

# TECHNICAL BROCHURE



## HOT WATER HEAT PUMPS

4 kW – 65kW

MANUFACTURED BY:



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## **ENERFLOW EH-MT AND EHR-MT HEAT PUMPS: ENERGY EFFICIENT WATER HEATING UNITS**

The **ENERFLOW** EH-MT and EHR-MT -MT series External Air water heat pumps recover heat contained in the ambient air and transfer it to the water. **ENERFLOW** EH-MT and EHR-MT heat pumps are extremely energy efficient. They consume (in the form of electrical power) only a fraction of the energy transferred to the water. In cases where heating is currently being done by means of electrical resistance elements or a diesel-fired heater, energy costs can be reduced by as much as 80%, depending on the temperature of the water and the temperature of the ambient air.

### **APPLICATIONS**

**ENERFLOW** EH-MT and EHR-MT heat pumps are ideally suited for the following applications:

- hot water systems for hotels, hostels, hospitals, schools, office blocks, universities and residential units
- green houses
- laundromats
- hot water for space heating of buildings
- industrial hot water systems.

### **MODELS**

#### **Model EH-MT**

These models operate at above zero temperatures down to approximately +3 °C. Defrosting of the air heat exchanger is done by stopping the compressor whilst maintaining air flow through the coil. This model can be used in areas where the ambient temperature seldom drops below +3 °C.

#### **Model EHR-MT**

These models can be used at below zero temperatures down to -10 °C. Defrost is accomplished by reversal of the heat pump cycle. This model must be used in areas where the ambient temperature drops below +3 °C for an appreciable portion of the total running time.

Both these models incorporate the latest technical innovations and run very quietly.

## **THE HEAT PUMP CONCEPT: FREE ENERGY FROM THE AIR**

Heat pumps are recognized as one of the most economical methods for heating water. Two types of energy sources are utilized to produce the required heat output. **ENERFLOW** EH-MT and EHR-MT heat pumps obtain up to 80% of the required energy from the air as free energy. The other source is electrical power, the only component which is paid for.

### **EASY INSTALLATION**

Installation is a simple matter of water pipe connections and main power supply. **ENERFLOW** heat pumps are designed for outdoor as well as indoor applications. The only requirement is access to external air.

### **NO MAINTENANCE**

**ENERFLOW** heat pumps do not require maintenance as is the case with coal and diesel fired boilers. The units are sealed and designed for trouble free operation. Models EH25MT – EH65MT are equipped with automatic fault finding light indicators and in the unlikely event of a malfunction the problem will show clearly, enabling even and unskilled person to rectify the problem.

### **HIGH INLET WATER TEMPERATURE**

A unique patented heat exchanger enables **ENERFLOW** EH-MT and EHR-MT heat pumps to heat water up to a temperature of 60 °C even when the inlet water temperature is as high as 55 °C. The fact that **ENERFLOW** heat pumps can handle high water inlet temperatures is very advantageous, as it enables water in a storage tank to be heated until the temperature at the bottom of the tank is only 5 °C lower than the maximum temperature at the top of the tank. In so doing the energy storage capacity of the tank is maximized.

### **QUIET OPERATION**

Advanced fans, with airfoil blades and a low noise level, are used on **ENERFLOW** heat pumps. The fan motors are also protected against moisture and dust.

### REVERSE CYCLE DEFROST

Reverse cycle defrost, provided on the HER-MT models, is the most efficient method for defrosting the air heat exchanger. Defrost is accomplished in a very short time period and any liquid refrigerant formed in the air heat exchanger is evaporated in the water heat exchanger before entering the compressor. This prevents liquid refrigerant, which can damage the compressor, from entering the compressor.

### FREE COLD AIR

The by-product of **ENERFLOW** EH-MT and EHR-MT heat pumps is cold air which can be used for air-conditioning purposes. The cold air can be ducted to any area of choice.

### TECHNOLOGY

**ENERFLOW** EH-MT and EHR-MT heat pumps are the end product of a fine engineering effort piloted by **M-Tech Industrial** in collaboration with other engineering research institutes. Computer aided design verified by experimental testing supported the project throughout its development and manufacturing phases.

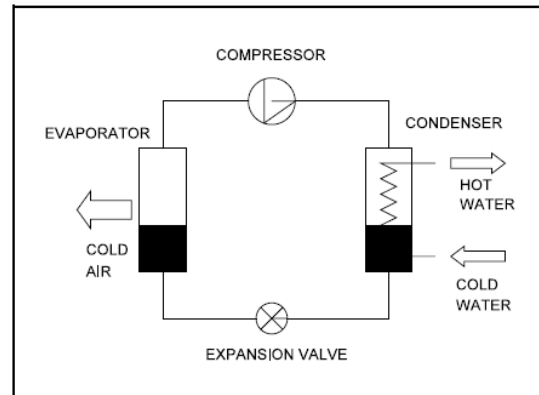
### HARD WATER

In areas where hard water scale (i.e. calcium) builds-up and insulate the inside of heat exchangers and produce such loss of efficiency, **M-Tech Industrial** can install a water softener system. The system, once installed on the hot water heat exchanger, operates silently, automatically and permanently never needing power, salt or chemicals. The system will dissolve any scale and will also neutralize any acid water.

### PRINCIPLE OF OPERATION

**ENERFLOW** EH-MT and EHR-MT heat pumps are based on the well known vapour-compression refrigeration cycle, described and illustrated below:

- The refrigerant enters the compressor as vapour at a low pressure and temperature.
- It enters the water heat exchanger as vapour at a high pressure and temperature.
- The refrigerant is condensed as a result of the heat that is transferred to the water.
- The pressure of the liquid decreases through the expansion valve causing the temperature to drop sharply.
- The liquid at low pressure vaporizes in the air heat exchanger as a result of heat transfer from the air.
- The cycle is completed as vapour re-enters the compressor.



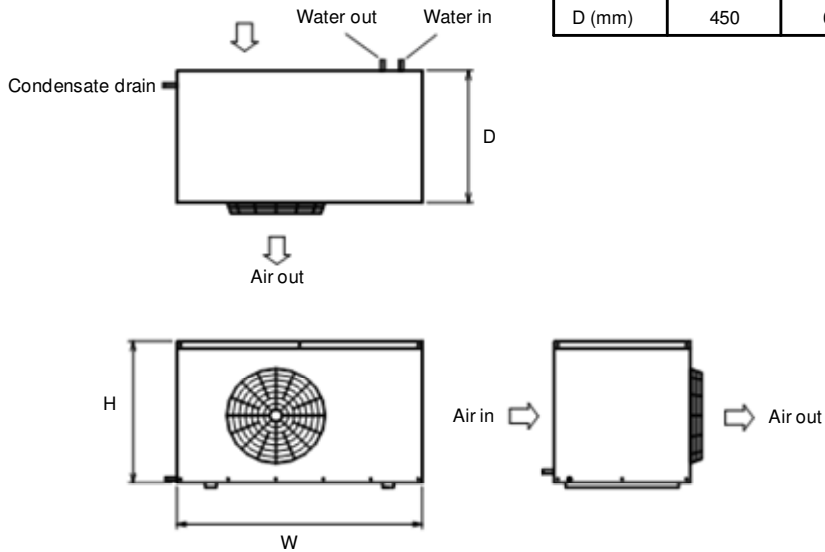
### WARRANTY

M-Tech Industrial warrants this equipment to be free from defects in material and workmanship for a period of 12 months from date of shipment provided the correct installation and water treatment procedures were followed. Any units or parts proving defective within the period will be repaired or replaced at our option when returned to our factory transportation charges pre-paid. M-Tech Industrial will not be responsible for any installation or removal costs.

**MAJOR DIMENSIONS**

Models -4, -6 and -8

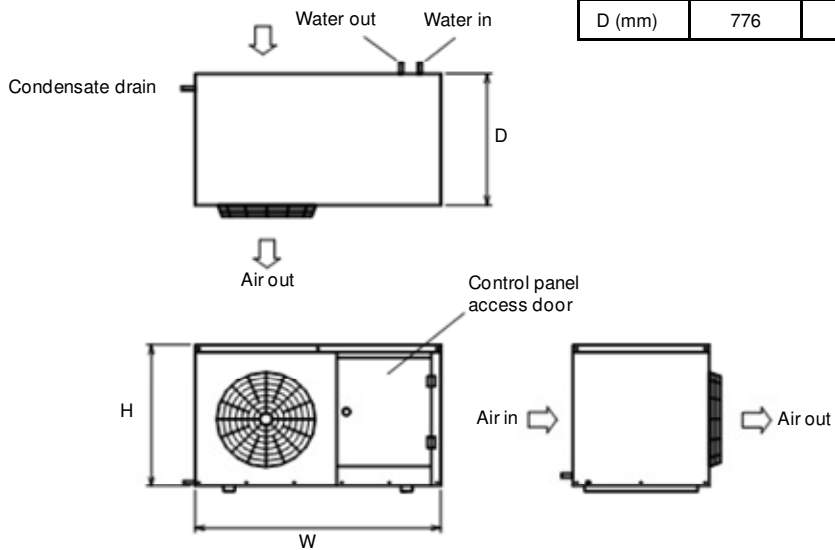
MODEL	-4	-6	-8
W (mm)	900	1030	1030
H (mm)	453	677	677
D (mm)	450	600	600



**MAJOR DIMENSIONS**

Models -12, -16 and -20

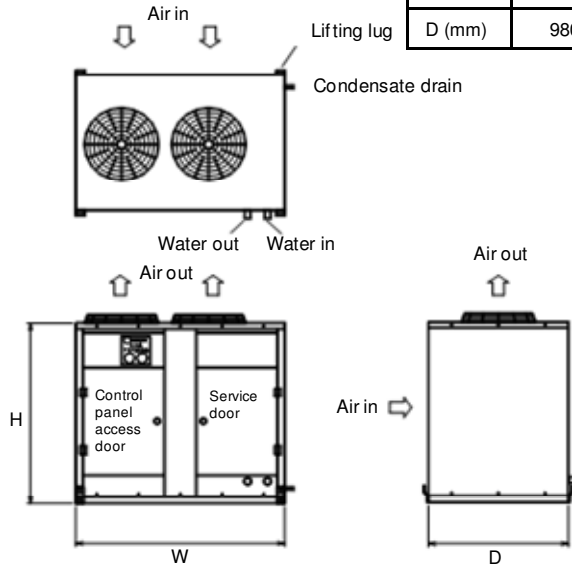
MODEL	-12	-16	-20
W (mm)	1300	1300	1400
H (mm)	776	776	1030
D (mm)	776	720	740



**MAJOR DIMENSIONS**

Models -30, -40 and -50

MODEL	-30	-40	-50	-65
W (mm)	1311	1463	1570	1770
H (mm)	1156	1308	1537	1680
D (mm)	980	980	980	990



MODEL		EH4MT	EH6MT	EH8MT	EH12MT	EH16MT	EH20MT
<b>RATING</b>		(Water 55°C out, air 15°C WB)					
Heating	kW	3.2	5.5	7.0	9.8	13.7	18.3
Water flow	l/min	9.0	15.6	19.8	28.2	39.0	52.2
COP		3.0	3.2	3.2	3.2	3.3	3.3
<b>ELECTRICAL (50 Hz)</b>							
Phases		1	1	1	1	3	3
Voltage	Volt	240	240	240	240	380	380
Power (Max cont.)	kW	1.2	1.9	2.4	3.5	5	6.4
Current (Max cont.)	Amps	5.2	8.6	10.3	16.7	10.3	10.9
<b>CAPACITY STEPS</b>		100 – 0	100 – 0	100 – 0	100 – 0	100 – 0	100 – 0
<b>CASING</b>		Powder Coated (Stainless Steel on request)					
Dimension HxWxD	mm	453x900 x450	677x1030 x600	677x1030 x600	776x1300 x720	776x1300 x720	1030x1400 x740
<b>COMPRESSOR</b>		Rotary Compressor		Hermetically sealed reciprocating			
No. of cylinders				2	2	4	4
Displacement 50 Hz	m <sup>3</sup> /h	4.3	5.7	7	10	13.6	17.7
Speed	rpm	2900	2900	2900	2900	2900	2900
Oil charge	Fl oz	18	24	36	55	70	70
<b>HEAT EXCHANGER (HOT WATER)</b>		Fluted tube					
<b>HEAT EXCHANGER (AIR)</b>							
(Rows x Columns) x No.		3 x 16 x 1	3 x 24 x 1	3 x 24 x 1	3 x 28 x 1	4 x 28 x 1	4 x 36 x 1
Number of circuits		2	3	3	4	6	8
Fin patch	mm	2.5	2.5	2.5	2.5	2.5	2.5
Face area	m <sup>2</sup>	0.17	0.28	0.35	0.51	0.51	0.66
<b>FAN</b>		Axial Flow					
Fan speed	rpm	1250	1250	1250	900	1100	1350
Fan diameter	mm	300	350	350	500	500	500
Air flow	m <sup>3</sup> /min	22	40	44	79	80	122
Face velocity	m/s	2.2	2.4	2.1	2.6	2.6	3.1
Power input	kW	0.13	0.2	0.2	0.32	0.5	0.7
Noise level	dB 3m	54	56	56	73	79	83
<b>REFRIGERANT</b>		R22					
Control		Thermostatic expansion valve					
No. of circuits		1	1	1	1	1	1
Charge	kg	0.4	1	1.5	2	3	3.5
<b>DEFROSTING METHOD</b>		Reverse cycle (Optional)					
<b>PIPE CONNECTION</b>							
Water inlet/outlet	mm	12.7	19.1	19.1	19.1	25.4	25.4
Drain	mm	12.7	12.7	12.7	12.7	19.1	19.1
<b>MACHINE WEIGHT</b>	kg	70	120	150	200	250	300

MODEL		EH30MT	EH40MT	EH50MT	EH65MT
<b>RATING</b>		(Water 55°C out, air 15°C WB)			
Heating	kW	27.9	36.9	46.4	73.5
Water flow	l/min	79.8	105.6	133.2	211.0
COP		3.3	3.4	3.3	3.6
<b>ELECTRICAL</b>					
Phases		3	3	3	3
Voltage Volt	Volt	380	380	380	380
Power (Max cont.)	kW	9.9	12.5	16.4	23.8
Current (Max cont.)	Amps	20	24.2	35	45
<b>CAPACITY STEPS</b>		100 – 0	100 – 0	100 – 0	100 – 0
<b>CASING</b>		Powder Coated (Stainless Steel on request)			
Dimension HxWxD	mm	1156x1311 x980	1308x1463 x980	1537x1570 x980	1680x1770 x990
<b>COMPRESSOR</b>		Hermetically sealed reciprocating			Hermetically sealed scroll
No. of cylinders		4	4	4	n/a
Displacement 50 Hz	m <sup>3</sup> /h	30.9	38.6	46.3	56.6
Speed	rpm	2900	2900	2900	2900
Oil charge	Fl oz	128	128	128	159
<b>HEAT EXCHANGER (HOT WATER)</b>		Fluted Tube-in-Tube			
<b>HEAT EXCHANGER (AIR)</b>					
(Rows x Columns) x No.		4 x 39 x 1	4 x 45 x 1	4 x 54 x 1	6x60 x 1
Number of circuits		13	15	18	42
Fin patch	mm	2.5	2.5	2.5	2.5
Face area	m <sup>2</sup>	0.98	1.31	1.72	2.21
<b>FAN</b>		Axial Flow			
Fan speed	rpm	1100	1350	1350	1200
Fan diameter	mm	500 x 2	500 x 2	500 x 2	630 x 2
Air flow	m <sup>3</sup> /min	156	241	267	345
Face velocity	m/s	2.7	3.1	2.6	2.6
Power input	kW	0.5 x 2	0.7 x 2	0.7 x 2	0.8 x 2
Noise level	dB 3m	79	83	83	83
<b>REFRIGERANT</b>		R22 (R-407C on request)			
Control		Thermostatic expansion valve			
No. of circuits		1	1	1	1
Charge	kg	7	8	9	10.5
<b>DEFROSTING METHOD</b>		Reverse cycle (Optional)			
<b>PIPE CONNECTION</b>					
Water inlet/outlet	mm	31.8	38.1	38.1	38.1
Drain	mm	19.1	19.1	19.1	19.1
<b>MACHINE WEIGHT</b>	kg	350	400	450	700

**HEATING CAPACITY (EH4MT – EH20MT)**

Q = Heat output (kW)

P = Power input, including fan, excluding pump (kW)

COP = Coefficient of performance (Q/P)

Twat = Hot water outlet temperature (°C)

Twb = Ambient air wet-bulb temperature (°C)

Hot water outlet temperature is 5°C higher than inlet temperature

UNIT	Twat→	40.0			45.0			50.0			55.0			60.0		
	Twb	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP
EH4MT	-5.0	1.8	0.8	2.4	1.8	0.8	2.2	1.8	0.9	2.1	1.8	0.9	2.0	1.7	0.9	1.8
	0.0	2.1	0.8	2.7	2.1	0.8	2.5	2.1	0.9	2.3	2.1	0.9	2.2	2.0	1.0	2.0
	5.0	2.5	0.8	3.1	2.5	0.9	2.8	2.4	0.9	2.6	2.4	1.0	2.4	2.3	1.0	2.2
	10.0	2.9	0.8	3.4	2.8	0.9	3.2	2.8	1.0	2.9	2.7	1.0	2.7	2.7	1.1	2.5
	15.0	3.3	0.9	3.9	3.3	0.9	3.5	3.2	1.0	3.3	3.2	1.1	3.0	3.1	1.1	2.8
	20.0	3.9	0.9	4.4	3.8	0.9	4.0	3.7	1.0	3.6	3.6	1.1	3.3	3.5	1.2	3.0
EH6MT	-5.0	3.0	1.2	2.5	2.8	1.2	2.3	2.7	1.2	2.2	2.5	1.2	2.0	2.4	1.3	1.9
	0.0	3.7	1.3	2.9	3.5	1.3	2.7	3.4	1.4	2.5	3.2	1.4	2.3	3.0	1.4	2.1
	5.0	4.4	1.3	3.3	4.2	1.4	3.0	4.1	1.5	2.8	3.9	1.5	2.6	3.7	1.6	2.4
	10.0	5.2	1.4	3.7	5.1	1.5	3.4	4.9	1.6	3.1	4.7	1.6	2.9	4.5	1.7	2.7
	15.0	6.2	1.5	4.1	6.0	1.6	3.8	5.7	1.7	3.5	5.5	1.7	3.2	5.3	1.8	2.9
	20.0	7.2	1.6	4.6	7.0	1.7	4.2	6.7	1.7	3.9	6.5	1.8	3.5	6.2	1.9	3.2
EH8MT	-5.0	3.6	1.5	2.4	3.4	1.5	2.2	3.3	1.6	2.1	3.1	1.6	1.9	3.0	1.6	1.8
	0.0	4.5	1.6	2.8	4.4	1.7	2.6	4.2	1.7	2.4	4.0	1.8	2.2	3.8	1.8	2.1
	5.0	5.5	1.7	3.2	5.3	1.8	3.0	5.1	1.9	2.7	4.9	1.9	2.5	4.7	2.0	2.4
	10.0	6.5	1.8	3.6	6.3	1.9	3.3	6.1	2.0	3.1	5.9	2.1	2.8	5.7	2.1	2.6
	15.0	7.7	1.9	4.1	7.5	2.0	3.7	7.2	2.1	3.4	7.0	2.2	3.2	6.7	2.3	2.9
	20.0	9.1	2.0	4.6	8.8	2.1	4.2	8.5	2.2	3.8	8.2	2.3	3.5	7.9	2.4	3.2
EH12MT	-5.0	5.0	2.0	2.5	4.8	2.1	2.3	4.6	2.2	2.1	4.4	2.2	2.0	4.3	2.2	1.9
	0.0	6.3	2.2	2.8	6.1	2.3	2.6	5.8	2.4	2.5	5.6	2.4	2.3	5.4	2.5	2.2
	5.0	7.5	2.3	3.2	7.3	2.4	3.0	7.1	2.6	2.8	6.9	2.7	2.6	6.7	2.8	2.4
	10.0	9.0	2.5	3.6	8.8	2.6	3.4	8.5	2.7	3.1	8.3	2.9	2.9	8.1	3.0	2.7
	15.0	10.6	2.6	4.1	10.4	2.7	3.8	10.1	2.9	3.5	9.8	3.1	3.2	9.6	3.2	3.0
	20.0	12.5	2.7	4.6	12.2	2.9	4.2	11.9	3.1	3.9	11.6	3.3	3.6	11.3	3.4	3.3
EH16MT	-5.0	7.2	2.6	2.8	6.7	2.6	2.5	6.1	2.6	2.3	5.6	2.6	2.1	5.1	2.6	1.9
	0.0	9.1	2.9	3.1	8.6	3.0	2.9	8.1	3.1	2.6	7.5	3.1	2.4	7.0	3.1	2.2
	5.0	10.9	3.2	3.5	10.5	3.3	3.2	10.0	3.4	2.9	9.5	3.5	2.7	8.9	3.6	2.5
	10.0	13.0	3.4	3.8	12.6	3.6	3.5	12.0	3.7	3.2	11.5	3.9	3.0	10.9	4.0	2.7
	15.0	15.4	3.6	4.2	14.8	3.8	3.9	14.3	4.0	3.5	13.7	4.2	3.3	13.1	4.4	3.0
	20.0	18.0	3.9	4.6	17.4	4.1	4.2	16.8	4.3	3.9	16.2	4.6	3.5	15.5	4.8	3.2
EH20MT	-5.0	9.8	3.5	2.8	9.2	3.5	2.6	8.5	3.5	2.4	7.8	3.5	2.2	7.2	3.5	2.1
	0.0	12.1	3.8	3.2	11.6	3.9	2.9	11.0	4.0	2.7	10.3	4.1	2.5	9.6	4.1	2.3
	5.0	14.6	4.2	3.5	14.0	4.3	3.2	13.4	4.5	3.0	12.8	4.6	2.8	12.1	4.7	2.6
	10.0	17.3	4.5	3.9	16.7	4.7	3.6	16.1	4.9	3.3	15.4	5.0	3.1	14.7	5.2	2.8
	15.0	20.3	4.8	4.2	19.7	5.0	3.9	19.0	5.3	3.6	18.3	5.5	3.3	17.5	5.7	3.1
	20.0	23.7	5.1	4.6	23.0	5.4	4.3	22.2	5.7	3.9	21.5	5.9	3.6	20.6	6.2	3.3

**HEATING CAPACITY (EH30MT - EH 100MT)**

Q = Heat output (kW)

P = Power input, including fan, excluding pump (kW )

COP = Coefficient of performance (Q/P)

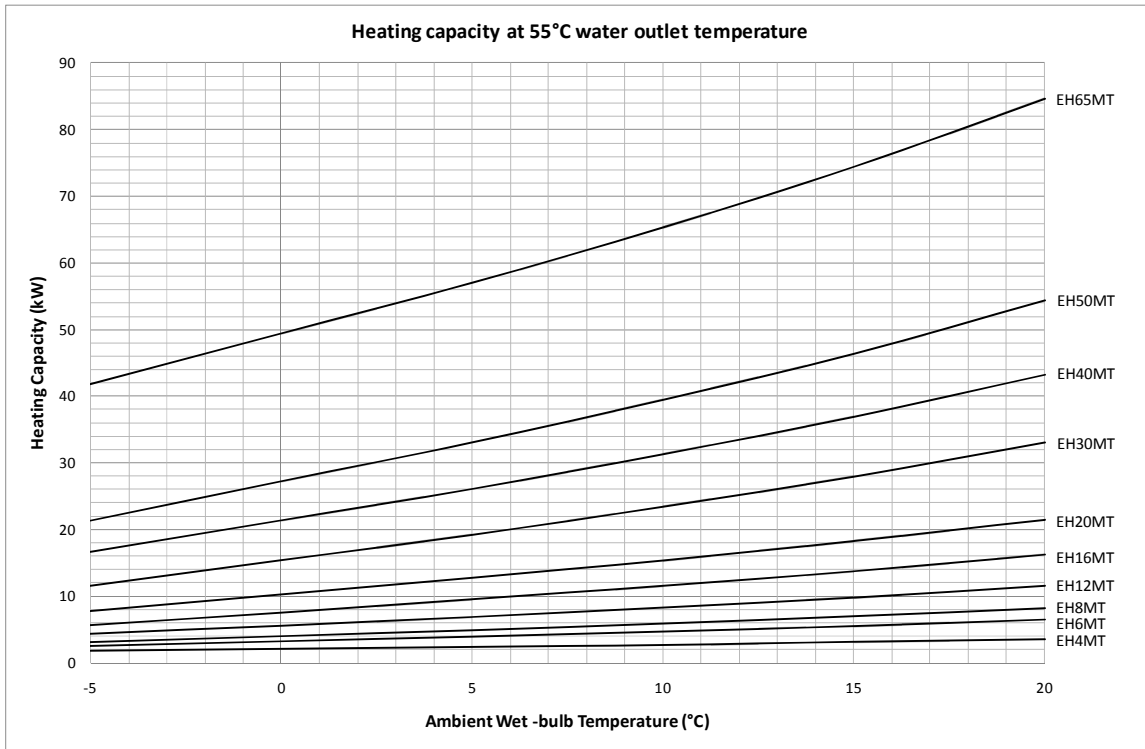
Twat = Hot water outlet temperature (°C)

Twb = Ambient air wet-bulb temperature (°C)

Hot water outlet temperature is 5°C higher than inlet temperature

UNIT	Twat→	40.0			45.0			50.0			55.0			60.0		
	Twb	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP	Q	P	COP
EH30MT	-5.0	14.7	5.2	2.8	13.7	5.3	2.6	12.7	5.3	2.4	11.6	5.2	2.2	10.6	5.2	2.1
	0.0	18.4	5.8	3.2	17.5	5.9	2.9	16.5	6.1	2.7	15.4	6.1	2.5	14.2	6.1	2.3
	5.0	22.3	6.4	3.5	21.4	6.6	3.3	20.3	6.7	3.0	19.2	6.9	2.8	18.1	7.0	2.6
	10.0	26.8	6.9	3.9	25.7	7.2	3.6	24.6	7.4	3.3	23.4	7.7	3.1	22.1	7.9	2.8
	15.0	31.7	7.5	4.2	30.5	7.8	3.9	29.2	8.1	3.6	27.9	8.4	3.3	26.6	8.7	3.0
	20.0	37.3	8.1	4.6	36.0	8.4	4.3	34.5	8.8	3.9	33.0	9.2	3.6	31.5	9.6	3.3
EH40MT	-5.0	20.2	6.9	2.9	19.1	7.0	2.7	17.9	7.1	2.5	16.7	7.1	2.3	15.5	7.1	2.2
	0.0	24.8	7.6	3.2	23.7	7.9	3.0	22.6	8.0	2.8	21.4	8.2	2.6	20.1	8.2	2.4
	5.0	29.5	8.3	3.6	28.5	8.6	3.3	27.3	8.8	3.1	26.1	9.1	2.9	24.8	9.2	2.7
	10.0	35.0	8.9	3.9	33.8	9.3	3.6	32.6	9.6	3.4	31.3	9.9	3.2	29.9	10.2	2.9
	15.0	41.0	9.6	4.3	39.7	10.0	4.0	38.4	10.4	3.7	36.9	10.8	3.4	35.4	11.2	3.2
	20.0	47.9	10.3	4.7	46.4	10.8	4.3	44.8	11.2	4.0	43.2	11.7	3.7	41.5	12.1	3.4
EH50MT	-5.0	25.6	9.0	2.8	24.3	9.2	2.6	22.9	9.3	2.5	21.4	9.3	2.3	20.0	9.3	2.2
	0.0	31.3	10.0	3.1	30.1	10.3	2.9	28.7	10.5	2.7	27.3	10.7	2.6	25.6	10.8	2.4
	5.0	37.3	10.9	3.4	36.0	11.2	3.2	34.6	11.6	3.0	33.1	11.8	2.8	31.5	12.1	2.6
	10.0	44.1	11.7	3.8	42.6	12.2	3.5	41.1	12.6	3.3	39.5	13.0	3.0	37.7	13.4	2.8
	15.0	51.6	12.6	4.1	50.0	13.2	3.8	48.3	13.7	3.5	46.4	14.2	3.3	44.5	14.6	3.0
	20.0	60.3	13.7	4.4	58.4	14.2	4.1	56.4	14.8	3.8	54.4	15.4	3.5	52.1	15.9	3.3
EH65MT	-5.0	44.0	15.0	2.9	43.4	16.3	2.7	42.7	17.8	2.4	41.8	19.4	2.2	40.8	21.2	1.9
	0.0	51.2	15.3	3.3	50.7	16.6	3.0	50.1	18.1	2.8	49.4	19.8	2.5	48.6	21.7	2.2
	5.0	58.7	15.6	3.8	58.2	17.0	3.4	57.6	18.5	3.1	57.0	20.2	2.8	56.3	22.1	2.5
	10.0	67.3	15.9	4.2	66.6	17.3	3.9	66.0	18.8	3.5	65.3	20.5	3.2	64.5	22.5	2.9
	15.0	77.0	16.2	4.7	76.2	17.6	4.3	75.3	19.1	3.9	74.4	20.9	3.6	73.5	22.8	3.2
	20.0	88.2	16.6	5.3	86.9	18.0	4.8	85.8	19.5	4.4	84.6	21.2	4.0	83.5	23.2	3.6

## EH-MT Series



## EH-MT Series

