



Test Report issued under the responsibility of:



TEST REPORT
EHPA-DACH Testing Regulation
Supplemental requirements for granting the international quality label for
heat pumps
Testing of Air/Water Heat Pumps
Testing of Water/Water and Brine/Water Heat Pumps

DIN EN 14511-1, DIN EN 14511-2, DIN EN 14511-3, DIN EN 14511-4
Air conditioners, liquid chilling packages and heat pumps with
electrically driven compressors for space heating and cooling
DIN EN 14511-1:2007 Terms and definitions
DIN EN 14511-2:2007 Test conditions
DIN EN 14511-3:2007 Test methods
DIN EN 14511-4:2007 Requirements

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Total number of pages	5
Testing Laboratory	VDE Prüf- und Zertifizierungsinstitut GmbH VDE <i>Testing and Certification Institute</i>
Address	Merianstrasse 28, 63069 Offenbach , Germany
Applicant's name	Vaillant GmbH
Address	Berghauser Str. 40, 42859 Remscheid
Test specification:	
Standard	<input type="checkbox"/> EHPA-DACH Testing Regulation Testing of Water/Water and Brine/Water Heat Pumps, Version 1.2, Release 20.08.2008 Test Method based on EN 14511-1 through 4 <input checked="" type="checkbox"/> EHPA-DACH Testing Regulation Testing of Air/Water Heat Pumps, Version 1.2, Release 20.08.2008 Test Method based on EN 14511-1 through 4 <input checked="" type="checkbox"/> EN 14511-1:2007 (DIN EN14511-1:2008-02), EN 14511-2:2007 (DIN EN 14511-2:2008-02), EN 14511-3:2007 (DIN EN 14511-3:2008-02), EN 14511-3:2007/AC:2008 (DIN EN 14511-3 Corrigendum 2008-10) EN 14511-4:2007 (DIN EN 14511-4 :2008-02)
Test procedure	EHPA

Principle of operation:

The Heat pump systems consist of separate circuits in which liquids or gases transport the heat from the heat source to the heating system. As these circuits operate with differing media (brine/water, coolant and heating water), they are coupled to one another by means of heat exchangers. In these heat exchangers the heat passes from a medium at a high temperature to a medium at a lower temperature. The Vaillant heat pump (brine) split type extracts heat from the outdoor air. This air-to-water heat pump split type can still generate heating heat at outdoor air temperatures of down to -20 °C.

The condenser, where it releases its heat to the heating water by condensation. It flows as a liquid to the expansion valve, where it expands significantly and in so doing loses much of its pressure and temperature. This temperature is now lower than that of the brine which flows through the evaporator. The coolant can thus take up more heat in the evaporator, turning into vapour in the process and flowing to the compressor. The cycle starts again.

If required, the electric auxiliary heating can be switched in by means of the integrated controller.

To prevent the formation of condensate in the interior of the unit, the pipes of the heat source circuit and the coolant circuit are insulated. Should condensate appear, however, it is collected in a basin inside the unit and fed away underneath it. Drop formation under the unit is thus possible.

Design of the heat pump:


The Vaillant heat pump is available in the versions listed below.

Remarks	Type designation Heating output (kW) at A2/W35
VWL 61/3 S, VWL 62/3 S *) With 1 outdoor unit VWL 10/3 SA	5.8
VWL 81/3 S, VWL 82/3 S *) With 1 outdoor unit VWL 10/3 SA	8.1
VWL 101/3 S, VWL 102/3 S *) With 1 outdoor unit VWL 10/3 SA	9.7
VWL 141/3 S With 2 outdoor units VWL 10/3 SA	13.9
VWL 171/3 S With 2 outdoor units VWL 10/3 SA	16.2

*) VWL xx2/x S are additionally provided with a 175l tank for sanitary hot water heating. This is the only difference to types VWL xx1/x S.

<input checked="" type="checkbox"/>	CB/CCA Testing Laboratory:	VDE Prüf- und Zertifizierungsinstitut GmbH VDE Testing and Certification Institute	
Testing location/ address.....:		Merianstrasse 28, D-63069 Offenbach , Germany	
<input type="checkbox"/>	Associated CB Laboratory:	--	
Testing location/ address.....:			
Tested by (name + signature).....:			
Approved by (+ signature).....:			
<input checked="" type="checkbox"/>	Testing procedure: TDAP		
Tested by (name + signature).....:		Stephan Richter	
Approved by (+ signature).....:		Christoph Staat	
Testing location/ address.....:		Vaillant GmbH Berghauser Str. 40, 42859 Remscheid	

Summary of testing:			
Tests performed (name of test and test clause): All tests were performed in manufacturer laboratory		Testing location: Vaillant GmbH Berghauser Str. 40, 42859 Remscheid	
Summary of compliance with National Differences:			
Remark according EHPA regulations for granting the international quality label for electrically driven heat pumps Version 1.2 Release 2008-08-20: A model range is characterised by uniform main components. The following number of units must be examined from each model range:			
Table 2.1			
n_{HP} serie	Ratio Q_{max}/Q_{min}	$Q_{max}-Q_{min}$	
		≤ 30 kW	>30 kW
≤ 4	-	1	2
> 4	≤ 3.0	2	2
> 4	> 3.0	2	3
n_{HP} serie -> number of heat pumps in a serie			
According section 2.1 of EHPA – Regulation two types of the model range must be tested. Type VWL 81/3 S (with one outdoor unit VWL 10/3 SA) and type VWL 171/3 S (with two outdoor units VWL 10/3 SA) are the selected test samples by the test center. The model range includes all types listed in table on page 2.			

Test item particulars:	
Testing of Air/Water Heat Pumps	
Machine-specific information:	
- Manufacturer	Vaillant GmbH 
- Machine type (Test sample)	VWL 171/3 S with 2 x VWL 10/3 SA VWL 81/3 S + VWL 10/3 SA
- Serial number test sample.....	VWL 171/3 S, ser.no. 21100100200752150006005000N6 with outdoor units VWL 10/3 SA, ser.no. 2109440020075230 1610005026 and VWL 10/3 SA, ser.no. 2109440020075230 1610005000 VWL 81/3 S, ser.no.21100100200752120006005000N8 with outdoor unit VWL 10/3 SA, ser.no. 2109440020075230 1610005026
- manufacturer compressor and type.....	Copeland, type ZH45K4E-TFD
- Serial number motor compressor	07A296233 C
- Refrigerant filling (type and quantity)	R407C; 3,05 kg (VWL171/3 S); R407C; 2,20kg (VWL 81/3 S)
- Rated volume flow on user side with which the measurements were taken.	3081 l/min (VWL171/3 S), 1434 l/min (VWL 81/3 S)
- Blower speed, air volume flow and maximum permissible external static pressure drop.....	VWL 171/3 S and 2 outddor units: 536 r/min / n.a. VWL 81/3 S and 1 outdoor unit: 515 r/min / n.a.
- Heat exchanger type.	See table page 9
- Evaporator	See table page 9
- Expansion valve type	See table page 9
- Dimensions and weight of the heat pump	See page 13
- Description of the design.....	See page 2
Output measurement: A2 / W35	
- Average heat output (clause 6.6.1).	VWL 171/3 S: 15,950 kW VWL 81/3 S: 7,428 kW
- Average electrical power consumption (clause 6.6.2).....	VWL 171/3 S: 4,135 kW VWL 81/3 S: 1,863 kW
- COP (clause 6.6.3).....	VWL 171/3 S: 3,86 VWL 81/3 S: 3,99
- min. required COP at A2/W35.....	3,00
- Hydraulic pressure drop in user system (delta p):	VWL 171/3 S: 52300 Pa (external static pressure) VWL 81/3 S: 57000 Pa (external static pressure)
Usage limits and safety test:	
- Extreme points tested and reached.	P
- Safety test passed or failed	P
Electrical measurements:	
- Max. start current with or <u>without</u> soft start.	VWL 171/3 S: 74 A _{eff} (< 25 A with Soft starter) VWL 81/3 s: 40 A _{eff} (< 16 A with Soft starter)
- Output factor (mean value).....	--

Test results Air-Water-Heat pump * heating * in conjunction with EN14511-2 Table 9 and EHPA-DACH Testing Regulation for Air-Water Heat pump Version 1.2 Release 20.08.2008

Model indoor unit		VWL 171/3S	VWL 141/3 S	VWL 101/3 S	VWL 81/3 S	VWL 61/3 S
Model outdoor unit		2x VWL10/3SA	2x VWL10/3SA	1x VWL10/3SA	1x VWL10/3SA	1x VWL10/3SA
	Footnote	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Volume flow heating side	[m³/h]	3,081	3,370	2,315	1,434	1,355
Refrig. / Mass	Type / [kg]	R407C/3,05	R407C/2,9	R407C/2,05	R407C/2,20	R407C/1,9
Installation:						
Sound power : indoor- / outdoor unit	[dB(A)]	53,0 / 54,2	52/52	50/53	49,5 / 51,2	46/45
A 7 / W 35	Heat output [kW]	18,110	15,40	10,30	8,394	6,40
	El. input [kW]	4,204	3,50	2,40	1,877	1,50
	COP [-]	4,31	4,40	4,29	4,47	4,27
A 2 / W 35	Heat output [kW]	15,950	13,90	9,60	7,428	5,70
	El. input [kW]	4,135	3,60	2,50	1,863	1,50
	COP [-]	3,86	3,86	3,84	3,99	3,80
	Mindest COP [-]			3,0		
A 2 / W 35-25	Heat output [kW]	16,315	13,9	9,30	7,542	5,70
	El. input [kW]	4,090	3,40	2,40	1,841	1,40
COP Reference according to EN 255	COP [-]	3,99	4,10	3,90	4,10	4,10
	ΔT [K]	10	10	10	10	10
A -7 / W 35	Heat output [kW]	12,914	11,10	7,50	5,912	4,50
	El. input [kW]	4,257	3,50	2,50	1,938	1,40
	COP [-]	3,03	3,17	3,00	3,05	3,21
A -15 / W 35	Heat output [kW]	10,349	8,90	6,10	4,716	3,50
	El. input [kW]	4,065	3,40	2,40	1,850	1,40
	COP [-]	2,55	2,62	2,54	2,55	2,50
A 7 / W 45	Heat output [kW]	17,697	15,10	10,30	8,276	6,20
	El. input [kW]	4,970	4,30	2,90	2,266	1,80
	COP [-]	3,56	3,51	3,55	3,65	3,44
A 2 / W 45	Heat output [kW]	15,605	13,20	9,10	7,135	5,40
	El. input [kW]	4,940	4,30	3,00	2,250	1,70
	COP [-]	3,16	3,10	3,03	3,17	3,18
A -7 / W 45	Heat output [kW]	13,150	10,80	7,40	5,778	4,30
	El. input [kW]	4,967	4,20	2,90	2,269	1,70
	COP	2,65	2,57	2,55	2,55	2,53
A -15 / W 45	Heat output [kW]	10,118	8,50	6,00	4,798	3,40
	El. input [kW]	4,723	4,10	2,80	2,171	1,70
	COP [-]	2,14	2,10	2,14	2,21	2,00
A 7 / W 55	Heat output [kW]	17,095	14,50	10,00	8,104	6,00
	El. input [kW]	5,852	5,20	3,40	2,712	2,20
	COP [-]	2,92	2,79	2,94	2,99	2,73
A -7 / W 55	Heat output [kW]	12,977	10,40	7,20	5,694	4,20
	El. input [kW]	5,819	5,00	3,40	2,694	2,10
	COP [-]	2,23	2,08	2,12	2,11	2,00
A 20 / W 55	Heat output [kW]	19,273	16,60	11,10	9,120	6,80
	El. input [kW]	5,955	5,80	3,90	2,745	2,60
	COP [-]	3,24	2,86	2,85	3,32	2,62
A 10 / W 35	Heat output [kW]	19,060	16,10	10,40	8,857	6,40
	El. input [kW]	4,237	3,60	2,40	1,896	1,40
	COP [-]	4,50	4,47	4,33	4,67	4,57
	Type design	Scroll	Scroll	Scroll	Scroll	Scroll
COMPRESSOR	Manufacturer	Copeland	Copeland	Copeland	Copeland	Copeland
	Type	ZH45K4E- TFD	ZH38K4E- TFD	ZH26K4E- TFD	ZH21K4E- TFD	ZH15K4E- TFD
	Number	1	1	1	1	1

Footnote

- This test sample was selected and tested by the test center
- The tech. datas of this type were transmitted by the manufacturer and **not tested by the test center**

-- END OF TEST REPORT --