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| Date | Description of modification | Revision number |
|------------|--|-----------------|
| 25-11-2015 | Initial version | 0 |
| 06-07-2017 | Update of type definition Introduction of air/air type Clarification of performances that shall certified and clarification of rerating rules | 1 |

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1 Definitions

Heat Pump

Heat pump means a space heater using ambient heat from an air source, water source or ground source, and/or waste heat for heat generation; a heat pump space heater may be equipped with one or more supplementary heaters using the Joule effect in electric resistance heating elements or the combustion of fossil and/or biomass fuels

Heat pump for space heating: means a space heater using ambient heat from an air source, water source or ground source, and/or waste heat for heat generation; a heat pump space heater may be equipped with one or more supplementary heaters using the Joule effect in electric resistance heating elements or the combustion of fossil and/or biomass fuels;

Combination heat pump: means a heat pump space heater that is designed to also provide heat to deliver hot drinking or sanitary water at given temperature levels, quantities and flow rates during given intervals, and is connected to an external supply of drinking or sanitary water;

Low temperature heat pump: means a heat pump space heater that is specifically designed for low-temperature application, and that cannot deliver heating water with an outlet temperature of 52 °C at an inlet dry (wet) bulb temperature of – 7 °C (– 8 °C) in the reference design conditions for average climate;

Domestic hot water (DHW) heat pump: means a water heater that uses ambient heat from an air source, water source or ground source, and/or waste heat for heat generation

Rerating: specific solution for failed tests under surveillance (see Annex A Chapter 4)

—

Manufacturing Site

The manufacturing site is the place in a factory where the final control test of the final product (refrigerant circuit) takes place.

That means, if the refrigerant circuit is produced on different production places with no final control test at one of the factory production place, it is required that such a control test should take place on each of the factory production places of the refrigerant circuit.

The control test includes the high voltage test and leak testing according EN 60335-2-40 and will be checked by the auditor of factory inspection .


Under the agreement of the auditor it is also possible, that manufacturers have the evidence of the product quality of the second manufacturing site without an additional factory inspection.

2 Data that shall be certified

2.1 Mandatory certified data

- Heat pump for space heating other than Air/air heat pump

A heat pump for space heating is a heat pump labelled as a space heating only product. When a product consists in 2 units that are connected either by hydronic or refrigerant pipes; sound power level of both units shall be measured.

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- Low temperature heat pump: P_{design} – E_{tas} – sound power level for both indoor and outdoor units when relevant) for low temperature application (35°C) under average climate conditions.
- Medium temperature heat pump: P_{design} – E_{tas} – sound power level for both indoor and outdoor units when relevant) for both low temperature and medium temperature application under average climate conditions.

For water/water heat pumps; heat sources as declared in the product fiche according regulation 813/2013 shall be certified.

- Air/air heat pump for space heating

P_{designh} – SCOP – sound power level for both indoor and outdoor units (when relevant) for average climate

- Air/air heat pump for space cooling

P_{designc} – SEER – sound power level for both indoor and outdoor units (when relevant).

- Air/air heat pump for space heating and space cooling

P_{designh} – SCOP - sound power level for both indoor and outdoor units (when relevant) for average climate.

P_{designc} – SEER – sound power level for both indoor and outdoor units (when relevant).

- Combination heat pump

When a product consists in 2 units that are connected either by hydronic or refrigerant pipes; sound power level of both units shall be measured.

P_{design} – E_{tas} – sound power level in heating mode – E_{tasDHW} and the corresponding load profile- for both indoor and outdoor units when relevant for medium temperature application under average climate conditions.

For water/water heat pumps; heat sources as declared in the product fiche according regulation 813/2013 shall be certified.

- Heat pump for domestic hot water production

When a product consists in 2 units that are connected either by hydronic or refrigerant pipes; sound power level of both units shall be measured.

E_{tasDHW} and the corresponding load profile – V_{40} – sound power level for both indoor and outdoor units when relevant under average climate conditions.

For water/water domestic hot water heat pumps; heat sources as declared in the product fiche according regulation 813/2013 shall be certified.


2.2 Optional certified data

- Heat pump for space heating other than air/air heat pumps

- For both low and medium temperature heat pumps, performances under cold or/and warm climates may be certified.
- For water/water heat pumps, performances for any other heat source (brine or water) may be certified.

- Air/air heat pump for space heating or space heating and space cooling

Performances under cold or/and warm climate conditions may be certified.

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- Combination heat pumps
 - Performances for low temperature space heating application (35°C) may be certified
 - Performances under cold/and warm climates may be certified
 - For water/water heat pumps, performances for any other heat source (brine or water) may be certified.
- Heat pumps for domestic hot water production
 - Performances under cold/and warm climates may be certified
 - For water/water heat pumps, performances for any other heat source (brine or water) may be certified

3 Details on rerating rules

3.1 Surveillance test process

Periodic surveillance test shall start 12 months after the first certificate has been granted to the applicant. Surveillance process and rules apply to each type independently.

A surveillance test is “passed” when all the certified performances that are tested are conform to the declared performances. The surveillance test is “passed” all the tested modes are “passed”.

A surveillance is “failed” when at least one of the certified performance that is tested deviates from the declared performance from more than the defined tolerances. A surveillance test is “failed” if at least of the testing mode is “failed”.

The certified performances are listed in scheme rules documents paragraph 7.

- Model and unit selection rules

The models to be tested shall be selected by certification body and units shall be chosen by an empowered auditor.

For a surveillance test, one model of a sub-type per type and per manufacturing site (according annex A) 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 an auditor empowered by the certification body from the existing stock of products or directly from the production line. The unit selection may be done during an annual factory audit or during a specific visit upon certification body request.

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


- Reception of unit by testing institutes

After the unit has been chosen by auditor the certificate holder shall inform the certification body within the following month about the schedule and place for the tests.

3.2 Rerating rules

3.2.1 General rules

- When a test is “failed” the rerating rules apply to all the models of the sub-type whose unit tested belongs to.
- For the performances non-listed in the scheme rules paragraph 7 that are tested (eg: EN14511-2 performances), even so the test is “passed”, in case measured data don’t match with declared the rerating rules apply to all the models of the sub-type whose unit tested belongs to.

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- Several operating modes are tested during surveillance tests: acoustic, heating, cooling and domestic hot water. Rerating rules apply independently to each mode and to the characteristic that has failed within this mode.
 - ⇒ Eg: failure on outdoor unit sound power level test leads to rerating of sound power level of the outdoor unit only.

3.2.2 Space heating/cooling modes rerating rules

3.2.2.1 Test according EN14511-2 or EN15879-1

Tolerance on heating capacity and COP measured at nominal point according EN14511-2 is equal to -8%.

If both measured and declared heating capacity and COP are within -8% tolerance then the EN14825 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 EN14825 tests shall be performed according to the measured flowrate and the EN14511-2 declared performances shall be rerated as follow.

- If measured heating capacity deviates more than -8%
 - Rerating of tested model

$$\text{rerated heating capacity} = \text{measured capacity} \times (1 + 0.08)$$
 - 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.

- If measured COP deviated more than -8%
 - Rerating of tested model

$$\text{rerated COP} = \text{measured COP} \times (1 + 0.08)$$
 - Rerating 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

$$\text{rerated input power} = \frac{\text{rerated heating capacity}}{\text{rerated COP}}$$

3.2.2.2 Test according EN14825


3.2.2.2.1. Space heating

The rerating rules apply independently to each declared climate.

In case a test in heating mode is “failed” and in case several heat sources are declared, both heat sources shall be rerated for the failed mode unless the certificate holder asks for a full test on both heat sources for all the declared applications for the failed climate. A full test means: test according EN14511-2, test according EN14825 at every part load condition and test of an auxiliary mode chosen by the certification body.

The space heating test is “passed” if the space heating test is “passed” for each declared climate.

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

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$$P_j[T_{biv}] = \frac{T_{biv} - 16}{T_{biv} - TOL} P_{declared\ Pesign} \pm 10\%$$

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 test laboratory within two weeks of the interrupted test. The tests may then be restarted from the beginning. If the bivalent temperature condition test has to be done at least twice, then the test in heating mode is failed and the P_{design} shall be rerated as follow:

- Rerating of the tested model:

rerated P_{design} = declared P_{design} that fulfil equation

$$P_j[T_{biv}] = \frac{T_{biv} - 16}{T_{biv} - TOL} P_{declared\ Pesign} \pm 10\%$$


- 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 P_{design} 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 is completed, the other selected part loads shall be tested.

At each part load, measured COP shall not differ by more than -8% from the declared COP.

- If every measured COP are within the tolerance, η_{tas} is calculated using the declared COP for each part load conditions and declared auxiliary modes consumption. If the calculated η_{tas} is not lower than -8% compare to the declared η_{tas} , then the test is over and η_{tas} is not rerated. If the calculated η_{tas} is lower than -8% compare to the declared η_{tas} , the declared η_{tas} shall be rerated. The rerated η_{tas} shall be equalled to the calculated one. η_{tas} for every models of the sub-type for every declared applications and every declared climates shall be calculated according the declared part load data and auxiliary modes consumption. Each η_{tas} being lower than the calculated value -8% shall be replaced by the calculated η_{tas} .
- If at least one of the measured COP is lower than the declared COP from more than 8% then, all the non-tested EN14825 part load conditions and one auxiliary mode condition (chosen by the certification body) shall be tested. η_{tas} is then calculated using the declared COP when they are within the 8% tolerance, otherwise using the measured ones and using the measured auxiliary mode consumption and the declared ones for the non-measured ones.
 - If the calculated η_{tas} does not deviate by more than -8% from the declared η_{tas} , η_{tas} is not rerated
 - If the calculated η_{tas} deviates by more than -8% from the declared η_{tas} then, η_{tas} shall be rerated and all the declared applications shall be fully tested (EN14511-2 or EN15879-1 and EN14825 at every part load conditions and one auxiliary mode chosen by certification body) and same rerating procedure (for both EN14511-2 or EN15879-1 and EN14825) applies for the other application.
- η_{tas} rerating
 - Rerating of tested model
$$rerated\ \eta_{tas} = measured\ \eta_{tas} \times (1 + 0.08)$$

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- 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 Etas of the tested model shall be applied to the Etas of the other models of the sub-type and other heat sources when relevant. Heating test is “passed” if none of the P_{design} and Etas for all tested applications have been rerated.


3.3.2.2.2. Space cooling

- Condition A is tested. If heating 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 test laboratory within two weeks of the interrupted test. The tests may then be restarted from the beginning. If the “A” condition test has to be done at least twice, then the test in cooling mode is failed and the $P_{designc}$ shall be rerated as follow:
 - For the tested model:
$$rerated\ P_{designc} = declared\ P_{designc}\ that\ fulfil\ equation\ above$$
 - 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 shall be tested.

At each part load, measured EER shall not differ by more than -8% from the declared EER.

- If every measured EER are within the tolerance, SEER is calculated using the declared EER for each part load conditions and declared auxiliary modes consumption. If the calculated SEER is not lower than -8% compare to the declared SEER, then the test is over and SEER is not rerated. If the calculated SEER is lower from declared SEER by more than -8%; then SEER shall be rerated and the rerated SEER shall be equal to the calculated SEER. SEER for every model of the sub-type shall be recalculated and rerated if calculated SEER are lower than the declared SEER by more than 8%.
- If at least one of the measured EER is lower than the declared EER from more than 8% then, every non-tested EN14825 part load conditions and one auxiliary mode condition (chosen by the certification body) shall be tested. SEER is then calculated using the declared EER when they are within the 8% tolerance, otherwise using the measured ones and using the measured auxiliary mode consumption and the declared ones for the non-measured ones.
 - If the calculated SEER does not deviate by more than -8% from the declared SEER, SEER is not rerated
 - If the calculated SEER deviates by more than -8% from the declared SEER then, SEER shall be rerated.
- SEER rerating
 - Rerating of tested model
$$rerated\ SEER = measured\ SEER \times (1 + 0.08)$$
 - 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.

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

3.2.2.3 Domestic hot water 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 older asks for a full test on the non-tested heat source.

If the test cannot fulfil the requirements of EN16147 in term of water temperature. The certificate holder shall provide a new complete set of declared values: load profile; $Etas_{DHW}$ and V_{40} (only for domestic hot water heat pumps) to the certification body and the chosen test laboratory within two weeks of the interrupted test. The tests may then be restarted from the beginning.

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

3.2.2.3.1 $Etas_{DHW}$

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

- Rerating of tested model

$$rerated\ etas_{DHW} = measured\ etas_{DHW} \times (1 + 0.08)$$

- 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 $Etas_{DHW}$ of the tested model shall be applied to the $Etas_{DHW}$ of the other models of the sub-type and for the other heat source when relevant.

3.2.2.3.2 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

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

- 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.

3.2.2.3.3 Other EN16147 performances


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

Heating up period: tolerance is equal to -15 min.

- Rerating of tested model

$$rerated\ heating\ up\ period = measured\ heating\ up\ period - 15\ minutes$$

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

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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.

- P_{es} : tolerance is equal to -10%
 - Rerating of tested model
$$rerated P_{es} = measured P_{es} \times (1 + 0.1)$$
 - 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.

- Reference temperature: tolerance is equal to -1K
 - Rerating of tested model
$$rerated\ reference\ temperature = measured\ reference\ temperature - 1$$
 - 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.

- Maximal volume (for combination heat pump): tolerance is equal to -3%
 - Rerating of tested model
$$rerated V_{max} = measured V_{max} \times (1 + 0.03)$$
 - 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_{max} of the tested model shall be applied to the V_{max} of the other models of the sub-type and for the other heat source when relevant.

3.2.2.4 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 older 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 dBA, then the following rerating rules apply:

- Rerating of tested model
$$rerated\ sound\ power\ level = measured\ sound\ power\ level - 2$$
- 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.



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4 Changes on Certified Products

In the following chapter a table is shown with the requirements of the changes that must be reported to the certification body. Excluded are minor amendments, e.g. different colours of the casing or similar changes. The specification refers to changes which are relevant for certification and is shown in the table below as a guideline for certification bodies and testing laboratories.

| Component | Change | Report only | Required Test Results and/or Documents |
|---------------------|---------------------|-------------|--|
| Refrigerant circuit | Design | | complete set of data (new model): <ul style="list-style-type: none">— performance data<ul style="list-style-type: none">○ EN 14511-3○ EN 14825— requirements from EN 14511-4:<ul style="list-style-type: none">○ operating range○ shutting off heat transfer medium○ complete power supply failure○ Defrosting / Freeze up— sound power EN 12102 |
| Refrigerant charge | Type of refrigerant | | complete set of data (new model) |
| Compressor | any | | complete set of data (new model) |
| Control | Hardware | x | |
| Control | Software | | to be decided depending on changes |
| Refrigerant charge | Amount > 10 % | | <ul style="list-style-type: none">— performance data<ul style="list-style-type: none">○ EN 14511-3○ EN 14825 |



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| Component | Change | Report only | Required Test Results and/or Documents |
|-----------------------|----------------------|-------------|--|
| Inverter Driver | Hardware Software | xx | <ul style="list-style-type: none">— performance data<ul style="list-style-type: none">○ EN 14511-3○ EN 14825— requirements from EN 14511-4:<ul style="list-style-type: none">○ complete power supply failure○ Defrosting / Freeze up— sound power EN 12102 |
| Pumps (water / brine) | any | xx | <ul style="list-style-type: none">— performance data<ul style="list-style-type: none">○ EN 14511-3○ EN 14825○ EN 16147— sound power EN 12102 |
| Fan | any | xx | <ul style="list-style-type: none">— performance data<ul style="list-style-type: none">○ EN 14511-3○ EN 14825○ EN 16147— sound power EN 12102 |
| Pressure sensors | Supplier | x | |
| Pressure switches | Supplier | x | <ul style="list-style-type: none">— requirements from EN 14511-4:<ul style="list-style-type: none">○ operating range○ shutting off heat transfer medium |
| Temperature sensors | Connection to piping | | <ul style="list-style-type: none">— requirements from EN 14511-4:<ul style="list-style-type: none">○ operating range○ shutting off heat transfer medium |
| Temperature sensors | Supplier | x | |



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|-------------------------------|----------------------|-------------|--|
| Temperature switches | Connection to piping | | — requirements from EN 14511-4: <ul style="list-style-type: none">○ operating range○ shutting off heat transfer medium |
| Temperature switches | Supplier | x | |
| 4 – way - valve | any | x | |
| Solenoid valves | any | x | |
| Electronic expansion valves | any | x | |
| Thermostatic expansion valves | any | | — performance data <ul style="list-style-type: none">○ EN 14511-3○ EN 14825 — requirements from EN 14511-4: <ul style="list-style-type: none">○ operating range○ Defrosting / Freeze up |
| Evaporator | any defrost | xx | — performance data <ul style="list-style-type: none">○ EN 14511-3○ EN 14825 — requirements from EN 14511-4: <ul style="list-style-type: none">○ operating range○ Defrosting / Freeze up (A / W only) — sound power EN 12102 (A / W only) |



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| Component | Change | Report only | Required Test Results and/or Documents |
|------------------|--------|-------------|--|
| Condenser | any | xx | <ul style="list-style-type: none">— performance data<ul style="list-style-type: none">○ EN 14511-3○ EN 14825— requirements from EN 14511-4:<ul style="list-style-type: none">○ operating range |
| Other components | any | | Any changes in the component list which are relevant for approval shall be updated continuously |

xx: If no negative impact on performance, an additional datasheet of components (old/new) is necessary.

Only some test points should be measured (third party) to approve manufacturer report like a yearly re-test. The measurement can have a tolerance of 10 % regarding to the former test result.

Procedure for reporting changes:

1. Step: Report on base of documents (Manufacturer to certification body) by using the template of Annex F
2. Step: decision if new measurements of manufacturer or testing laboratories are required (Certification Body to manufacturer)