

EHPA Testing Regulation

Testing of Heat Pumps for Domestic Hot Water Production

Terms, Test Conditions and Test Method based on
EN 16147

Additional requirements for granting the international
quality label for heat pumps



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Revisions of the document

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		Test report	6.3	page 7	

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1 Introduction

This regulation specifies the terms and definitions, the test conditions, the performance tests and other requirements for granting the EHPA Quality label for heat pumps for domestic hot water production.

The test conditions and testing methods described in this regulation are based on the European standard EN 16147 and EN 12102 and on additional specifications referenced therein. Anything not defined in this regulation shall be proceeded regarding EN 16147.

A heat pump can be awarded with the International Heat Pump Quality Label once it is successfully tested in accordance with this regulation. The process is described in the “EHPA regulations for granting the international quality label for electrically driven heat pumps”.

This regulation has been adopted by the EHPA Quality Label Committee, changes of this regulation must also be approved by the Committee.

2 Scope of application

The regulation applies to the testing of factory-made electrically driven heat pumps for domestic hot water production under the testing conditions specified in chapter 5.

In order to attain the international quality label, the test specimen must be a heat pump manufactured in series production.

The heat pump for DHW production can use air, water or brine as a heat source.

In case of heat pumps providing both space heating and DHW production, the unit shall be tested and labelled for space heating before to be tested and labelled for DHW production.

3 Reference documents

The latest edition of the reference standards (including any amendments) applies.

EN 16147: 2011

Heat pumps with electrically driven compressors – Testing and requirements for marking for domestic hot water units

EN 12102: 2013

Air conditioners, heat pumps and dehumidifiers with electrically driven compressors – Measurement of airborne noise – Determination of the sound power level

4 Terms and definitions

The terms and definitions given in EN 16147 and in EN 12102 apply with the followings:

Defrost mode

State of the unit in the heating mode where the operation is modified or reversed to defrost the outdoor heat exchanger

Defrost cycle

Time for which the unit is in the defrost mode

5 Tests to be performed

To be granted the heat pump shall perform the following tests:

- a) Performance test (see chapter 5.1)
- b) Acoustic test (see chapter 5.2)

c) Safety tests (see chapter 5.3)

5.1 Performance test

Performance test shall be made fully in accordance with EN 16147 for the determination of the following characteristics:

- heating up time, t_h
- coefficient of performance (COP_{DHW}),
- standby power input, P_{es}
- reference hot water temperature, θ'_{WH}
- maximum quantity of usable hot water, V_{max}

5.1.1 Test conditions

The performance shall be declared by the manufacturer for one (or more) of the tapping cycles described in EN 16147.

Performance testing shall be performed for this(these) tapping cycle(s) and the test conditions given in EN 16147.

The hysteresis shall be set according to the manufacturer's instructions in the technical documentation and the value of which is indicated in the application form.

5.1.2 Test method

The testing shall be made according to EN 16147 test method with the additional following requirements:

The unit shall be delivered to the test house charged with the refrigerant from the manufacturer.

For units with variable capacity control, the manufacturer shall specify and declare the settings for testing (frequency or others).

For DHW only function units using water or brine as heat source, the flow rate shall be specified by the manufacturer and set before the beginning of the test.

For space heating and DHW HPs, the flow rate is set equal to the flow rate measured during the test in heating mode operation at 35°C leaving water temperature.

According to EN 16147, the tests can be conducted with or without the supplementary heat supply, according to the manufacturer's specifications.

If the manufacturer specifies that the supplementary heat supply shall be switched on during the tests, the test report shall clearly mention that the heater was on during the tests and its power input shall also be recorded.

When testing brine/water heat pumps, a brine concentration of 30 % by volume of ethylene glycol, with a freezing point of -15 °C shall be used.

Note: The concentration shall be checked by the test laboratory against density, freezing point or other properties.

In case of an air source heat pump operating in a transient regime due to defrosting, the permissible deviations on air side given in EN 16147 Table 2 shall be replaced by the deviations given in the following Table 1.

Table 1 – Permissible deviations from set values during transient regime

Readings	Variations of arithmetical mean values from specified test conditions		Variation of individual readings from specified test conditions	
	Interval H	Interval D	Interval H	Interval D
Air source temperature:				
- dry-bulb	± 0,6 °K	± 1,5 °K	± 1,0 °K	± 5,0 °K
- wet-bulb	± 0,3 °K	± 1,0 °K	± 0,6 °K	—
Ambient air temperature	± 1,0 °K	± 1,5 °K	± 2,0 °K	± 5,0 °K

Interval H is defined as the period when the heat pump is in heating mode, except for the first 10 minutes after termination of a defrost cycle.

Interval D is defined as the period including a defrost cycle and the first 10 min after the termination of a defrost cycle when the heat pump is back operating in the heating mode.

Note: Table 1 is used in EN 14511 for HPs using outdoor air as heat source

5.2 Sound power level measurement

A sound power level measurement shall be performed using one of the acoustic measurement methods described in EN 12102, using Class A method with the following operation of the heat pump.

1. The settings and test conditions shall be the same as for the performance test
2. The heating up period test is performed again in order to measure the sound power level when the water outlet temperature is raised from 35°C to 45°C. The outlet water temperature is checked by small draw-offs.
3. Sound power level measurement starts when the outlet water temperature is reaching 35°C ± 2 K and ends when the outlet water temperature is 45 °C± 2K.

The test is performed this way for DHW only units. For units providing both space heating and DHW, the sound power level is the one determined for space heating operation.

5.3 Safety tests

The safety tests check if the safety devices respond correctly to operational malfunctions and protect the heat pump from damage.

The safety devices are tested by simulating operational malfunctions during normal heat pump operation.

The safety tests shall be performed according to EN 16147 clause 6.8.

6 Test report Level 1 (disclosure status: private)

Production of this test report by the heat pump test centre is part of the overall test procedure. The report is sent only to the manufacturer or the customer who has ordered the tests.

The heat pump test centre is allowed to publish the test results only if the applicant has approved such publication with an authorized signature.

This test report level 1 shall specify the version of the testing regulation and of the related standards that have been applied.

It shall contain all test documents and fulfil the requirements in EN 16147 and EN 12102.

In addition, the use of the supplementary heat supply during the tests if any, shall be clearly mentioned with its power input.

6.1 General Information on the testing institute

- Date
- Name of the testing institute
- Test location
- Test supervisor
- Test number
- Test methods and reference to the EN standards
- References to the EHPA regulation and version

6.2 Technical data sheet

- Name of the customer (usually the manufacturer)
- Machine type, designation
- Serial number (if not available, compressor serial number)
- Brief description of the design
- Information on the components, such as compressor type, heat exchanger type, expansion valve type, etc.
- Intermediate heat transfer medium flow rate for indirect systems
- Fan speed, air volume flow and maximum permissible external static pressure, where applicable
- Nominal volume of the storage tank
- Year of production
- Photos of the machine
- Dimensions and weight of the heat pump
- Type and charge of refrigerant:
- GWP value of the refrigerant (as required by the EU Ecolabel, 2007/742/EC)

6.3 Performance test

The report shall include a description of the heat pump tested and the storage tank including thermostat setting and hysteresis, pump and fan speed, capacity control settings where applicable. It shall include all data recorded as specified in EN 16147 Table 14 as well as the main results as specified in EN 16147 Table 15.

6.4 Sound measurement

- Specific requirements for installation of the tested model(s), where applicable
- acoustic test method
- measured sound power level(s)

6.5 Safety tests

- Safety tests passed or failed

7 Marking

Each heat pump shall have a durable, permanently fixed marking that is easily readable when the unit is in position for use, bearing at least the information required by the safety standards. If the heat pump consists in several parts the information shall be marked on each of these parts with the model designation of the complementary parts.

The name plate shall include the following information:

- Manufacturer or supplier
- Type
- Serial or production number
- Nominal volume of the tank

- Coefficient of performance (COP_{DHW}) to 3 significant figures and designation of the test conditions and tapping cycle
- Type and filling weight of the refrigerant

Note: for heat pumps providing both space heating and domestic hot water production, the COP for each function shall be indicated and clearly identified on the nameplate.