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Date	Description of modification	Revision number
14/12/2015	Initial version	1
10/03/2017	Addition of air/air Editorial changes Annex E included in Annex A – reference to prEN12102-2 suppressed – Reference to EN 15979-1 is added – rerating process chart was added –one testing point is added for periodic control test – periodic control test selection has been modified	2
12/09/2017	SCOP tool usage details Editorial changes Safety test for domestic hot water heat pumps Periodic surveillance process and rerating rules have been modified	3
07/03/2018	Addition of “one off admission testing approach” Precisions on 4 way valves in type definition Addition of nominal point for air/air heat pumps Safety tests have been renamed “operating test” Addition of operating test in the surveillance process Operating tests EN14511-4 have been updated according EN14511-4 revision Clarification of admission sample process Correction of Pes tolerance Clarification of surveillance test matrix table 4 Chart 1 is deleted	4
13/09/2018	Addition of space cooling testing requirements for water-based heat pumps Addition of non-heated space air heat source for domestic hot water heat pumps Update of EN12102-1 standard	5

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1 Classification of products

1.1 Type


A type of heat pumps is defined by the use of the same:

- Heat source
- Heat sink
- Driving energy (gas, electricity etc.).

The types covered by the KEYMARK Scheme are:

- Outdoor air (or exhaust air)/water - heat pumps
- Water/water (including brine/water) - heat pumps
- Direct expansion/water - heat pumps
- Air/air – outdoor air/recycled air heat pumps and air conditioners except single duct and double duct units

The types are declared by the manufacturers.

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1.2 Sub-type

A sub-type is part of a type. Heat pumps with an identical refrigeration circuit design, including same refrigerant and mass of refrigerant are considered as being the same sub-type if they fulfil all conditions below:

- Same compressor: identical (same manufacturer and commercial reference)
- Same condenser: identical (same manufacturer and commercial reference)
- Same evaporator: identical (same manufacturer and commercial reference) – except for air/air multi-split units
- Same defrost process (when relevant)
- Expansion device: same technology

Heat pumps with and without 4 way-valve shall not be included in the same sub-type.

In addition, for combination heat pumps and heat pumps only designed for domestic hot water (DHW) production:

- Same tank volume
- Same heat exchanger

For air/air multi-split units the sub-type classification only applies to outdoor unit.

Sub-types are declared by manufacturers but the final decision on sub-types rests with the certification body.

1.3 Model


A sub-type may consist of several different models, i.e. heat pumps using identical refrigeration circuits, but otherwise differ in design. Examples of such differences are given, but not limited to the list below

- With or without integrated circulator pump(s)
- With or without integrated storage tank
- With or without integrated back up heater
- Different sizes and corrosion protection of storage tank(s)
- Different location and dimensions on pipe connections
- Different electrical supply (frequency, single/three phases)
- Different brand names

Models are declared by manufacturers but the final decision on models rests with the certification body.

2 First admission

2.1 Factory inspection

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Factory inspection is part of the first admission process and shall be performed according Annex B.

2.2 First admission testing

Admission tests shall be conducted in a recognised laboratory (see Annex H).

Depending on the certification approach chosen by the applicant, the sampling rules for admission vary.

2.2.1. Sample selection: one off admission testing approach

Every sub-type shall be tested prior to the certification. The model to be tested is chosen by the certification body, according the following sampling process.

For the sampling process the applicant shall provide a minimum of three units (traceable by serial numbers) for the sub-type selected by the certification body; from which certification body will select one random unit (traceable by serial number) to be tested by recognised laboratory. The selection does not require that the units are physically selected or picked up by the certification body or inspector. For example, the whole process can be conducted by email.

The certification body also indicates to the manufacturer the testing conditions (climates; temperature application and part load conditions). The manufacturer shall send the sample to a recognised laboratory and inform the certification body within the following month about the schedule and place for the tests.

2.2.2. Sample selection: periodic testing approach

The sub-type(s) to be tested shall be selected by the certification body. The model(s) to be tested shall be selected by the certification body according the following sampling process.

For the sampling process the applicant shall provide a minimum of three units (traceable by serial numbers) for the sub-type selected by the certification body; from which certification body will select one random unit (traceable by serial number) to be tested by recognised laboratory. The selection does not require that the units are physically selected or picked up by the certification body or inspector. For example, the whole process can be conducted by email.

The certification body also indicates to the manufacturer the testing conditions (climates; temperature application and part load conditions). The manufacturer shall send the sample to a recognised laboratory and inform the certification body within the following month about the schedule and place for the tests.

2.2.2.1. Sampling rules

2.2.2.1.1. Sample size for all types of heat pumps except air/air type


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Table 1 Minimum number of sub-types to be tested in a type

Number of sub-types to be certified	Number of sub-type to be tested
≤ 5	1
$> 5 \leq 10$	2
$> 10 \leq 15$	3
$> 15 \leq 20$	4
$> 20 \leq 25$	5
> 25	every 5 th sub-type will require one additional test

2.2.2.1.2. Sample size for air/air types

For air/air type, different rules for single split/package units and multi-split units apply.

2.2.2.1.2.1. Single split and package units


Table 2 Minimum number of sub-types to be tested in a type

Number of sub-types to be certified	Number of sub-type to be tested
≤ 10	1
$> 10 \leq 20$	2
$> 20 \leq 30$	3
$> 30 \leq 40$	4
$> 40 \leq 50$	5
> 50	every 10 th sub-type will require one additional test

2.2.2.1.2.2. Multi-split units

Table 3 Minimum number of outdoor sub-types to be tested in a type

Number of sub-types to be certified	Number of outdoor units to be tested
≤ 5	1
$> 5 \leq 10$	2
$> 10 \leq 15$	3

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Number of sub-types to be certified	Number of outdoor units to be tested
> 15 ≤ 20	4
> 20 ≤ 25	5
> 25	every 5 th sub-type will require one additional test

As each outdoor unit can be combined with several kinds of indoor units

- Wall
- Ducted
- Cassette
- Floor
- Ceiling
- Etc.

The combination of the outdoor unit with indoor units shall be selected so that the capacity ratio is equal to 1 ($\pm 5\%$) within the combinations declared by the manufacturer.

All declared kinds of indoor units shall be tested in combination with one or several of the selected outdoor units at least once.

2.2.3. Data declaration

The applicant shall declare all the requested data in the Heat Pump KEYMARK database for all sub-types and models.


2.2.4. Modification and adding of sub-type

2.2.4.1. Modification of certified types (see Annex F)

- Additional tests are only needed if the modification has an impact on the certified performance (either on heating/cooling performance, DHW production or sound power level); the manufacturer has to inform the certification body about changes of components
- The rules for the number of tests to be performed are the same as for admission and depend on the chosen certification approach.

2.2.4.2. Addition of one or several sub-types in a type (see Annex F)

- The rules for the number of sub-types to be tested are the same as for admission and depends on the chosen certification approach
- The test must be performed in a recognised laboratory

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2.2.4.3. Extension of certified sub-types to another brand (see Annex G)

- No additional product test is required
- Technical documentation check according to EN 14511-4 / EN 16147 / EN 15879-1

The manufacturer has to sign and provide a written confirmation that no technical change that can affect the performance, has been made to the sub-types.

The final decision on modification rests with the certification body.

2.2.5. Test description

2.2.5.1. Test Points for all types except air/air type

2.2.5.1.1. Heat pump for space heating only (and cooling as an option)

2.2.5.1.1.1. Space heating tests for low temperature heat pump

If both water and brine as heat source are certified, tests shall be carried out with both heat sources.

- a) A7/W35; A20/W35; B0/W35; W10/W35 according to EN 14511-2 and E4/W35 according to EN 15879-1.
- b) Bivalent temperature condition according to EN 14825 for average climate
- c) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- d) For any other climate, bivalent temperature condition shall be tested according to EN 14825

2.2.5.1.1.2. Space heating tests for medium temperature heat pump


If both water and brine as heat source are certified, tests shall be carried out with both heat sources.

For each low and medium temperature application, the following tests shall be performed:

- a) A7/W35/55; A20/W35/55; B0/W35/55; W10/W35/55; according to EN 14511-2 and E4/W35/55 according to EN 15879-1.
- b) Bivalent temperature condition according to EN 14825 for average climate
- c) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- d) For any other climate, bivalent temperature condition shall be tested according to EN 14825

2.2.5.1.1.3. Sound power level tests

Tests shall be performed according to EN 12102-1 for average climate at the certified highest temperature application.

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For heat pumps certified for brine and water as heat source, the sound power level test is performed using brine.

2.2.5.1.1.4. Operating tests

Operating tests shall be performed according to EN 14511-4 as follows:

- Starting and operating tests
- shutting off the heat transfer medium flows
- Complete power supply failure.

In case the heat pump can be used with brine or water, only one heat source (brine or water) shall be tested.

According to EN 15879-1 clauses as follows:

- Direct exchange
 - chapter 7.1 starting test according to Table 8
 - chapter 7.2.2 pressure drop
 - chapter 7.2.3 shutting of the heat transfer medium flow
 - chapter 7.2.4 complete power supply failure

2.2.5.1.1.5. Air flow for exhaust air heat pumps

The manufacturer shall declare the exhaust air volume flow that shall be used for space heating test.

2.2.5.1.1.6. Space cooling tests

SEER and $P_{designc}$ for A35/W7 and/or A35/W18, W10/W7 and/or W10/W18 applications can be certified as an option.


If both water and brine as heat source are certified, tests shall be carried out with either brine or water as heat source; the heat source being chosen by the certification body.

2.2.5.1.1.6.1. Only one cooling application is certified

- a) "A" testing condition according EN14825 for the certified cooling application;
- b) One other testing condition to be chosen by the certification body according EN14825.

2.2.5.1.1.6.2. Both cooling applications are certified

- a) "A" testing condition according EN14825 for both applications;
- b) One other testing condition from one of the 2 applications to be chosen by the certification body according EN14825.

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2.2.5.1.2. Combination heat pump

2.2.5.1.2.1. Heating mode tests

If both water and brine as heat source are certified, tests shall be carried out with both heat sources.

- a) A7/W55; A20/W55; B0/W55; W10/W55 according to EN 14511-2 and E4/W55 according to EN 15879-1.
- b) Bivalent temperature condition according to EN 14825 for average climate
- c) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- d) For any other climate, bivalent temperature condition shall be tested according to EN 14825

Low temperature application can be certified as an option; in this case, testing at low temperature application shall be performed according 2.2.5.1.1.1.

2.2.5.1.2.2. Sound power level tests

Tests shall be carried out according to EN 12102-1 for medium temperature application for average climate.

For heat pumps certified for brine and water as heat source, the acoustic test is carried out using brine.

2.2.5.1.2.3. Domestic hot water tests

Tests shall be performed according to EN 16147 for average climate.

Tests may also performed according to EN 16147 for any other declared climate.

The tests shall be performed for the load profiles as declared by the manufacturer in the data sheet for each climate where relevant.

For water (brine)/water type, in case brine and water as heat source are declared, only one heat source shall be tested. The heat source to be tested is chosen by the certification body.

2.2.5.1.2.4. Operating tests


Operating tests shall be performed according to EN 14511-4 as follows:

- Starting and operating tests
- shutting off the heat transfer medium flows,
- Complete power supply failure.

In case the heat pump can be used with brine or water, only one heat source (brine or water) shall be tested.

According to EN 15879-1 clauses as follows:

- Direct exchange chapter 7.1 starting test according to Table 8

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chapter 7.2.2 pressure drop
 chapter 7.2.3 shutting of the heat transfer medium flow
 chapter 7.2.4 complete power supply failure

2.2.5.1.2.5. Air flow for exhaust air heat pumps

The manufacturer shall declare the exhaust air volume flow that shall be used for both space heating test and DHW test.

2.2.5.1.2.6. Space cooling tests

SEER and $P_{designc}$ for A35/W7 and/or A35/W18, W10/W7 and/or W10/W18 applications can be certified as an option.

If both water and brine as heat source are certified, tests shall be carried out with either brine or water as heat source; the heat source being chosen by the certification body.

2.2.5.1.2.6.1. Only one cooling application is certified

- a) "A" testing condition according EN14825 for the certified cooling application;
- b) One other testing condition to be chosen by the certification body according EN14825.

2.2.5.1.2.6.2. Both cooling applications are certified

- a) "A" testing condition according EN14825 for both applications;
- b) One other testing condition from one of the 2 applications to be chosen by the certification body according EN14825.

2.2.5.1.3. Heat pump for domestic hot water only

2.2.5.1.3.1. Performance tests

Tests shall be performed according to EN 16147 for average climate.

Tests may also be performed according to EN 16147 for any other declared climate.


The tests shall be performed for the load profiles as declared by the manufacturer in the data sheet for each climate where relevant.

For water (brine)/water type, in case brine and water as heat source are declared, only one heat source shall be tested. The heat source to be tested is chosen by the certification body.

For domestic hot water heat pumps that can operate with several air sources (outdoor air, exhaust air; indoor air) only one heat source shall be tested. The heat source to be tested is chosen by the certification body.

As an option, heat pump for domestic hot water can also be tested using non-heated space air conditions, i.e. +15°C (+12°C). The test under non-heated space air condition shall be conducted in addition to the test performed using a heat source defined in regulation 814/2013.

2.2.5.1.3.2. Sound power level tests

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Tests shall be performed for average climate according to the European standard when available and with the same heat source as for performance tests

2.2.5.1.3.3. Operating tests

Operating test shall be performed according to EN 16147:

- 8.1.: temperature operating range
- 8.3.: safety devices checking test
- 8.4.: condensate draining

2.2.5.1.3.4. Air flow for exhaust air heat pumps

The manufacturer shall declare the exhaust air volume flow that shall be used.

2.2.5.2. Test point for air/air types

2.2.5.2.1. Heat pump for space heating only

2.2.5.2.1.1. Space heating tests

- a) Bivalent temperature condition according to EN 14825 for average climate
- b) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- c) For any other climate, bivalent temperature condition shall be tested according to EN 14825
- d) As an option, A7/A20 according to EN14511-2 can also be tested

2.2.5.2.1.2. Sound power level tests

Tests shall be performed according to EN 12102-1 for average climate.

2.2.5.2.1.3. Operating tests


Operating tests shall be performed according to EN 14511-4 as follows:

- Starting and operating tests
- shutting off the heat transfer medium flows,
- complete power supply failure.

2.2.5.2.2. Heat pump for space cooling only

2.2.5.2.2.1. Space cooling tests

- a) Test condition "A" according to EN 14825

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- b) One other testing condition to be chosen by the certification body according to EN 14825

2.2.5.2.2.2. Sound power level tests

Tests shall be carried out according to EN 12102-1.

2.2.5.2.2.3. Operating tests

Operating tests shall be performed according to EN 14511-4 as follows:

- Starting and operating tests
- shutting off the heat transfer medium flows,
- Complete power supply failure.

2.2.5.2.3. Heat pump for space heating and cooling

2.2.5.2.3.1. Space cooling tests

- a) Test condition “A” according to EN 14825
 b) One other testing condition to be chosen by the certification body according to EN 14825

2.2.5.2.4. Space heating tests

- a) Bivalent temperature condition according to EN 14825 for average climate
 b) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
 c) For any other climate, bivalent temperature condition shall be tested according to EN 14825
 d) As an option, A7/A20 according to EN14511-2 can also be tested

2.2.5.2.5. Sound power level tests


Tests shall be performed according to EN 12102-1 in cooling mode.

2.2.5.2.6. Operating tests

Operating tests shall be performed according to EN 14511-4 as follows:

- Starting and operating tests
- shutting off the heat transfer medium flows,
- complete power supply failure

2.2.6. SCOP and SEER calculations

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For SCOP and SEER calculations, certification bodies shall use the SCOP tools approved by the HPSG.

3. Periodic surveillance

3.1. One off admission testing approach

The surveillance process is passed if both factory inspection and documentation control are confirmed to conform by the certification body.

3.1.1. Factory inspection

Factory inspection shall be performed at each manufacturing site at least every 12 months according to Annex B.

3.1.2. Technical documentation control process

Technical documentation control applies to each type and to each manufacturing site independently. [The technical documentation control process is called Physical Inspection and shall include every aspect included in Annex K.](#)

For the model to be controlled, the certificate holder shall provide the component list, drawings and all other documents that may be requested by the recognised inspector. The technical documentation control is done on site by the recognised inspector. The technical documentation control is passed if the certification body can confirm that the heat pump being produced is equivalent to the certified model. In case equivalency cannot be proved, the control is failed.

3.1.2.1. Model and unit selection rules

The models to be controlled shall be selected by certification body and units shall be chosen by a recognised inspector.


For a technical documentation control, one model of a sub-type per type is selected by the certification body. If heat pumps for space heating and combination heat pumps are certified a combination heat pump shall be selected.

One unit of the selected model shall be chosen by a recognised inspector from the existing stock of products or directly from the production line. The unit selection may be done during an annual factory inspection or during a specific visit upon certification body request.

In case of split type heat pump, this rule applies to the indoor and outdoor parts of the selected model. In case outdoor and indoor units are not produced in the same manufacturing site, the technical documentation control is done in each site. The control is passed only if both indoor and outdoor unit technical documentation control is confirmed to conform by the certification body.

3.1.2.2. Periodicity

Regular technical documentation control periodicity is 12 months. Every 12 months, one model of each type is to be controlled in each manufacturing site.

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3.1.3. Penalties

In case the technical documentation control is failed, the certificate for the controlled sub-type shall be withdrawn by the certification body.

3.1.4. Standard revisions

In case of a standard revision, certificate holders are allowed to declare new performances for all concerned certified products providing the new declared performances are lower than the original ones.

3.2. Periodic testing approach

The periodic surveillance process shall start 12 months after the first certificate has been granted to the applicant. Surveillance (including positive assessment of certification body) has to be completed not later than 3 months after the process has started.

The process starts with the factory inspection where models are chosen by recognised inspector for surveillance test.

Surveillance test process and rules apply to each type independently.

Re-rating rules shall be applied to each “failed” test according clause 4.

The surveillance process is passed if factory inspection, operating test and test are confirmed to conform by the certification body.

3.2.1. Factory inspection

Factory inspection shall be performed at each manufacturing site at least every 12 months according to Annex B.

3.2.2. Surveillance test process

Periodicity of surveillance test depends on the test results and number of manufacturing sites.


A surveillance test is “passed” when the certification body has confirmed that all the certified performances that are tested conformed to the declared performances according the scheme requirements. A surveillance test is “failed” when at least one of the certified performance that is tested deviates from the declared performance in a higher level than the defined tolerances.

The certified performances are listed in scheme rules documents clause 8.

3.2.2.1. Model and unit selection rules

The models to be tested shall be selected by certification body and units shall be chosen by recognised inspector.

For a surveillance test, one model of a sub-type per type is selected by the certification body. If heat pumps for space heating and combination heat pumps are certified a combination heat pump shall be selected.

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One unit of the selected model shall be chosen by a recognised inspector from the existing stock of products or directly from the production line. The unit selection may be done during an annual factory inspection or during a specific visit upon certification body request.

In case of split type heat pump, this rule applies to the indoor and outdoor parts of the selected model.

3.2.2.2. Periodicity

- Single manufacturing site

Regular surveillance test periodicity is 24 months. If the surveillance test is “passed”, then the next surveillance will be performed after 24 months.

In case the surveillance test is “failed”, the next surveillance, on another model of another sub-type or same sub-type upon decision of certification body, shall be performed after 12 months. The unit to be tested shall be chosen during factory inspection.

In case this test performed 12 months later than the first one is also “failed”, another test, on another model of another sub-type or same sub-type upon decision of certification body shall be performed after 6 months. The unit to be tested shall be chosen by a recognised inspector.

The periodicity remains one test every 6 months until the test is “passed”. Then the regular periodicity applies again.

- Multi manufacturing sites

If the manufacturing of a type takes place at more than one manufacturing site, the regular surveillance test periodicity is 12 months. The unit to be tested shall be selected from a different manufacturing site every 12 months. For air/air type, only the manufacturing sites of the outdoor units are considered for the following procedure.


If the surveillance test is “failed” the regular surveillance test periodicity as described above goes on but in addition, another unit manufactured at the same manufacturing site shall be tested after 12 months. The model can belong to another sub-type or to the same sub-type upon decision of the certification body. The unit to be tested shall be chosen by a recognised inspector.

In case this second test is “failed”, another unit manufactured on the same manufacturing site shall be performed after 6 months. The model can belong to another sub-type or to the same sub-type upon decision of the certification body. The unit to be tested shall be chosen by a recognised inspector.

The periodicity remains one test every 6 months until the test is “passed”. Then the regular periodicity applies again.

The process is described through an example and a chart in a note at the end of this document.

3.2.2.3. Reception of unit by recognised laboratory

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After the unit has been chosen by the recognised inspector the certificate holder shall send the unit to a recognised laboratory and shall inform the certification body within the following month about the schedule and place for the tests.

3.2.3. Performances to be tested

3.2.3.1. Heat pumps for space heating and combination heat pumps except air/air type

For heat pumps certified for brine and water as heat source, the certification body shall choose one of these heat sources to be used during the following tests.

- Sound power level is tested according to EN 12102-1; both outdoor and indoor units shall be tested, where relevant, under average climate.
In the case of low temperature heat pumps, the sound power level is tested at low temperature condition, in the case of medium temperature heat pumps or combination heat pumps, the sound power level is tested at medium temperature condition.
- For low temperature heat pumps:
 - a) A7/W35; A20/W35; B0/W35; W10/W35 according to EN 14511-2 and E4/W53 according to EN 15879-1 where relevant
 - b) Bivalent temperature conditions according to EN 14825 for average climate
 - c) One other part load condition to be chosen by the certification body according to EN 14825 for average climate
 - d) For any other declared climate, bivalent testing temperature condition and another part load condition to be chosen by the certification body shall be tested according to EN 14825
- For medium temperature heat pumps:
Low or medium temperature application has to be chosen by the certification body, then the same test as described for low temperature heat pumps in clause 3.3.1 is to be performed.
- For combination heat pumps:
 - a) Heating mode test:
 - if only medium temperature application is declared the same test as described for low temperature heat pumps in clause 3.3.1 is to be applied for medium temperature application
 - If both low and medium temperature applications are declared, low or medium temperature application has to be chosen by the certification body, then the same test as described for low temperature heat pumps in clause 3.3.1 is to be performed
 - b) DHW efficiency, η_{DHW} , according to EN 16147 under average climate for the load profile declared by the manufacturer
 - c) DHW efficiency, η_{DHW} , according to EN 16147 under another declared climate for the load profile declared by the manufacturer
- For heat pumps also certified in cooling mode
 - a) "A" testing condition according EN14825 for all certified applications

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- b) One other testing condition from one of the certified applications chosen by the certification body.

3.2.3.2. Heat pumps designed for domestic hot water production

For heat pumps certified for brine and water as heat source, the certification body shall choose one of these heat sources to be used during the following tests.

For heat pumps certified for several air sources (outdoor air, exhaust air, indoor air; non-heated space air), the certification body shall choose one of these heat sources to be used during the following tests.


- Sound power level according to the European standard when it will be available. Where relevant, both indoor and outdoor units shall be tested. Sound power level is only tested under average climate conditions
- DHW efficiency, η_{DHW} , according to EN 16147 for average climate for the load profile declared by the manufacturer
- DHW efficiency, η_{DHW} , according to EN 16147 under another declared climate for the load profile declared by the manufacturer
- V_{40} according to EN 16147 for average climate for the load profile declared by the manufacturer
- V_{40} according to EN 16147 for another climate for the load profile declared by the manufacturer

3.2.3.3. Air/air heat pumps for space heating only

- Sound power level is tested according to EN 12102-1. Both outdoor and indoor units shall be tested where relevant. For package units, both outdoor and indoor sound power level shall be measured.
- Heating mode test
 - a) Bivalent temperature conditions for average climate according to EN 14825
 - b) One other part load condition to be chosen by the certification body according to EN 14825 for average climate
 - c) For any other declared climate, bivalent temperature condition and another part load condition to be chosen by the certification body shall be tested according to EN 14825
 - d) In case A7/A20 testing condition according to EN14511-2 is certified, this testing condition shall be tested

3.2.3.4. Air/air heat pumps for space cooling only

- Sound power level is tested according to EN 12102-1. Both outdoor and indoor units shall be tested where relevant. For package units, both outdoor and indoor sound power level shall be measured.
- Cooling mode test
 - a) Part load condition "A" according to EN 14825
 - b) One other part load condition to be chosen by the certification body according to EN 14825

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3.2.3.5. Air/air heat pumps for space heating and cooling

- Sound power level is tested according to EN 12102-1 in cooling mode. Both outdoor and indoor units shall be tested where relevant. For package units, both outdoor and indoor sound power levels shall be measured.
- Heating mode test
 - a) Bivalent temperature conditions for average climate according to EN 14825
 - b) One other part load condition to be chosen by the certification body according to EN 14825 for average climate
 - c) For any other declared climate, bivalent temperature condition and another part load condition to be chosen by the certification body shall be tested according to EN 14825
 - d) In case A7/A20 testing condition according to EN14511-2 is certified, this testing condition shall be tested
- Cooling mode test
 - a) Part load condition “A” according to EN 14825
 - b) One other part load condition to be chosen by the certification body according to EN 14825

3.2.4 Operating tests

3.2.4.1. Heat pumps for space heating and combination heat pumps

One test according to EN14511-4 or EN15879-1 shall be performed. The test is to be chosen by the certification body among the two following tests: “Shutting off the heat transfer medium flow” and “complete power supply failure”.

3.2.4.2. Heat pumps designed for domestic hot water production

One test according to EN16147 clause 8 shall be performed. The test is to be chosen by the certification body among the two following tests: “Shutting off the heat transfer medium flow” and “complete power supply failure”.

3.2.4. Standard revisions


For heat pumps that have been originally certified according to standards that have been revised, certificate holder shall communicate to the certification body, before the surveillance test starts, the performance according to the revised standard.

The surveillance test process, including rerating when relevant, is conducted using these declared performances.

If the test is passed, the database and the certificate shall be revised, for the tested sub-type, with the new set of performances declared by the certificate holder.

In case of overlapping of standard versions the certificate holder shall state which version of standard shall be used for the test.

In case of a standard revision, certificate holders are allowed to declare new performances for all concerned certified products, those performances are to be approved by certification body.

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4. Rerating rules

Rerating rules only apply to heat pump certified under periodic testing approach.

4.1. General rules

- When a performance test is “failed” the rerating rules apply to the corresponding performance of all the models in the sub-type in which the tested unit belongs to.
 - For the performances non-listed in the Scheme Rules clause 8 that are tested (eg: EN 14511-2 performances), in case measured data don't match with declared data, the rerating rules apply to all the models in the sub-type in which the tested unit belongs to.
 - Several operating modes are tested during surveillance tests: acoustic, heating, cooling and DHW. Rerating rules apply independently to each mode and to the characteristics for which the tolerances are set in clause 4.2. that has failed within this mode
- ⇒ E.g.: failure on outdoor unit sound power level test leads to rerating of sound power level of the outdoor unit of the models of the considered sub-type.

4.2. Space heating/cooling performances rerating rules

4.2.1. Performances according to EN 14511-2 or to EN 15879-1

Tolerance on heating capacity and COP measured at standard rating conditions according to EN 14511-2 is equal to -8%.

If both the measured heating capacity and COP are not lower than 8% compared to declared values, then the EN 14825 tests shall be performed according the flowrate declared by the applicant.

If an observed deviation between declared and measured heating capacity or COP exceeds - 8 %, then EN 14825 tests shall be performed according to the measured flowrate and the EN 14511-2 declared performances shall be rerated as follow:

- Rerating of tested model

$$\mathbf{rerated\ heating\ capacity} = \mathbf{measured\ capacity} \times (1 + 0.08) \quad \text{Equation 1}$$

$$\mathbf{rerated\ COP} = \mathbf{measured\ COP} \times (1 + 0.08) \quad \text{Equation 2}$$


- Rerating of the other models of the sub-type

Same relative deviation in between declared and rerated heating capacity of the tested model shall be applied to the heating capacity of the other models of the sub-type.

Same relative deviation in between declared and rerated COP of the tested model shall be applied to the COP of the other models of the sub-type.

- Input power rerating for all models

$$\mathbf{rerated\ input\ power} = \frac{\mathbf{rerated\ heating\ capacity}}{\mathbf{rerated\ COP}} \quad \text{Equation 3}$$

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4.2.2. Performances according to EN 14825

4.2.2.1. Space heating

The rerating rules apply independently to each declared climate.

In case a test in heating mode is “failed” and in case of two heat sources are declared, both heat sources shall be rerated unless the certificate holder asks for a full test on both heat sources for all the declared temperature applications for the failed climate. A full test means: test according to EN 14511-2, test according to EN 14825 at every part load conditions and test of an auxiliary mode chosen by the certification body.

For the space heating test to be considered as “passed” the space heating tests for all declared climates need to be “passed”.

a) Test at bivalent temperature condition

Bivalent temperature condition shall be tested first. If the measured heating capacity at T_{biv} fulfil the following criteria:

$$P_j[T_{biv}] = \frac{T_{biv-16}}{TOL-16} P_{declared} P_{designh} \pm 10\% \quad \text{Equation 4}$$

then the test continues. If not, the test is interrupted. The certificate holder shall provide a new complete set of declared values to the certification body and to the recognised laboratory within two weeks after the interrupted test. The tests may then be restarted from the beginning and the $P_{designh}$ shall be rerated as follows:

- Rerating of the tested model:

$$\text{rerated } P_{designh} = P_j[T_{biv}] \times \frac{TOL-16}{T_{biv-16}} \quad \text{Equation 5}$$

- Rerating of the other models of the sub-type and of the other heat source when relevant:


Same relative deviation between declared and rerated $P_{designh}$ of the tested model shall be applied to the other models of the sub-type and to the other heat sources when relevant.

When test at bivalent temperature condition has been completed, the other selected part loads shall be tested.

b) Test at other part load conditions

At each part load condition, measured COP shall not be lower than -8% compared to the declared COP.

- If each measured COP is within the tolerance, SCOP is calculated using the declared COP for each part load conditions and declared auxiliary modes consumption. If the calculated SCOP is not lower than -8% compared to the declared SCOP, then the test is over and nor SCOP nor η are rerated. If the calculated SCOP is lower than -8% compared to the declared SCOP, the declared SCOP and η shall be rerated. The rerated SCOP and η shall be equalled to the calculated ones. SCOP and η for each models of the sub-type for each declared applications and each declared climates shall be

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calculated according the declared part load data and auxiliary modes consumption. Each SCOP being lower than the calculated value -8% shall be replaced by the calculated SCOP and η shall be recalculated accordingly

- If at least one of the measured COP is lower than -8% compared to the declared COP then, all the non-tested EN 14825 part load conditions and one auxiliary mode condition (chosen by the certification body) shall be tested. SCOP is calculated using the declared COP when they are within the 8% tolerance, otherwise using the measured COP. For the calculation, the measured auxiliary mode consumption and the declared values for the modes that have not been tested shall be considered
 - If the calculated SCOP is not lower than -8% compared to the declared SCOP, SCOP and η are not rerated
 - If the calculated SCOP is lower than -8% compared to the declared SCOP then, SCOP and η shall be rerated and all the declared applications shall be fully tested (EN 14511-2 or EN 15879-1 and EN 14825 at every part load conditions and one auxiliary mode chosen by certification body). The same rerating procedure applies to each application

- Rerating of tested model

$$\mathit{rerated\ SCOP} = \mathit{measured\ SCOP} \times (1 + 0.08)$$

Equation 6

Rerated η is recalculated according rerated SCOP.

- Rerating of the other models of the sub-type and of the other heat sources when relevant

Same relative deviation in between declared and rerated SCOP of the tested model shall be applied to the SCOP of the other models of the sub-type and other heat sources when relevant. η is recalculated according rerated SCOP.

Heating test is “passed” if none of the $P_{designh}$ and η for all tested applications have been rerated.

4.2.2.2. Space cooling


- a) Condition A test

Condition A is tested. If cooling capacity measured under condition A does not deviate from $P_{designc}$ from more than -8% then the test continues. If not, the test is interrupted. The certificate holder shall provide a new complete set of declared values to the certification body and the chosen recognised laboratory within two weeks of the interrupted test. The tests may then be restarted from the beginning and the $P_{designc}$ shall be rerated as follows:

- For the tested model:

$$\mathit{rerated\ } P_{designc} = P_{dc}(35)$$

Equation 7

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- For the other models of the sub-type, same deviation in between declared and rerated $P_{designc}$ of the tested model shall be applied.

When test at A temperature condition is completed, the other selected part load condition shall be tested.

b) Test at other part load conditions

At each of the part load conditions, measured EER shall not be lower than -8% compared to the declared EER.

- If all measured EER values are within the tolerance, SEER is calculated using the declared EER values for all part load conditions and declared auxiliary modes consumptions.
- If at least one of the measured EER is lower than -8% compared to the declared EER then, all non-tested EN 14825 part load conditions and one auxiliary mode condition (chosen by the certification body) shall be tested. SEER is then calculated using the declared EER values when they are within the 8% tolerance, otherwise using the measured values and the measured auxiliary mode consumption and the other declared auxiliary mode consumptions for those not tested.

If the calculated SEER is not lower than -8% compared to the declared SEER, SEER is not rerated

If the calculated SEER is lower than -8% compared to the declared SEER then, SEER shall be rerated.

- Rerating of tested model

$$\text{rerated SEER} = \text{measured SEER} \times (1 + 0.08) \quad \text{Equation 8}$$

- Rerating of the other models of the sub-type


Same relative deviation in between declared and rerated SEER of the tested model shall be applied to the SEER of the other models of the sub-type.

Cooling test is “passed” if neither $P_{designc}$ nor SEER have been rerated.

4.3. Domestic hot water performances rerating rules

The rerating rules apply independently to each declared climate.

In case the test is “failed” and in case several heat sources are declared, all heat sources shall be rerated unless the certificate holder asks for a full performance test on the non-tested heat source.

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If the test cannot fulfil the requirements of EN 16147 in term of water temperature; the certificate holder shall provide a new complete set of declared values: load profile; η_{DHW} and V_{40} (only for DHW heat pumps) to the certification body and the chosen recognised laboratory within two weeks of the interrupted test. The tests may then be restarted from the beginning.

DHW test is “passed” if for each declared climate the test has been performed for the declared load profile and if neither η_{DHW} nor V_{40} has been rerated, otherwise the test is “failed”.

4.3.1. η_{DHW}

If an observed deviation between declared and measured η_{DHW} exceeds -8 %, then η_{DHW} shall be rerated.

- Rerating of tested model

$$\text{rerated } \eta_{DHW} = \text{measured } \eta_{DHW} \times (1 + 0.08) \quad \text{Equation 9}$$

- Rerating of the other models of the sub-type and of the other heat source when relevant

Same relative deviation in between declared and rerated η_{DHW} of the tested model shall be applied to the η_{DHW} of the other models of the sub-type and for the other heat sources when relevant.

4.3.2. V_{40} – only for domestic hot water heat pumps

If an observed deviation between declared and measured V_{40} exceeds -3 %, then V_{40} shall be rerated.

- Rerating of tested model

$$\text{rerated } V_{40} = \text{measured } V_{40} \times (1 + 0.03) \quad \text{Equation 10}$$

- Rerating of the other models of the sub-type and of the other heat source when relevant

Same relative deviation in between declared and rerated V_{40} of the tested model shall be applied to the V_{40} of the other models of the sub-type and for the other heat source when relevant.


4.3.3. Other EN 16147 performances

If a deviation between declared and measured values is observed for the heating up period, P_{es} , reference temperature and the V_{40} for combination heat pumps; the following rerating rules apply:

4.3.3.1. Heating up period

Tolerance is equal to -15 min.

- Rerating of tested model

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rerated heating up period = measured heating up period – 15 minutes Equation 11

- Rerating of the other models of the sub-type and of the other heat source when relevant

Same deviation (in minutes) in between declared and rerated heating up period of the tested model shall be applied to the heating up period of the other models of the sub-type and for the other heat source when relevant.

4.3.3.2. P_{es}

Tolerance is equal to +10%

- Rerating of tested model

rerated $P_{es} = measured P_{es} \times (1 + 0.1)$ Equation 12

- Rerating of the other models of the sub-type and of the other heat source when relevant

Same relative deviation in between declared and rerated P_{es} of the tested model shall be applied to the P_{es} of the other models of the sub-type and for the other heat source when relevant.

4.3.3.3. Reference temperature

Tolerance is equal to -1K

- Rerating of tested model

rerated reference temperature = measured reference temperature – 1
Equation 13

- Rerating of the other models of the sub-type and of the other heat source when relevant

Same deviation (in Kelvin) in between declared and reference temperature of the tested model shall be applied to the reference temperature of the other models of the sub-type and for the other heat source when relevant.


4.3.3.4. V_{40} (for combination heat pump)

Tolerance is equal to -3%

- Rerating of tested model

rerated $V_{40} = measured V_{40} \times (1 + 0.03)$
Equation 14

- Rerating of the other models of the sub-type and of the other heat source when relevant

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Same relative deviation in between declared and rerated V_{40} of the tested model shall be applied to the V_{40} of the other models of the sub-type and for the other heat source when relevant.

4.4. Sound power level rerating rules

The rerating rules apply independently to indoor and outdoor units.

In case the test is “failed” and in case several heat sources are declared, all heat sources shall be rerated unless the certificate holder asks for a full test on the non-tested heat source.

Sound power level test is “passed” if neither indoor unit (when relevant) nor outdoor unit (when relevant) has been rerated.

If measured sound power level is higher than declared sound power level from more than 2 dB(A), then the following rerating rules apply:

- Rerating of tested model

$$\text{rerated sound power level} = \text{measured sound power level} + 2$$

Equation 15

- Rerating of the other models of the sub-type and of the other heat source when relevant

Same absolute deviation in between declared and rerated sound power level of the tested model shall be applied to the sound power level of the other models of the sub-type and for the other heat source when relevant.

Sound power test is “passed” if neither outdoor nor indoor unit, where relevant, sound power level has been rerated; otherwise, the test is “failed”.

4.5. Operating test

In case operating test failed, certificate holder shall provide the certification body with corrective actions within one month after the failed test was performed.

Note 1 Example of surveillance test process related to paragraph 3.2.2.2 Periodicity.

Table 4 Surveillance test periodicity in case of multi manufacturing sites



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Matrix	Manufacturing site							
		A	B	C	D	E	F	G
Types	1	X	X	X				
	2				X	X		
	3				X			
	4						X	X
	5						X	X
Year 1	Manufacturing site							
Types	1	X	X	X				
	2				X	X		
	3				X			
	4						X	
	5						X	X
Year 2	Manufacturing site							
Types	1	X	X	X				
	2				X	X		
	3				X			
	4						X	
	5						X	X

The picture „Matrix“ shows a manufacturer with seven factories (A-G) at which 5 types of heat pump (1 – 5) are produced.

Since not every type of heat pump has to be verified annually in every factory the picture “Year 1” shows the types that have been tested from the different factories (marked with a circle). Green circles are successful tests (A1, D2, F2) red circles are failed tests (D3, F5).

As D3 and F5 failed in year 1, they have to be tested again in year 2.
In addition, 3 other units from B1, E2 and G5 are tested.
No test on type 4 as year 1 test passed.
All tests performed in year 2 passed, except E2.



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Year 3	Manufacturing site							
		A	B	C	D	E	F	G
Types	1	X	X	X				
	2				X	X		
	3				X			
	4						X	
	5						X	X

As E2 failed in year 2, it has to be tested again in year 3. In addition, 4 other units from C1, D2, F4 and F5 are tested. No test on type 3 as year 2 test passed. All tests performed in year 3 passed, except C1, D2 and E2.

Year 4	Manufacturing site							
		A	B	C	D	E	F	G
Types	1	X	X	X				
	2				X	X		
	3				X			
	4						X	
	5						X	X

As C3, D2 and F3 failed in year 3, They have to be tested again in year 4. In addition, 3 other units from A1, E2 and G5 are tested. No test on type 4 as year 3 test passed. All tests performed in year 4 passed.

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