

Energy Save AW-EVI 90 – ErP Data

Appendix I Test results

<b>Table 1.</b>	<b>Heating mode(Low temperature application):</b>						<b>P</b>	
<b>Model</b>	Model A ( Indoor unit: PEVH-90V4DEA/IA; Outdoor unit: PEVH-90V4DEA )							
<b>Product type</b>	Air to Water	<b>Heating season</b>	<input checked="" type="checkbox"/>	<b>Average</b>	<input type="checkbox"/>	<b>Warmer</b>	<input type="checkbox"/>	<b>Colder</b>
<b>1. Test conditions:</b>								
<b>Condition</b>	<b>Part Load Ratio in %</b>				<b>Outdoor heat exchanger</b>	<b>Indoor heat exchanger</b>		
	<b>Formula</b>	<b>A</b>	<b>W</b>	<b>C</b>	<b>Inlet dry (wet) bulb temperature °C</b>	<b>Inlet/outlet water temperatures (°C)</b>		
A	$(-7-16)/(T_{designh-16})$	88	N/A	N/A	-7(-8)	a / 34		
B	$(+2-16)/(T_{designh-16})$	54	N/A	N/A	2(1)	a / 30		
C	$(+7-16)/(T_{designh-16})$	35	N/A	N/A	7(6)	a / 27		
D	$(+12-16)/(T_{designh-16})$	15	N/A	N/A	12(11)	a / 24		
E	$(TOL-16)/(T_{designh-16})$				TOL	a / 35.3		
F	$(T_{bivalent-16})/(T_{designh-16})$				T <sub>biv</sub>	a / 34		
G	$(-15-16)/(T_{designh-16})$	N/A	N/A	N/A	-15	N/A		
Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 30/35 conditions, the capacity is 70732.97 W, the power is 17521.03W, the COP is 4.04W/W.								
<b>2. Tested data/correction data(Average):</b>								
<b>General test conditions/ Part-Load</b>	<b>Unit</b>	<b>A(-7)/W34 (88%)</b>	<b>A2/W30 (54%)</b>	<b>A7/W27 (35%)</b>	<b>A12/W24 (15%)</b>	<b>A(-10)/W35.3 (100%)</b>	<b>A(-7)/W34 (88%)</b>	
	--	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	
<b>Data collection period</b>	hh: min:sec	2:10:00	4:00:00	2:10:00	2:10:00	2:10:00	2:10:00	
<b>The heat pump defrosts</b>	--	No	Yes	No	No	No	No	
<b>Complete Cycles</b>	--	0	1	0	0	0	0	
<b>Barometric pressure</b>	kPa	101.02	101.01	101.01	101.02	101.01	101.02	
<b>Voltage</b>	V	398.3	398.8	399.9	398.4	398.4	398.3	
<b>Current input of the unit</b>	A	27.56	17.49	11.05	8.17	27.40	27.56	
<b>Power input of the unit</b>	kW	19.832	8.894	5.652	5.135	19.736	19.832	
<b>Test conditions indoor unit</b>								
<b>Inlet Water temperature, DB</b>	°C	29.86	27.11	24.66	21.47	31.54	29.86	
<b>Outlet Water temperature, DB</b>	°C	33.98	29.78	26.98	24.00	35.29	33.98	

**Appendix I Test results**

Test conditions outdoor unit							
Air inlet temperature, DB	°C	-7.00	2.02	7.01	12.01	-10.00	-7.00
Air inlet temperature, WB	°C	-7.89	1.04	6.00	11.00	-10.84	-7.89
Summary of the results							
Total heating capacity	kW	57.429	37.278	32.543	35.488	52.316	57.429
Effective power input	kW	20.306	9.368	6.126	5.609	20.210	20.306
Coefficient of performance (COP)	--	2.83	3.98	5.31	6.33	2.59	2.83
Compressor frequency	Hz	85	45	30	30	85	85
Water flow	m <sup>3</sup> /h	12.00	12.00	12.00	12.00	12.00	12.00
Remark: * In part condition, outlet temperature data is recorded by a full average complete cycle's data.							
3.Calculation/conclusion for SCOP(Average):							
Tdesignh(°C)	-10		Tbiv(°C)		-7		
Pdesignh(kW)	64.920		TOL(°C)		-10		
Test result A, B, C, D, E, F conditions:							
Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load	
E	64.920	52.316	2.59	0.00	1.00	2.59	
F	57.429	57.429	2.83	0.00	1.00	2.83	
A	57.429	57.429	2.83	0.00	1.00	2.83	
B	34.957	37.278	3.98	0.00	0.94	3.98	
C	22.472	32.543	5.31	0.99	0.69	5.29	
D	9.988	35.488	6.33	0.99	0.28	6.17	
CR: part load divided by capacity;							

**Appendix I Test results**

Electric power consumptions	Unit	Value
Thermostat-off mode [ $P_{TO}$ ]	kW	0.032
Standby mode [ $P_{SB}$ ]	kW	0.032
Crankcase heater [ $P_{CK}$ ]	kW	0.070
Off mode [ $P_{OFF}$ ]	kW	0.032

  

Conclusions:	Unit	Value
SCOP <sub>on</sub> :	kWh/kWh	4.14
SCOP:	kWh/kWh	4.13
$Q_H$ :	kWh/year	134125
$Q_{HE}$ :	kWh/year	32451
$\eta_{s,h}$	%	162.3
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 2)	--	A++

**Appendix I Test results**

Table 2.		Heating mode(Medium temperature application):					P	
Model		Model A ( Indoor unit: PEVH-90V4DEA/IA; Outdoor unit: PEVH-90V4DEA )						
Product type		Air to Water	Heating season	<input checked="" type="checkbox"/> Average	<input type="checkbox"/> Warmer	<input type="checkbox"/> Colder		
<b>1. Test conditions:</b>								
Condition	Part Load Ratio in %				Outdoor heat exchanger	Indoor heat exchanger		
	Formula	A	W	C	Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)		
A	$(-7-16)/(T_{designh}-16)$	88	N/A	N/A	-7(-8)	a / 52		
B	$(+2-16)/(T_{designh}-16)$	54	N/A	N/A	2(1)	a / 42		
C	$(+7-16)/(T_{designh}-16)$	35	N/A	N/A	7(6)	a / 36		
D	$(+12-16)/(T_{designh}-16)$	15	N/A	N/A	12(11)	a / 30		
E	$(TOL-16)/(T_{designh}-16)$				TOL	a / 55.3		
F	$(T_{bivalent}-16)/(T_{designh}-16)$				T <sub>biv</sub>	a / 52		
G	$(-15-16)/(T_{designh}-16)$	N/A	N/A	N/A	-15	N/A		
Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 47/55 conditions, the capacity is 66586.94 W, the power is 23548.10W, the COP is 2.83W/W.								
<b>2. Tested data/correction data(Average):</b>								
General test conditions/ Part-Load	Unit	A(-7)/W52 (88%)	A2/W42 (54%)	A7/W36 (35%)	A12/W30 (15%)	A(-10)/W55.3 (100%)	A(-7)/W52 (88%)	
	--	A	B	C	D	E	F	
Data collection period	hh: min:sec	2:10:00	2:10:00	2:10:00	2:10:00	2:10:00	2:10:00	
The heat pump defrosts	--	No	No	No	No	No	No	
Complete Cycles	--	0	0	0	0	0	0	
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85	
Voltage	V	397.1	398.3	398.6	398.7	397.1	397.1	
Current input of the unit	A	53.36	21.01	13.21	11.05	54.75	53.36	
Power input of the unit	kW	32.389	10.997	6.525	5.316	33.523	32.389	
<b>Test conditions indoor unit</b>								
Inlet Water temperature, DB	°C	44.36	37.40	32.10	25.49	47.88	44.36	
Outlet Water temperature, DB	°C	52.14	42.07	36.03	29.98	55.24	52.14	

**Appendix I Test results**

Test conditions outdoor unit							
Air inlet temperature, DB	°C	-6.99	2.01	7.00	12.00	-10.00	-6.99
Air inlet temperature, WB	°C	-7.82	0.99	6.00	11.00	-10.86	-7.82
Summary of the results							
Total heating capacity	kW	65.619	39.968	33.738	38.601	62.598	65.619
Effective power input	kW	32.680	11.289	6.816	5.607	33.814	32.680
Coefficient of performance (COP)	--	2.01	3.54	4.95	6.88	1.85	2.01
Compressor frequency	Hz	95	41	30	30	95	95
Water flow	m³/h	7.40	7.40	7.40	7.40	7.40	7.40
Remark: * In part condition, outlet temperature data is recorded by a full average complete cycle's data.							
3.Calculation/conclusion for SCOP(Average):							
Tdesignh(°C)	-10	Tbiv(°C)		-7			
Pdesignh(kW)	74.178	TOL(°C)		-10			
Test result A, B, C, D, E, F conditions:							
Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load	
E	74.178	62.598	1.85	0.00	1.00	1.85	
F	65.619	65.619	2.01	0.00	1.00	2.01	
A	65.619	65.619	2.01	0.00	1.00	2.01	
B	39.942	39.968	3.54	0.00	1.00	3.54	
C	25.677	33.738	4.95	0.99	0.76	4.93	
D	11.412	38.601	6.88	0.99	0.30	6.72	
CR: part load divided by capacity;							

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<b>Electric power consumptions</b>	<b>Unit</b>	<b>Value</b>
Thermostat-off mode [ $P_{TO}$ ]	kW	0.032
Standby mode [ $P_{SB}$ ]	kW	0.032
Crankcase heater [ $P_{CH}$ ]	kW	0.070
Off mode [ $P_{OFF}$ ]	kW	0.032
<b>Conclusions:</b>	<b>Unit</b>	<b>Value</b>
SCOP <sub>on</sub> :	kWh/kWh	3.62
SCOP:	kWh/kWh	3.61
$Q_H$ :	kWh/year	153252
$Q_{HE}$ :	kWh/year	42395
$\eta_{s,h}$	%	141.6