

EHPA regulations for granting the international quality label for electrically driven heat pumps



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© **European Heat Pump Association**
Rue d'Arlon 63-67 | B-1040 Brussels | www.ehpa.org
phone +32 24 00 10 17 | fax +32 24 00 10 18 | info@ehpa.org

contact: **Christian Köfing** | christian.koefinger@ait.ac.at

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1. General information regarding the international quality label for heat pumps

1.1 Scope of the quality label

- This regulation applies to space heating electrically driven heat pumps, with or without domestic hot water heating capability, with heat outputs up to 400 kW from air, geothermal or water sources.
- The regulation applies to mass-produced electrically driven heat pumps for the production of domestic hot water (DHW) from air, geothermal or water sources.
- In case the unit consist of several parts, the regulation applies to those designed and supplied as a complete package.

1.2 The heat pump quality label

The EHPA quality label applies to the heat pump, accompanying documents (sales, distribution and planning documentation), and to the customer service organisation. To qualify for the quality label, heat pumps must comply with the regulations regarding the following areas:

- a) Technical specifications in accordance with the EHPA heat pump test criteria or *CEN HP KEYMARK*.
- b) Sales & distribution, planning, service and operating documentation.

The quality label is valid in each country for which an individual application is made. The labelling scheme itself is available in several European countries. A separate application is necessary per country and distribution organisation.

Products certified under the scheme are automatically included in the Quality Label List of EHPA. They can be included in the quality label lists of individual EHPA countries.

A request for admission must be submitted to each National Quality Label Commission and must include the following documents:

- a) A copy of the certification document.
- b) Verification of a service organisation in the country concerned.
- c) Copy of the list of the main components.
- d) The complete heat pump documentation (see section 2.3)
- e) Declaration of Conformity for the country concerned.

1.3 Requirements for applicants

Applicants and quality label holders can either be manufacturers or distributors. Heat pump manufacturers may apply for or hold a quality label only if they have their own sales organisation. If a manufacturer's heat pump is sold by different sales organisations (including its own distribution organisation), a separate quality label must be requested for each sales organisation. However, inspection of the heat pump in accordance with EHPA test criteria is required only once.

1.4 Application procedure

Application documents are available on the EHPA website and from the National Quality Label Commission.

The completed application for the quality label is sent to the National Quality Label Commission and must include all necessary documents and declarations. By applying for a quality label, the applicant grants the right of access to the test data to the Quality Label Commission. **The applicant confirms therewith that the model to be tested is taken from an identical in design to series production models.** The National Quality Label Commission inspects the documents for compliance with regulations.

In case the quality label is granted, the applicant agrees that the test results according to test report 2 or the *CEN HP KEYMARK* will be made public on the EHPA/member organisations website.

1.5 Technical testing

Before a quality label can be issued, the heat pump unit must be tested in accordance with the EHPA heat pump test **regulations based on existing CEN standards**. The tests must be carried out at an authorised EHPA test centre, which will check (non exhaustive) COP values and/or COP minimum values, capacity, safety, and sound power levels for conformity with the data provided by the manufacturer.

Alternatively, the CEN HEAT PUMP KEYMARK is accepted as proof of technical testing

1.6 Heat pump test centre

Only test centres authorised and listed by the EHPA can perform the necessary tests based on EHPA testing regulations. Such test centres have established the necessary test facilities for the testing of heat pumps and comply with quality requirements as set by the EHPA Quality Label Committee. After detailed review of the documentation, test centres are solely responsible for deciding which additional test objects must be examined. The test centre compiles a final test report. A list of test centres is published on the EHPA webpage.

This point does not apply in case where the CEN HEAT PUMP KEYMARK is used to document performance unit certified with the CEN HEAT PUMP KEYMARK.

1.7 Test report

The **test report (level 2)** presents a summary of the results of the device under test, with information on the technical data necessary for the allocation of the quality label, such as heat output and COP at nominal points, flow rates, heat transfer medium and refrigerant mass and for direct expansion heat pumps, a description of the evaporator. For tests of a model range, the actual representative model is tested separately and appropriate technical data for the applicant's remaining models are adopted. The test report level 2 then is used for all the equipment in the model range.

The test report 2 must make reference to both the CEN standard used and the EHPA rules and regulations. Both test reports must clearly state that the test centre is accredited for the used method and the tests are done under this accreditation.

The applicant receives a full **test report (level 1)** according to EN 14511 with all details on measurements carried out by the test centre.

This point does not apply in case where the CEN HEAT PUMP KEYMARK is used to document performance unit certified with the CEN HEAT PUMP KEYMARK

1.8 National quality label Commission

In order to use the quality label in a country, a National "Quality Label" Commission needs to be established. Its creation is governed by the requirements of the rules and regulations document of the EHPA quality label committee.

This commission is responsible for granting the quality label once all application documents are complete and all criteria are fulfilled. The commission grants the applicant the quality label for the corresponding model and/or for the complete model range.

Only one quality label commission can exist per country.

The list of all national quality label commissions and contact information is published on the EHPA web site.

1.9 Validity and surveillance

Quality labels are valid for three years from the date issued (certification date) and can be extended two times by re-certification. At the third and following re-certification, the Commission again carries out a detailed examination of the certification documents listed in 2.3 Heat pump documentation and the manufacturer provides evidence that the components used are equivalent or better than those originally tested during the unit testing. The technical assessment is carried out by the national testing institute, if there is no testing body in the country concerned, an external testing body must be appointed to carry out the assessment.

1.9.1 Technical assessment

Data to be delivered by the manufacturer and checked by the Commission and the test lab:

- Fulfilling the minimum SCOP
- Comparison of the compressor performance and check that it is equivalent or better
- Comparison of the heat exchanger performance and check that it is equivalent or better
- ...

The comparison shall be done by checking test results, calculations or simulation of the component manufacturer or an independent test institute.

Changes to models must be immediately reported to the National Commission, who will then decide on continued validity of the quality label. The National Quality Label Commission can perform spot checks at end customer sites for existence and accuracy of manufacturer documentation and conformity of installed equipment to standard (main components).

1.10 Extensions of the quality label

If the owner of a label wants to extend its validity, he must submit a request for quality label validity extension to the National Quality label Commission using the application form for re-certification. The Quality label Commission will decide on the request for an extension within three months. Extensions to quality label validity will be granted on the basis of the regulations in force at the time of extension.

In case the CEN HEAT PUMP KEYMARK is used to document unit performance the National Quality Label Commissions must be informed about any changes of the KEYMARK certification that may occur due to the annual testing (e.g.. validity, performance data, revocation)

1.11 Validity of the quality label

The quality label and its associated rights for a certified model range or single model will expire:

- a) automatically **three years** after certification date, if no renewal is requested
- b) after termination of equipment sales
- c) if breaches of quality label rules and regulations occur
- d) if unauthorised changes are made to the heat pump main components
- e) if quality label issuing fees are not paid within three months from invoice
- f) in case of misrepresentation of quality label information in advertising
- g) after a maximum of two renewals
- h) after a maximum period of nine years
- i) in case of revocation of the CEN HEAT PUMP KEYMARK (if used to document unit performances).

The National Quality Label Commission will inform the holder of the quality label certificate in writing of its intention to revoke the quality label. The quality label holder concerned has the right of appeal within 30 days.

Place of jurisdiction: the location of the respondent's headquarters in Europe.

1.12 Modification of requirements

Stricter requirements on COP or a change of testing requirements during the validity period do not affect the validity: however, in the event of such changes, renewal of validity will require the heat pump to comply with the new performance requirements. If a range is expanded, and testing is necessary, the additional unit or units can be tested under the criteria valid at the time the basic range was initially tested.

Expanding of or modification to a range does not prolong the validity of the label.

1.13 Rights of quality label holders

The holder of the quality label certificate is entitled to:

- a) mark the certified model range or single model with the quality label.
- b) attach the official quality label decal to equipment from the certified series or to the certified single unit.
- c) use the label for marketing purposes.

1.14 Dissemination of information

The most recent information is provided on the EHPA website. It provides

- participating countries and contact data,
- a list of tested products and test results (according to the details described for the level 2 report),
- the latest version of all documents governing the quality label.

2. Quality label rules and regulations

Heat pumps that use the CEN HP KEYMARK to document unit performance must meet the minimum requirements according to 2.1.1.

2.1 Technical conditions

Heat pumps that don't use the CEN HEAT PUMP KEYMARK to document unit performance must meet the following technical conditions in order to be eligible for the quality label:

- **Conformity of all main components**
(refrigerant circuit, compressor, evaporator fan, heat exchangers, expansion valve, refrigerant, heat source and heat sink, hot water storage tank) between the standard unit and test unit, and between the standard unit and the list of components. When applying for approval, the applicant must provide a parts list with the exact designations of the main components used in the heat pump, details of the method of defrosting and a description of defrosting control, and details of the refrigerant and the refrigerant mass.
- A **model range** is characterised by uniform main components (see paragraph 2.2.1 and the technical note on the model range for a detailed description). The following number of units must be examined from each model range:

Table 2.1: Number of heat pumps to be tested (space heating), depending on Heating Capacity (Q)

n _{HP} serie	Ratio Q _{max} / Q _{min}	Q _{max} -Q _{min}	
		≤ 30 kW	>30 kW
≤ 4	-	1	2
> 4	≤ 3,00	2	2
> 4	> 3,00	2	3

Table 2.2: Number of heat pumps, to be tested (domestic hot water production). Depending on volume water in the storage tank (V)

n _{HP} serie	V _{max} -V _{min}	
	≤ 300 L	>300 L
≤ 4	1	2
> 4	2	3

n_{HP} serie indicates the number of heat pumps in a series (model range).

- Applications for approval must be accompanied by the documents and information as specified in the application form (see appendix).
- The serial numbers from the selected heat pumps units must be provided, together with the serial numbers of their respective compressors. The test centre will select the heat pump units for testing as shown in the table above. If, within a model series, there are subordinate model series with one or two compressors, then a model from each subordinate model series must be tested.
- National regulations, e.g. the power supplier's technical connection regulations, must be complied with.

2.1.1 Minimum requirements

The performance figures (SCOP), determined in accordance with the EHPA heat pump test regulations, must comply with the following minimum requirements at the nominal points (in accordance with the current EHPA test regulations):

Minimum SCOP requirements for heat pumps for space heating for average climate and low temperature application:

Brine to water:	4.10
Water to water:	4.10
Air to water:	3.50
Direct exchange ground coupled to water:	4.10
Exhaust air to water:	3.50
Air to Air:	3.40

Minimum requirements for heat pumps for domestic hot water production:

Minimum reference hot water temperature of 52°C

There is no minimum COP for domestic hot water heat pumps.

For heat pumps that use a refrigerant with a **global warming potential (GWP)** less than 150, the minimum requirements of the coefficient of performance (COP) shall be reduced by 15 %.

These requirements are subject to revision to reflect technical developments in components, plant etc. as well as modifications to legal requirements.

Permissible tolerances in accordance with EHPA heat pump test regulations.

Data supplied by the manufacturer must not deviate by more than ± 5 % from the values determined by the test centre. If the test results deviate by more than 5 % from the values provided by the manufacturer, the manufacturer's values must be altered to those of the test results. Reported results of the units from the model range not tested are adjusted the deviation found in the tested specimen.

Performance data

The declared performance data, shall be considered valid if the values are not deviating by more than +5% from the measured capacity and COP values.

Seasonal performance data

For the conditions A to G, the declared capacities and COP shall not differ by more than +8% from the measured values.

For climates and/or temperature application for which only random tests are performed, all declared performance data shall be considered valid if the above requirement is fulfilled.

SCOP_{on} and SCOP calculations

Declared SCOP_{on} and SCOP values for any climate and/or temperature application shall not deviate by more than 8% from the calculated values.

2.1.2 Sound power level

Sound power levels must be measured at a recognised test centre in accordance with EHPA test regulations.

2.2 Additional requirements

2.2.1 Definition of model range

A model range is defined by the following characteristics:

- The same refrigeration process.
- The same refrigerant.
- The same compressor technology.
- The same expansion valve technology.
- The same evaporator technology.
- The same condenser technology.
- The same defrosting principle.
- The same principle of capacity control.
- The same construction of hot water storage tank incl. insulation (domestic hot water heat pumps)
- The variable characteristics follow a regular pattern (theoretical piston displacement, heat exchanger surfaces, charge quantities).
- The same generation of control software. Same functional parts within the interior condenser casing

These conditions ensure that the performance figures of all models within a model range are identical within a precise framework, even if only two models from a model range are tested in accordance with the EHPA test criteria. A thorough explanation of the underlying reasoning is presented in the **EHPA Quality Label Model Range Definition**, which is part of the documentation (see annex).

2.2.2 Definition of identical design

A heat pump is identical in design to the certified model range or single model if its refrigerant cycle, heat source and cooling medium (and where air-cooled, the de-frosting method including defroster control) correspond to the unit tested in accordance with the EHPA heat pump test regulations (= main components). This ensures that the most important output data, performance coefficients and refrigerant mass of standard models are guaranteed to correspond to the model tested by EHPA. Components that play no significant part in heat output or performance coefficients or noise level are not covered by the term "identical design".

2.2.3 Changes to tested units

Changes to main components must be reported immediately to the examining quality label commission, which will decide whether the change concerned is a substantial change or not. Any changes made to existing quality label-certified model ranges or single models must be set out in detail. Changes to main components are deemed insignificant if the following conditions are met:

Compressor:

Identical design comprises those instances where compressor design and characteristics (absolute work function, cylinder charge, theoretical piston displacement) are the same or better. Such changes are permitted.

Evaporator and condenser:

Identical design comprises those instances where heat exchanger surface areas are the same as, or greater than, those of the test unit. Such changes are permitted.

Charge quantities:

Changes to charge quantities of less than 15 %.

If the cooling circuit concept is changed (installation of an accumulator tank, suction line accumulator, intermediate injection, use of changed output control, defroster or defroster control or similar), retesting and/or partial retesting in accordance with EHPA test regulations will be required.

In each individual case, the original test centre will decide whether a design review, partial retest or complete retest is necessary.

The unit within the model range can be retained if it can be proven that after the component replacement, the performance labelled is equally good or better than for the original unit.

If the technology of one or more components is changed the heat pump is treated as a new model range.

2.2.4 Partial retesting requirement

If an applicant is unable, or does not wish, to submit detailed data on the changes made, a partial retest of the unit in accordance with EHPA test regulations will be necessary. A partial retest comprises the determination of heat output and performance coefficients at three operating points for units using air as heat source and two operating points for units using brine, water or ground as heat source.

2.3 Heat pump documentation

The following minimum requirements on submitted documentation must be met:

2.3.1 Planning documentation (plans, engineering and construction):

- Performance data covering heating output and drive (input) power over the whole operating range
- Dimension drawing(s) of the heat pump, incl. minimum clearances
- Tender specifications
- Installation aspects subject to safety regulations

2.3.2 Technical data (plans, engineering and construction)

- Number of compressors
- Type of refrigerant and mass
(the refrigerants GWP value will be documented on the certificate and on the website)
- Starting current
- Operating range
- Performance data
- Flow rates

- Volume of the hot water storage tank
- Weight
- Sound power level according ErP-Regulation
- Maximum sound power level

2.3.3 Installation instructions (plans, engineering and construction)

- Installation regulations
- Dimension drawing(s), including minimum clearances
- Schematic diagram, refrigerant and water circuit Schematic diagram, electrical system

2.3.4 Manuals (Owner, Operator)

- General information and safety recommendations for proper use
- Major components and spare part lists
- Heat pump operation (start-up, temperature adjustment, manual operation)
- Maintenance
- Trouble-shooting
- Customer service

2.3.5 Customer service organisation

A functioning customer service network¹ must be established in the sales area. Customer service must be available (reaction time) within 24 hours when necessary. How to get in contact with customer service and/or contact addresses for the sales areas must be listed in the manual or made easily available on a service web-site.

2.3.6 Commissioning and repair documentation

The documentation must include at least a template for the installation/repair log.

2.3.7 Minimum requirements for warranty

Two years full warranty on the heat pump, commencing from the date of purchase must be given to the end customer. The warranty shall include a declaration on the availability of heat pump spare parts for at least ten years.

The documents for the end customer must be provided in the language of the country in which the heat pump is sold.

3. Handling of controversial issues

In case of doubt, difficulty or of controversial application of the rules and regulations by a National Commission or a test centre, the case shall be reported to the EHPA QLC which is the superior decision making body.

¹ If a Quality Label is used in other EHPA countries, the service partner in these countries shall be informed when submitting the Quality Label application.

4. Annex: List of documents

The EHPA quality label is based on the following list of documents:

1. The **EHPA regulations for granting the international quality label for electrically driven heat pumps** (this document)
2. EHPA Testing Regulations for types of heat pumps covered
3. Application form for certification
4. Application form for re-certification
5. Example test report 2
6. Example Quality label certificate
7. Usage rules for the quality label
8. Technical notes
 - a. Definition of the requirements of a model range
 - b. Testing procedure for capacity controlled heat pumps.
9. Flow-chart outlining the application procedure