompa ciepła	N
Wyposażony w dodatkową grzałkę	T
Wielofunkcyjne ogrzewacze z pompą ciepła	N
Odwracalna	T

Znamionowa moc cieplna <sup>1)</sup>	Prated	1.3 [kW]
Sezonowa efektywność energetyczna ogrzewania pomieszczeń	$\eta_s$	137.3 [%]
	SCOP	3.51 [-]

Zmierzona wydajność grzewcza przy częściowym obciążeniu przy temperaturze zewnętrznej Tj	Klimat umiarkowany-zastosowania średniotemperaturowe	Tj = -15 °C	Pdh	- [kW]
		Tj = -7 °C	Pdh	11.63 [kW]
		Tj = 2 °C	Pdh	7.29 [kW]
		Tj = 7 °C	Pdh	6.03 [kW]
		Tj = 12 °C	Pdh	6.89 [kW]
		Tj= temperatura biwalentna	Pdh	11.63 [kW]
		Tj= graniczna temperatura robocza	Pdh	10.53 [kW]

Zmierzony współczynnik wydajności przy temperaturze zewnętrznej Tj	Klimat umiarkowany-zastosowania średniotemperaturowe	Tj = -15 °C	COPd	- [-]
		Tj = -7 °C	CO Pd	2.02 [-]
		Tj = 2 °C	COPd	3.42 [-]
		Tj = 7 °C	COPd	4.93 [-]
		Tj = 12 °C	COPd	6.02 [-]
		Tj= temperatura biwalentna	COPd	2.02 [-]
		Tj= graniczna temperatura robocza	COPd	1.82 [-]

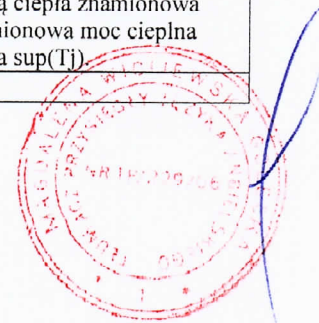
temperatura biwalentna	Tbivaent	-7 [°C]
graniczna temperatura robocza	TOL	-10 [°C]
temperatury	WTOL	- [°C]
Współczynnik degradacji	Cdh	0.98 [-]

Pobór mocy w trybach innych niż tryb aktywny	Tryb wyłączony	P <sub>OFF</sub>	0.021 [kW]
	Tryb wyłączenia termostatu	P <sub>TO</sub>	0.026 [kW]
	Tryb gotowości	P <sub>SB</sub>	0.021 [kW]
	Tryb grzałki karteru	P <sub>CK</sub>	0.021 [kW]
Dodatkowa grzałka <sup>1)</sup>	Znamionowa moc cieplna	P <sub>SUP</sub>	2.47 [kW]
	Rodzaj poboru energii		Elektryczna

Pozostałe parametry	Regulacja wydajności		Zmienna
	Regulacja przepływu wody		Zmienna
	Natężenie przepływu wody		-
	Roczne zużycie energii	Q <sub>HE</sub>	7655 [kWh]

<sup>1)</sup> W przypadku ogrzewaczy pomieszczeń z pompą ciepła i wielofunkcyjnych ogrzewaczy z pompą ciepła znamionowa moc cieplna Prated jest równa obciążeniu obliczeniowemu dla trybu ogrzewania Pdesignh, a znamionowa moc cieplna ogrzewacza dodatkowego Psup jest równa dodatkowej wydajności grzewczej dla trybu ogrzewania sup(Tj)

<sup>2)</sup> Do obliczenia SCOP używana jest wartość PCK - PSB. Patrz strona 17



**Wyniki badań dla cieplejszego klimatu i niskiej temperatury zgodnie z EN14825**

Nr	Warunki testowe	Wydajność grzewcza [kW]	COP
1	B	13.106	3.508
2	Tbivalent F i C	8.750	5.514

**Wyniki badań dla chłodniejszego klimatu i niskiej temperatury zgodnie z EN14825**

Nr	Warunki testowe	Wydajność grzewcza [kW]	COP
1	A	8.383	3.315
2	Tbivalent F i G	11.301	2.497

**Wyniki badań COP - niska temperatura - EN 14511**

Nr	Warunki testowe	Wydajność grzewcza [kW]	COP
1	A7/W35	15.707	4.498

**Wyniki badań COP - średnia temperatura - EN 14511**

Nr	Warunki testowe	Wydajność grzewcza [kW]	COP
1	A7/W55	16.139	2.854

[koniec strony]



### Wyniki badań pomiarów mocy akustycznej - EN 12102

Nr	Warunki testowe	Poziom mocy akustycznej LW(A) [dB re 1pW]	Niepewność Otot [dB]
1 <sup>E</sup>	A7/W35	66.5	1.6
2 <sup>P</sup>	A7/W35	51.5	1.6
3 <sup>F</sup>	A7/W55	65.2	1.6
4 <sup>E</sup>	A7/55	55.6	1.6

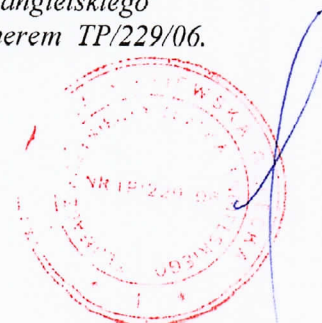
F) Pełne obciążenie, P) Częściowe obciążenie, E) Oznaczenie ErP

Całkowity poziom mocy akustycznej ważony krzywą korekcyjną A jest wyznaczany dla mierzonego zakresu częstotliwości od 100 Hz do 10 kHz. Aby obliczyć niepewność, patrz załącznik 1.

Pomiary mocy akustycznej przeprowadza Kamalathasan Arumugam (KAMA), a weryfikuje Patrick Glibert (PGL) z Duńskiego Instytutu Technologicznego.

[koniec tłumaczenia]

Poświadczam zgodność powyższego tłumaczenia z przedłożonym dokumentem sporządzonym w języku angielskim. Magister Magdalena Wicijewska-Golecka Tłumacz przysięgły języka angielskiego wpisana na Listę Tłumaczy przysięgłych przez Ministra Sprawiedliwości pod numerem TP/229/06. Numer repertorium 2849/2024 Ilość stron taryfowych 7 Wrocław, dnia 06.06.2024



# TEST REPORT

Report no.:  
300-KLAB-23-039-21



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Init: PRES/RTHI

File no.: 226006

Enclosures: 2

**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.: 541K814480238190100003  
Prod. year: Outdoor unit: N/A

**Dates:** Test period: December 2023 – January 2024

**Brand name:** Brand: De Dietrich  
Type: Air to water heat pump (mono block)  
Model: Mono 2 AWHP 16TR

**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.

**Terms:** This test was conducted under accreditation in accordance with international requirements (ISO/IEC 17025:2017) and in accordance with the General Terms and Conditions of Danish Technological Institute. The test results solely apply to the tested item. This test report may be quoted in extract only if Danish Technological Institute has granted its written consent.

The customer may not mention or refer to Danish Technological Institute or Danish Technological Institute's employees for advertising or marketing purposes unless Danish Technological Institute has granted its written consent in each case.

**Division/Centre:** Danish Technological Institute  
Energy and Climate  
Heat Pump Laboratory, Aarhus

**Date:** 2024.05.16

**Signature:**  
Preben Eskerod  
B.TecMan & MarEng

**Co-reader:**  
Rasmus Thisgaard  
B.TecMan & MarEng



Test Reg. nr. 300



## Heat pumps of identical design

According to GD MIDEA HEATING & VENTILATING EQUIPMENT CO. LTD. The heat pumps listed in the table below are considered identical with the tested unit. They have identical:

- a. heating capacity
- b. refrigerant cycle (incl. refrigerant mass)
- c. heat source and sink medium
- d. main components / operating principle and control strategy
- e. same outdoor casing

<b>Brand</b>	<b>Model 380-415V 3ph/50Hz</b>
Midea	MHC-V16W/D2RN8-B
Midea	MHC-V16W/D2RN8-BE30
Midea	MHC-V16W/D2RN8-BER90
Midea	MHC-V16W/D2RN8-B1
Midea	MHC-V16W/D2RN8-B1E30
Midea	MHC-V16W/D2RN8-B1ER90
Midea	MHC-V16W/D2RN8-B2
Midea	MHC-V16W/D2RN8-B2E30
Midea	MHC-V16W/D2RN8-B2ER90

<b>Brand</b>	<b>Model 220-240 1ph/50Hz</b>
Midea	MHC-V16W/D2N8-B
Midea	MHC-V16W/D2N8-BE30
Midea	MHC-V16W/D2N8-BER90
Midea	MHC-V16W/D2N8-B1
Midea	MHC-V16W/D2N8-B1E30
Midea	MHC-V16W/D2N8-B1ER90
Midea	MHC-V16W/D2N8-B2
Midea	MHC-V16W/D2N8-B2E30
Midea	MHC-V16W/D2N8-B2ER90





## 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<sub>B</sub> and SCOP<sub>C</sub> at low temperature application for warmer climate according to EN 14825:2022.

SCOP part load test conditions SCOP<sub>A</sub> and SCOP<sub>F/G</sub> 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.



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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 <sup>d</sup> °C		
	Formula	Average	Warmer	Colder	Outdoor air	Exhaust air	All climates	Average	Warmer	Colder
A	$(-7 - 16) / (T_{\text{designh}} - 16)$	88,46	n.a.	60,53	-7(-8)	20(12)	a / 35	a / 34	n.a.	a / 30
B	$(+2 - 16) / (T_{\text{designh}} - 16)$	53,85	100,00	36,84	2(1)	20(12)	a / 35	a / 30	a / 35	a / 27
C	$(+7 - 16) / (T_{\text{designh}} - 16)$	34,62	64,29	23,68	7(6)	20(12)	a / 35	a / 27	a / 31	a / 25
D	$(+12 - 16) / (T_{\text{designh}} - 16)$	15,38	28,57	10,53	12(11)	20(12)	a / 35	a / 24	a / 26	a / 24
E	$(TOL^e - 16) / (T_{\text{designh}} - 16)$				$TOL^e$	20(12)	a / 35	a / b	a / b	a / b
F	$(T_{\text{biv}} - 16) / (T_{\text{designh}} - 16)$				$T_{\text{biv}}$	20(12)	a / 35	a / c	a / c	a / c
G	$(-15 - 16) / (T_{\text{designh}} - 16)$	n.a.	n.a.	81,58	-15	20(12)	a / 35	n.a.	n.a.	a / 32

### Additional information

Climate	$T_{\text{designh}}$ [°C]	$T_{\text{bivalent}}$ [°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 <sup>d</sup> °C		
	Formula	Average	Warmer	Colder	Outdoor air	Exhaust air	All climates	Average	Warmer	Colder
A	$\frac{-7 - 16}{(T_{designh} - 16)}$	88,46	n.a.	60,53	-7(-8)	20(12)	<sup>a</sup> / 55	<sup>a</sup> / 52	n.a.	<sup>a</sup> / 44
B	$\frac{+2 - 16}{(T_{designh} - 16)}$	53,85	100	36,84	2(1)	20(12)	<sup>a</sup> / 55	<sup>a</sup> / 42	<sup>a</sup> / 55	<sup>a</sup> / 37
C	$\frac{+7 - 16}{(T_{designh} - 16)}$	34,62	64,29	23,68	7(6)	20(12)	<sup>a</sup> / 55	<sup>a</sup> / 36	<sup>a</sup> / 46	<sup>a</sup> / 32
D	$\frac{+12 - 16}{(T_{designh} - 16)}$	15,38	28,57	10,53	12(11)	20(12)	<sup>a</sup> / 55	<sup>a</sup> / 30	<sup>a</sup> / 34	<sup>a</sup> / 28
E	$(TOL^e - 16) / (T_{designh} - 16)$				$TOL^e$	20(12)	<sup>a</sup> / 55	<sup>a</sup> / <sup>b</sup>	<sup>a</sup> / <sup>b</sup>	<sup>a</sup> / <sup>b</sup>
F	$(T_{biv} - 16) / (T_{designh} - 16)$				$T_{biv}$	20(12)	<sup>a</sup> / 55	<sup>a</sup> / <sup>c</sup>	<sup>a</sup> / <sup>c</sup>	<sup>a</sup> / <sup>c</sup>
G	$\frac{-15 - 16}{(T_{designh} - 16)}$	n.a.	n.a.	81,58	-15	20(12)	<sup>a</sup> / 55	n.a.	n.a.	<sup>a</sup> / 49

### Additional information

Climate	T <sub>designh</sub> [°C]	T <sub>bivalent</sub> [°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)
1 <sup>S</sup>	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)
1 <sup>S</sup>	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 <sup>F</sup>	7/6	30/35	64	730	15.70	3.49
2 <sup>P</sup>	7/6	30/35	24	400	5.67	1.16
3 <sup>F</sup>	7/6	47/55	72	650	16.14	5.65
4 <sup>E</sup>	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

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

<b>Rated heat output<sup>1)</sup></b>	$P_{rated}$	<b>15.2 [kW]</b>
<b>Seasonal space heating energy efficiency</b>	$\eta_s$	<b>184.1 [%]</b>
	SCOP	<b>4.68 [-]</b>

<b>Measured capacity for heating for part load at outdoor temperature <math>T_j</math></b>	Average Climate	$T_j = -15\text{ °C}$	$P_{dh}$	- [kW]
	-	$T_j = -7\text{ °C}$	$P_{dh}$	13.27 [kW]
	Low temperature application	$T_j = 2\text{ °C}$	$P_{dh}$	8.24 [kW]
		$T_j = 7\text{ °C}$	$P_{dh}$	6.26 [kW]
		$T_j = 12\text{ °C}$	$P_{dh}$	7.26 [kW]
		$T_j = \text{bivalent temperature}$	$P_{dh}$	13.27 [kW]
		$T_j = \text{operation limit}$	$P_{dh}$	12.62 [kW]

<b>Measured coefficient of performance at outdoor temperature <math>T_j</math></b>	Average Climate	$T_j = -15\text{ °C}$	COPd	- [-]
	-	$T_j = -7\text{ °C}$	COPd	2.64 [-]
	Low temperature application	$T_j = 2\text{ °C}$	COPd	4.59 [-]
		$T_j = 7\text{ °C}$	COPd	6.62 [-]
		$T_j = 12\text{ °C}$	COPd	8.13 [-]
		$T_j = \text{bivalent temperature}$	COPd	2.64 [-]
		$T_j = \text{operation limit}$	COPd	2.51 [-]

<b>Bivalent temperature</b>	$T_{bivalent}$	-7 [°C]
<b>Operation limit temperatures</b>	TOL	-10 [°C]
<b>Degradation coefficient</b>	$C_{dh}$	0.97 [-]

<b>Power consumption in modes other than active mode</b>	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 <sup>2)</sup>	$P_{CK}$	0.021 [kW]
<b>Supplementary heater<sup>1)</sup></b>	Rated heat output	$P_{SUP}$	2.58 [kW]
	Type of energy input		Electrical

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

<sup>1)</sup>For heat pump space heaters and heat pump combination heaters, the rated heat output,  $P_{rated}$ , is equal to the design load for heating,  $P_{design,h}$ , and the rated heat output of a supplementary heater,  $P_{sup}$ , is equal to the supplementary capacity for heating,  $sup(T_j)$ .

<sup>2)</sup>For SCOP calculation the value  $P_{CK} - P_{SB}$  is used. See page 15





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

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

<b>Rated heat output<sup>1)</sup></b>	$P_{rated}$	<b>13 [kW]</b>
<b>Seasonal space heating energy efficiency</b>	$\eta_s$	<b>137.3 [%]</b>
	SCOP	<b>3.51 [-]</b>

<b>Measured capacity for heating for part load at outdoor temperature <math>T_j</math></b>	Average Climate - Medium temperature application	$T_j = -15\text{ °C}$	$P_{dh}$	- [kW]
		$T_j = -7\text{ °C}$	$P_{dh}$	11.68 [kW]
		$T_j = 2\text{ °C}$	$P_{dh}$	7.29 [kW]
		$T_j = 7\text{ °C}$	$P_{dh}$	6.03 [kW]
		$T_j = 12\text{ °C}$	$P_{dh}$	6.89 [kW]
		$T_j = \text{bivalent temperature}$	$P_{dh}$	11.68 [kW]
		$T_j = \text{operation limit}$	$P_{dh}$	10.53 [kW]

<b>Measured coefficient of performance at outdoor temperature <math>T_j</math></b>	Average Climate - Medium temperature application	$T_j = -15\text{ °C}$	COPd	- [-]
		$T_j = -7\text{ °C}$	COPd	2.02 [-]
		$T_j = 2\text{ °C}$	COPd	3.42 [-]
		$T_j = 7\text{ °C}$	COPd	4.93 [-]
		$T_j = 12\text{ °C}$	COPd	6.02 [-]
		$T_j = \text{bivalent temperature}$	COPd	2.02 [-]
		$T_j = \text{operation limit}$	COPd	1.82 [-]

<b>Bivalent temperature</b>	$T_{bivalent}$	-7 [°C]
<b>Operation limit temperatures</b>	TOL	-10 [°C]
<b>Degradation coefficient</b>	WTOL	- [°C]
	$C_{dh}$	0.98 [-]

<b>Power consumption in modes other than active mode</b>	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]
<b>Supplementary heater<sup>1)</sup></b>	Rated heat output	$P_{SUP}$	2.47 [kW]
	Type of energy input		Electrical

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

<sup>1)</sup>For heat pump space heaters and heat pump combination heaters, the rated heat output,  $P_{rated}$ , is equal to the design load for heating,  $P_{designgh}$ , and the rated heat output of a supplementary heater,  $P_{sup}$ , is equal to the supplementary capacity for heating,  $sup(T_j)$ .

<sup>2)</sup>For SCOP calculation the value  $P_{CK} - P_{SB}$  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 <sup>#</sup>	Test conditions	Sound power level LW(A) [dB re 1pW]	Uncertainty $\sigma_{\text{tot}}$ [dB]
1 <sup>F</sup>	A7/W35	66.5	1.6
2 <sup>P</sup>	A7/W35	51.5	1.6
3 <sup>F</sup>	A7/W55	65.2	1.6
4 <sup>E</sup>	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 Kamalathan Arumugam (KAMA) and co-read by Patrick Glibert (PGL), Danish Technological Institute.



## Photos

### Rating plate

MONOBLOC HEAT PUMP	
MODEL	MHC-V16W/D2RN8-B
COOLING CAPACITY/EEER @ A35W18	14.20kW / 3.61
HEATING CAPACITY/COP @ A7W35	15.90kW / 4.50
POWER SOURCE	380-415V 3N-50Hz
RATED INPUT	6200W
RATED WATER PRESSURE	0.1-0.3MPa
NET WEIGHT	144kg
REFRIGERANT	R32/1750g
GWP	675
EQUIVALENT CO <sub>2</sub>	1.18t
EXCESSIVE OPERATING PRESSURE	HIGH 4.3MPa LOW 2.0MPa
MAXIMUM ALLOWABLE PRESSURE	4.3MPa
OUTDOOR RESISTANCE CLASS	IP24
	
Hermetically sealed equipment contains fluorinated greenhouse gases	
	
GD Midea Heating & Ventilating Equipment Co., Ltd. (Penglai Industry Road, Deyin, Shoude, Weihai, Shandong, P.R. China)	



### 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 [-]
<b>A</b>	-7	88	13.45	13.27	2.64	0.99	1.00	2.64
<b>B</b>	2	54	8.18	8.24	4.59	0.99	1.00	4.59
<b>C</b>	7	35	5.26	6.26	6.62	0.97	0.84	6.58
<b>D</b>	12	15	2.34	7.26	8.13	0.97	0.32	7.66
<b>E</b>	-10	100	15.20	12.62	2.51	0.99	1.00	2.51
<b>F - BIV</b>	-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]
<b>Off mode</b>	0	0.02097	0.02097	0
<b>Thermostat off</b>	178	0.02612	0.02612	4.64936
<b>Standby</b>	0	0.02097	0.02097	0
<b>Crankcase heater</b>	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]	
<b>E</b>	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	
<b>A / F - BIV</b>	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>B</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	
<b>C</b>		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	
	<b>D</b>	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	

<b>SUM</b>	31397.35	6706.27	31327.85	6636.77
<b>SCOPon</b>		4.68	<b>SCOPnet</b>	4.72



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

### Calculation of reference SCOP

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

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<sub>on</sub>

	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 <sub>bin</sub> [-]	Annual heating demand [kWh]	Annual energy input [kWh]	Net annual heating capacity [kWh]	Net annual power input [kWh]
	[-]											
<b>E</b>	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
<b>A / F - BIV</b>	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>B</b>	33	2	320	7.00	7.00	0.00	0.00	3.42	2240.00	654.97	2240.00
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
<b>C</b>	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
<b>D</b>	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

<b>SUM</b>	26853.00	7648.65	26790.45	7586.11
<b>SCOP<sub>on</sub></b>		3.51	<b>SCOP<sub>net</sub></b>	3.53



## Detailed test results

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

<b>Detailed result for 'EN14825:2022' Average Low (A and F) A -7 /W34</b>		
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	
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>13.271</b>
COP	-	<b>2.642</b>
Power consumption	kW	<b>5.023</b>
<b>Measured</b>		
Heating capacity	kW	13.299
COP	-	2.630
Power consumption	kW	5.057
<b>During heating</b>		
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	<b>34.06</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000694



<b>Detailed result for 'EN14825:2022' Average Low (B) A 2 /W30</b>		
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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>8.235</b>
COP	-	<b>4.589</b>
Power consumption	kW	<b>1.795</b>
<b>Measured</b>		
Heating capacity	kW	8.249
COP	-	4.556
Power consumption	kW	1.810
<b>During heating</b>		
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	<b>30.08</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000417



<b>Detailed result for 'EN14825:2022' Average Low (C) A 7 /W27</b>		
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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>6.264</b>
COP	-	<b>6.615</b>
Power consumption	kW	<b>0.947</b>
<b>Measured</b>		
Heating capacity	kW	6.266
COP	-	6.601
Power consumption	kW	0.949
<b>During heating</b>		
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	<b>26.98</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000303



<b>Detailed result for 'EN14825:2022' Average Low (D) A 12 /W24</b>		
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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>7.265</b>
COP	-	<b>8.134</b>
Power consumption	kW	<b>0.893</b>
<b>Measured</b>		
Heating capacity	kW	7.271
COP	-	8.081
Power consumption	kW	0.900
<b>During heating</b>		
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	<b>23.99</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000348



<b>Detailed result for 'EN14825:2022' Average Low (E) A -10 /W35</b>		
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	
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>12.620</b>
COP	-	<b>2.509</b>
Power consumption	kW	<b>5.030</b>
<b>Measured</b>		
Heating capacity	kW	12.640
COP	-	2.501
Power consumption	kW	5.055
<b>During heating</b>		
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	<b>35.02</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000619



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

<b>Detailed result for 'EN14825:2022' Average Medium (A and F) A -7 /W52</b>		
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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>11.680</b>
COP	-	<b>2.012</b>
Power consumption	kW	<b>5.805</b>
<b>Measured</b>		
Heating capacity	kW	11.694
COP	-	2.009
Power consumption	kW	5.821
<b>During heating</b>		
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	<b>52.29</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000361



<b>Detailed result for 'EN14825:2022' Average Medium (B) A 2 /W42</b>		
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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>7.291</b>
COP	-	<b>3.420</b>
Power consumption	kW	<b>2.132</b>
<b>Measured</b>		
Heating capacity	kW	7.296
COP	-	3.414
Power consumption	kW	2.137
<b>During heating</b>		
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	<b>42.18</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000231





<b>Detailed result for 'EN14825:2022' Average Medium (C) A 7 /W36</b>		
Tested according to:	EN14511:2022	EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		C
Condition temperature:	°C	7
Part load:	%	35%
Chosen Tivalent	°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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>6.028</b>
COP	-	<b>4.935</b>
Power consumption	kW	<b>1.222</b>
<b>Measured</b>		
Heating capacity	kW	6.041
COP	-	4.884
Power consumption	kW	1.237
<b>During heating</b>		
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	<b>35.87</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000182



<b>Detailed result for 'EN14825:2022' Average Medium (D) A 12 /W30</b>		
Tested according to:	EN14511:2022	EN14825:2022
Climate zone:		Average
Temperature application:		Medium
Condition name:		D
Condition temperature:	°C	12
Part load:	%	15%
Chosen Tivalent	°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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>6.889</b>
COP	-	<b>6.019</b>
Power consumption	kW	<b>1.145</b>
<b>Measured</b>		
Heating capacity	kW	6.893
COP	-	6.001
Power consumption	kW	1.149
<b>During heating</b>		
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	<b>30.03</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000208



<b>Detailed result for 'EN14825:2022' Average Medium (E) A -10 /W55</b>		
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 Tivalent	°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	
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>10.531</b>
COP	-	<b>1.818</b>
Power consumption	kW	<b>5.792</b>
<b>Measured</b>		
Heating capacity	kW	10.545
COP	-	1.816
Power consumption	kW	5.807
<b>During heating</b>		
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	<b>55.07</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000329



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

<b>Detailed result for 'EN14825:2022' Warmer Low (B) A 2 /W35</b>		
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	
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>13.106</b>
COP	-	<b>3.508</b>
Power consumption	kW	<b>3.736</b>
<b>Measured</b>		
Heating capacity	kW	13.134
COP	-	3.482
Power consumption	kW	3.772
<b>During heating</b>		
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	<b>35.08</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000709



<b>Detailed result for 'EN14825:2022' Warmer Low (C) A 7 /W31</b>		
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	
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>8.750</b>
COP	-	<b>5.514</b>
Power consumption	kW	<b>1.587</b>
<b>Measured</b>		
Heating capacity	kW	8.737
COP	-	5.557
Power consumption	kW	1.572
<b>During heating</b>		
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	<b>31.04</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000419



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

<b>Detailed result for 'EN14825:2022' Colder Low (A) A -7 /W30</b>		
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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>8.383</b>
COP	-	<b>3.315</b>
Power consumption	kW	<b>2.529</b>
<b>Measured</b>		
Heating capacity	kW	8.386
COP	-	3.312
Power consumption	kW	2.532
<b>During heating</b>		
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	<b>30.13</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000411



<b>Detailed result for 'EN14825:2018' Colder Low (F and G) A -15 /W32</b>		
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
<b>Included corrections (Final result)</b>		
Heating capacity	kW	<b>11.301</b>
COP	-	<b>2.497</b>
Power consumption	kW	<b>4.526</b>
<b>Measured</b>		
Heating capacity	kW	11.328
COP	-	2.484
Power consumption	kW	4.560
<b>During heating</b>		
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	<b>32.09</b>
<b>Circulation pump</b>		
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 <sup>3</sup> /s	0.000536



## Detailed COP test results - low temperature – EN 14511

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





## Detailed COP test results - medium temperature – EN 14511

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



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

		<b>Sound power levels according to ISO 3743-1:2010</b>																																																																			
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 insulators and placed on four pieces of concrete tiles (20x20x2.5 cm). All of these are placed in a water drop tray 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: 64[Hz], Fan speed: 730[rpm], Pump speed: 80 [%], EXV1(P): 138, Heating capacity: 15.7 [kW], Power_input: 3.49 [kW], Water flow rate: 2720 [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		L3: 0.9 m																																																																			
Area, S, of test room: 138.9 m²		Volume: 0.5 m³																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Frequency f [Hz]</th> <th>L<sub>w</sub> 1/3 octave [dB]</th> <th>1/1 oct [dB]</th> </tr> </thead> <tbody> <tr><td>100</td><td>67.3</td><td></td></tr> <tr><td>125</td><td>62.7</td><td>69.5</td></tr> <tr><td>160</td><td>62.4</td><td></td></tr> <tr><td>200</td><td>61.6</td><td></td></tr> <tr><td>250</td><td>61.3</td><td>66.0</td></tr> <tr><td>315</td><td>60.9</td><td></td></tr> <tr><td>400</td><td>59.8</td><td></td></tr> <tr><td>500</td><td>59.3</td><td>64.5</td></tr> <tr><td>630</td><td>60.1</td><td></td></tr> <tr><td>800</td><td>59.5</td><td></td></tr> <tr><td>1000</td><td>56.5</td><td>62.2</td></tr> <tr><td>1250</td><td>54.9</td><td></td></tr> <tr><td>1600</td><td>53.6</td><td></td></tr> <tr><td>2000</td><td>51.8</td><td>56.7</td></tr> <tr><td>2500</td><td>49.4</td><td></td></tr> <tr><td>3150</td><td>46.6</td><td></td></tr> <tr><td>4000</td><td>44.4</td><td>49.4</td></tr> <tr><td>5000</td><td>41.7</td><td></td></tr> <tr><td>6300</td><td>40.4</td><td></td></tr> <tr><td>8000</td><td>41.1</td><td>45.9</td></tr> <tr><td>10000</td><td>41.7</td><td></td></tr> </tbody> </table>		Frequency f [Hz]	L <sub>w</sub> 1/3 octave [dB]	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			
Frequency f [Hz]	L <sub>w</sub> 1/3 octave [dB]	1/1 oct [dB]																																																																			
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2000	51.8	56.7																																																																			
2500	49.4																																																																				
3150	46.6																																																																				
4000	44.4	49.4																																																																			
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6300	40.4																																																																				
8000	41.1	45.9																																																																			
10000	41.7																																																																				
<b>Sound power level L<sub>w</sub>(A): 66.5 dB [re 1pW],      Uncertainty <math>\sigma_{tot}</math>: 1.6 dB</b>																																																																					
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

		<b>Sound power levels according to ISO 3743-1:2010</b>																																																																			
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 insulators and placed on four pieces of concrete tiles (20x20x2.5 cm). All of these are placed in a water drop tray 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	<u>Reference box:</u>																																																																			
Air temperature:	7.0 °C	L1:	1.4 m																																																																		
Relative air humidity:	84.0 %	L2:	0.4 m																																																																		
Test room volume:	102.8 m <sup>3</sup>	L3:	0.9 m																																																																		
Area, S, of test room:	138.9 m <sup>2</sup>	Room:	Room 2																																																																		
		Volume:	0.5 m <sup>3</sup>																																																																		
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Frequency f [Hz]</th> <th>L<sub>w</sub> 1/3 octave [dB]</th> <th>1/1 oct [dB]</th> </tr> </thead> <tbody> <tr><td>100</td><td>67.3</td><td></td></tr> <tr><td>125</td><td>64.4</td><td>70.8</td></tr> <tr><td>160</td><td>66.0</td><td></td></tr> <tr><td>200</td><td>63.1</td><td></td></tr> <tr><td>250</td><td>59.5</td><td>65.8</td></tr> <tr><td>315</td><td>59.2</td><td></td></tr> <tr><td>400</td><td>58.6</td><td></td></tr> <tr><td>500</td><td>57.4</td><td>63.4</td></tr> <tr><td>630</td><td>59.6</td><td></td></tr> <tr><td>800</td><td>57.1</td><td></td></tr> <tr><td>1000</td><td>54.4</td><td>59.8</td></tr> <tr><td>1250</td><td>52.4</td><td></td></tr> <tr><td>1600</td><td>51.6</td><td></td></tr> <tr><td>2000</td><td>49.8</td><td>55.1</td></tr> <tr><td>2500</td><td>49.1</td><td></td></tr> <tr><td>3150</td><td>46.3</td><td></td></tr> <tr><td>4000</td><td>44.9</td><td>49.2</td></tr> <tr><td>5000</td><td>39.9</td><td></td></tr> <tr><td>6300</td><td>38.9</td><td></td></tr> <tr><td>8000</td><td>40.7</td><td>45.4</td></tr> <tr><td>10000</td><td>41.7</td><td></td></tr> </tbody> </table>	Frequency f [Hz]	L <sub>w</sub> 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				
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<b>Sound power level L<sub>w</sub>(A): 65.2 dB [re 1pW],      Uncertainty <math>\sigma_{tot}</math>: 1.6 dB</b>																																																																					
Name of test institute:	DTI	Date:	18-01-2024																																																																		
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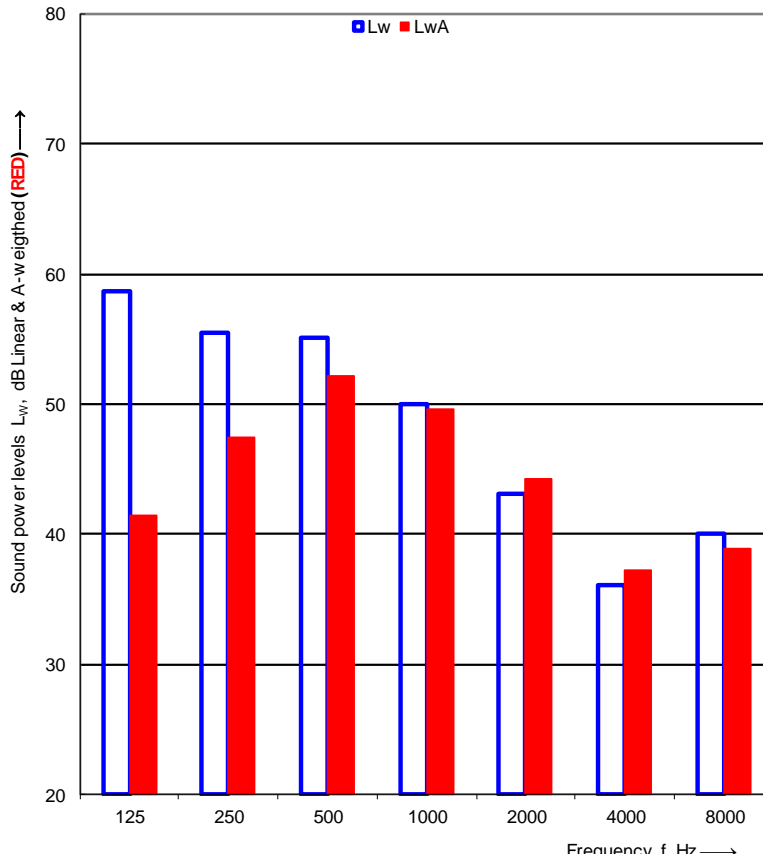


## Detailed test results of sound power measurement – Test N#4

	<h3>Sound power levels according to ISO 3743-1:2010</h3>	 <b>TEKNOLOGISK INSTITUT</b>	
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 insulators and placed on four pieces of concrete tiles (20x20x2.5 cm). All of these are placed in a water drop tray 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	<u>Reference box:</u>	
Air temperature:	7.0 °C	L1:	1.4 m
Relative air humidity:	84.0 %	L2:	0.4 m
Test room volume:	102.8 m <sup>3</sup>	Room:	Room 2
Area, S, of test room:	138.9 m <sup>2</sup>	L3:	0.9 m
		Volume:	0.5 m <sup>3</sup>

Frequency f [Hz]	L <sub>w</sub> 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	50.0
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	

<b>Sound power level L<sub>w</sub>(A): 55.6 dB [re 1pW],      Uncertainty <math>\sigma_{tot}</math>: 1.6 dB</b>
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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			





## 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<sup>3</sup> 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

<b>Id nr.</b>	<b>Manufacturer</b>	<b>Description</b>	<b>Calibration company</b>
100864	GRAS	Gras 40AE_26CA, 1/2" free field microphone, Room 1	Norsonic A/S, Norway
100865	GRAS	Gras 40AE_26CA, 1/2" free field microphone, Room 1	Norsonic A/S, Norway
100866	GRAS	Gras 40AE_26CA, 1/2" free field microphone, Room 1	Norsonic A/S, Norway
100867*	GRAS	Gras 40AE_26CA, 1/2" free field microphone, Room 2	Norsonic A/S, Norway
100868*	GRAS	Gras 40AE_26CA, 1/2" free field microphone, Room 2	Norsonic A/S, Norway
100869*	GRAS	Gras 40AE_26CA, 1/2" free field microphone, Room 2	Norsonic A/S, Norway
100870	GRAS	Gras 40AE_26CA, 1/2" 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:

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

$\sigma_{RO}$  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.

$\sigma_{omc}$  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  $\sigma_{\text{omc}}$  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  $\sigma_{\text{RO}}$  is set to 1.5.

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

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

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 BDR.THERMEA France are identical to our following models

Master company(Midea) model	De Dietrich model
MHC - V4W/D2N8-B	Mono 2 AWHP 4MR
MHC - V6W/D2N8-B	Mono 2 AWHP 6MR
MHC - V8W/D2N8-B	Mono 2 AWHP 8MR
MHC - V10W/D2N8-B	Mono 2 AWHP 10MR
MHC - V12W/D2N8-B	Mono 2 AWHP 12MR
MHC - V16W/D2N8-B	Mono 2 AWHP 16MR
MHC - V12W/D2RN8-B	Mono 2 AWHP 12TR
MHC - V16W/D2RN8-B	Mono 2 AWHP 16TR

Company name: BDR.THERMEA France

Tradename /-mark: De Dietrich

Address: 57, rue de la gare F-67580 - MERTZWILLER

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

**Production year: 2021~2024**

Date : 20/03/2024

Authorization:

