Working Document:
Draft elements of possibly merged labelling regulations for room heaters, room air conditioners and comfort fans

This draft legal text is a working document prepared as follow up to the review studies undertaken for the revision of Regulation (EU) 2015/1186 for local space heaters and of Regulation (EU) 2011/626 for air conditioners and comfort fans, in preparation of the Consultation Forum meeting of 24 June. Please note that whilst this draft document has been prepared by DG ENER staff and its consultants, it is by no means an official document endorsed by the European Commission.

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1 EXPLANATORY MEMORANDUM

1.1 Scope

1.1.1 General considerations

This working document (WD) proposes the merging of (revised) energy labelling regulations for local space heaters using gas, oil or solid fuels, air-to-air heat pumps, (reversible) air-to-air air conditioners, Joule electric heaters and comfort fans (the latter two are not labelled at present). Typical 'commercial' heaters like luminous and tube heaters are not covered in this scope. In complexity the scope may be comparable to the "Lot 21" ecodesign Regulation (EU) 2016/2281 which also combines air heating and cooling products.

Room air conditioners are included in the WD because of the many reversible air conditioners/heat pumps that would otherwise be covered by separate labelling regulations for heating and cooling performance. The present labelling regulation for (reversible) room air conditioners also covers their heating and cooling performance. The merging of scopes covering reversible room air conditioners and other local space heating products is a recognition of the fact that more and more consumers are aware that reversible air conditioners can provide an energy efficient form of heating.

A certain number of stakeholders have mentioned on earlier occasions that not all heating products covered under the proposed scope can be applied universally, and therefore argue that such products are not comparable and should be covered in different regulations, if at all.

The EC acknowledges that not all products can be applied universally: fuel fired room heaters need a flue gas exhaust, owners of room heat pumps may need permission for outdoor units, portability of products can be an important aspect, etc. However, the primary function of these products is comparable: to heat rooms. These products are often specifically marketed as room heaters, whether bought as main form of room heating or simply as additional heater for ambience or coziness.

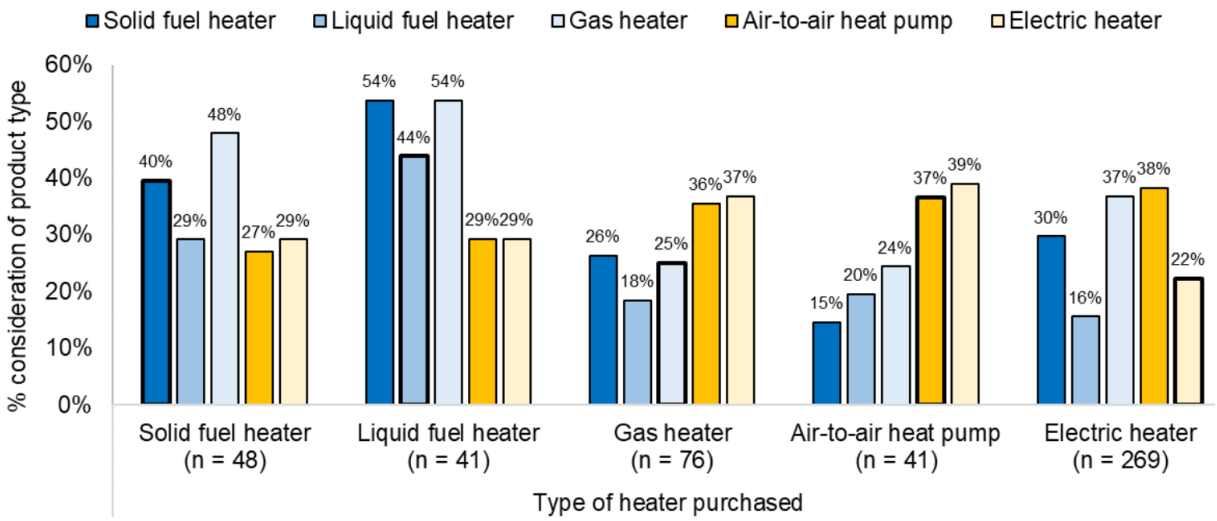
The labelling framework regulation 2017/1369 specifies in *Article 2(2)* that 'product group' means a group of products which have the same main functionality.

> (2) 'product group' means a group of products which have the same main functionality;

The 2021 consumer study[1] shows that a significant percentage of people consider different types of room heaters, which indicates these people find these products having similar room heating functionality (see Figure 1).

[1] Figure 2.4 on page 22 of study on consumer understanding of the energy label for space heaters and air conditioners - Final report, by CentERdata for European Commission, 30 March 2021

Figure 1. Share of consumers that considered buying another type of heater (fig. 2.4 from study)



The limitations of certain technologies are often presented as commercial advantages of other technologies. This may be exaggerated by mimicking the look and feel of the competing product (this is most obvious for electric fireplaces that mimic burning flames).

The application of room air conditioners in dense urban environments also indicates that renewable heat, by reversible room heat pumps, can be applied in such environments as well. For air conditioners the scope is the same as the regulation it replaces.

The proposed scope mentions products that may be within scope but for which the requirements will not apply. These are mainly products that are considered to be of less interest for consumers and oriented towards commercial markets with different customers.

Additional complexity is introduced by products that combine multiple functions covered under the proposed regulation, plus functions that are not covered. For example a comfort fan with built-in heating element and fullfills the definition of an electric heater as well. Air conditioners that can use the built-in fan to provide an air flow without active cooling (using a wind-chill effect) meet the definition of comfort fan. There are comfort fans that can also humidify, ionise, filter or provide other form of air treatment. Boundaries between product functions are sometimes blurred. The general approach is that if a product meets the definition (regardless of what else it can do) it shall be considered subject to regulation.

Electric room heaters and comfort fans have been added to the revised scope of the proposal for a 'merged' LSH+RAC regulation. The following paragraphs reflect on these additions, starting with electric towel heaters and slave heaters followed by comfort fans.

1.1.2 Towel heaters

Towel heaters ("towel rails") are covered under the present ecodesign requirements for local space heaters, but only if the main purpose is to contribute to a certain level of human comfort by providing heat output for space heating. The smallest of towel heaters may not meet that definition, with heat outputs as low 60 W.

The issue then becomes: where lies the border between products that contribute to thermal comfort and products that do not. The review study mentioned (in section 4.4.1) a heat output of 250 W below which the main purpose (of the towel heater) is no longer to contribute to space heating comfort. But there are also other small electric heaters (e.g. plugged into wall sockets) that have heat outputs as low as this, the main purpose of which is to provide a very local space heating comfort.

Calculation example

Assuming a 100 m^2 dwelling has a design heat load of 6 kW (at -10ºC outdoor), the specific heat demand is 60 W/m^2 (this is a reasonably insulated dwelling). A 250 W heater could keep a 4 m^2 room at temperature. If the dwelling insulation is less performant, the 250 W heater can only keep a smaller room at temperature (and vice versa for better insulated dwellings).

1.1.3 Slave heaters

Electric 'slave heaters' are at present excluded from the labelling (and ecodesign) regulation and have been identified in the review study (for ecodesign) as a potential loophole as they are not regulated (because these products do not have controls incorporated). However, other types of (electric) room heaters may also be sold without controls (e.g. infra-red panel heaters, or electric underfloor heating). It can be assumed that regardless how the product is put on the market,it will ultimately be operated using a form of heating controls. As regards labelling, the section "*Obligations of suppliers and dealers*" describes how suppliers and dealers could go about such heaters (equipped with or without controls).

1.1.4 Comfort fans

The scope of this Working Document includes comfort fans. A proposal for revised ecodesign requirements and a new energy label for comfort fans was presented and discussed in the Consultation Forum meeting of 6 July 2021. This Working Document supports the general conclusions presented but proposes an alternative approach where the class boundaries are based on *air flow rate* instead of *impeller diameter*. More explanation is provided in the Section "Energy label classes - Comfort fans" and the supplement at the end of this document.

1.1.5 Boundaries for heat output

The present scope of the regulation for room air conditioners is maximum 12 kW cooling or heating output. The maximum heat output of the present labelling regulation for local space heaters extends to 50 kW. Merging these scopes raises the question of whether to keep the respective boundaries (12 kW and 50 kW) or applying a flat-fee limit of maximum 12 kW heating (or cooling) output for all products within the revised scope.

The highest direct heat output of a fuel fired room heater registered in EPREL is 33 kW. But there are heaters registered with a combined (total) heat output (direct + indirect) of up to 48 kW and even 54 kW. As an average whole house/dwelling in the EU requires 5-10 kW at most the 50 kW limit applies to a very large room heating requirement. One can argue that heaters with a (total) heat output above 12 kW are no 'room' heaters anymore.

Limiting the scope to maximum 12 kW heating (or cooling) output would make no difference for (reversible) room air conditioners. The 12 kW scope limit would remove 5.8% of fuel fired room heaters registered with EPREL as these have a direct heat output above 12 kW. The 12 kW limit would remove 7.5% of EPREL registered products that have a total (direct + indirect) heat output above 12 kW, or 13.3% of total registered products.

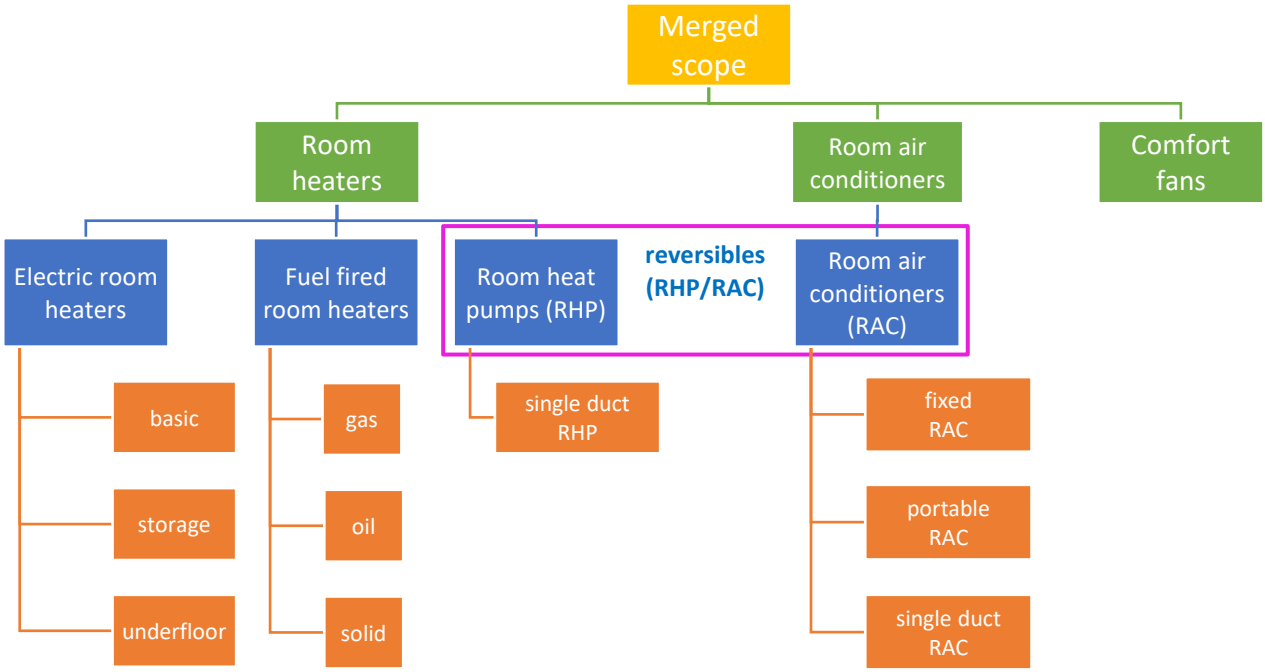
Of these 7.5% heaters with a total heat output exceeding 12 kW some 0.2% (28 models of a total of 11791 models) should actually be registered under the fossil fuel boiler regulation 2015/1187 as their share of direct heat output is less than 6% of the total output.

Limiting the scope of the labelling regulation to 12 kW would mean that 13.2% of fuel fired heaters currently registered in EPREL would no longer be required to carry energy labels and be registered in EPREL and would only be covered under (to be revised) ecodesign regulations.

1.2 Definitions

This WD builds upon working documents previously shared with CF members but differs in certain aspects. The following subdivision is proposed:

Figure 2. Overview of product (sub)groups within scope



Not previously covered by labelling regulations are:

- Electric Joule room heaters;
- Comfort fans.

Some definitions proposed differ from existing regulations and draft proposals for separate regulations:

- It is proposed to amend the definitions for fuel room heaters (gas/oil/solid fuel) presented in 2019. The defining elements are whether the heater draws air from the room itself or from outside (the latter is "balanced flue"). When drawn in from the room itself, the combustion air supply is regulated by the user or model ("controllable"), or not ("uncontrolled"). This leads to the following definitions:
    - "Open fronted" (2015/1186) to be replaced by "open combustion/uncontrolled air supply"; the meaning is the same;
    - "Closed fronted" (2015/1186) to be replaced by "open combustion/controllable air supply". The former definition led to confusion as although flames may be shielded from the room, the combustion air supply may still be uncontrolled. The proposed definition rectifies this by requiring control over air supply;
    - "Balanced flue" has the same meaning as in the draft working document for the review of regulation 1188/2015 for local space heaters discussed in 2019.
- For room heat pumps and room air conditioners: There have been changes in relation to the calculation of seasonal efficiencies and related definitions of parameters;
- For all products in scope: There have been changes proposed to the definitions related to control options.

1.3 Methods

The efficiency of all products is expressed in **primary** energy efficiency, thus enabling the comparison of products that use solid fuel, gas, oil or electricity, for both heating and cooling. For comfort fans, which do not actively heat or cool the room, the values are not expressed in primary energy and this is considered to be an "appropriate product differentiation from the customer's perspective" (as mentioned in 2017/1369).

1.3.1 Efficiency of portable room heat pumps and air conditioners

As already proposed in the review study for RACs the expression of the energy efficiency of portable heat pumps and room air conditioners on the basis of their seasonal performance (in the present regulation they are based on EER/COP, established in one test condition).

This means that single duct appliances in particular will have to take into account the effect of infiltration of air. The result is a much lower efficiency value for both heating and cooling performance (as cold respectively hot air is drawn in from outside which counteracts the main heating or cooling function).

For other portable appliances like portable double duct or split appliances, this document proposes additional test conditions to better describe the performance of these products over a cooling or heating season. In case the portable appliance is equipped with an inverter (or other variable capacity technology) a part load test condition is added.

The efficiencies of all room heat pumps and room air conditioners is calculated on the basis of the bins applicable to the season the unit is marketed for.

1.3.2 Efficiency of fuel fired room heaters and electric room heaters

The method to calculate the efficiency of fuel fired room heaters and electric room heaters does not differ significantly from the present approach.

1.3.2.1 Correction factors related to control options

The existing regulations for (gas/oil/electric) local space heaters 2015/1186 includes corrections for efficiency related to presence/absence of various control options (like room thermostats, staged or variable output levels, etc.). Many of these options also apply to room air conditioners, room heat pumps and reversible products but where not considered in the calculation method in regulation 626/2011 for labelling of RAC.

The proposed merging of labelling regulations applicable to various room heaters, room air conditioners and comfort fans provided an opportunity to include consideration of various control options in the calculation of product efficiency and label ratings.

In the present LSH regulation 2015/1186 this was done by reducing the nominal efficiency by 10% points which could then be recovered by various control options. However, the reduction in the form of absolute percentage points creates an uneven playing field as it hits the (primary energy) efficiency of electric room heaters much harder than that of fuel fired heaters or electric heat pumps: Fuel fired LSH with efficiencies without controls where corrected downwards to an average of 86%-10% = 76%, a factor 0,88 (= 76/86) whereas electric heaters were corrected from their primary energy efficiency of a maximum of 40% (CC = 2,5) to 30%, a factor 0,75 (= 30/40). If the correction of 10% was applied at the level of final energy (electricity), the factor, assuming 100% conversion of final energy into heat, would have been 0,9 (= [(100-10)/2,5]/(100/2,5)) and very close to fuel heaters.

For this reason this WD introduces a 'flat fee' correction of 0,9 for products without energy saving control options, which can be 'boosted' to a factor 1,0 (no negative correction) if multiple energy saving control features are applied. The method therefore nudges products towards more energy saving control features as this is where most progress can be made, because the nominal efficiencies of many heaters in the scope have little room for further improvement (without prejudice to revised ecodesign requirements which may/may not raise minimum efficiencies by phasing out certain product categories). The correction is applied to room heat pumps / room air conditioners and comfort fans as well, making the proposal coherent and consistent for all

products covered. The correction for control options is proposed to apply to the efficiency calculation of comfort fans as well as similar functionalities (like presence detection etc.) are offered for these products.

The calculation method also takes into account the revised primary energy factor (pef or CC) of 2,1 referred to in Directive (EU) 2018/2002 of the European Parliament and of the Council [2] amending Directive 2012/27/EU.

The generic calculation of the product energy efficiency therefore follows this format:

$$Seasonal\ efficiency\ =\ nominal\ efficiency\ *\ correction\ for\ controls\ *\ Faux\ *Fign$$

With F_{aux} and F_{ign} being corrections for auxilliary electricity consumption and permanent ignition device fuel input respectively and the nominal efficiency being the efficiency established by testing, including SEER or SCOP, or a default value, depending on the product.

The definition, and correction factors, for "third party control" have been removed in anticipation of objective methods to verify the applicability of this parameter.

1.3.2.2 Transitional methods

To strengthen the legal basis of the standards and calculation methods to be applied by suppliers the proposal contains an Annex 'Transitional Methods' which lists the standards that can be used to calculate performances and other parameters. This Annex replaces the Commission Communications on Transitional Methods as published for various product groups until recently.

1.3.3 Energy label classes

The energy label classes have been defined such that the A-class is expected to be empty at the moment the regulation applies.

1.3.3.1 BLF - biomass label factor

The BLF or biomass label factor is a factor that increases the nominal efficiency of a biomass heater by multiplying this efficiency by a value of 1.45. The purpose of the BLF is worded in recital 8 of 2015/1186 as: "*promoting the use of renewable energy in heating products is consistent with the objective of promoting renewable energy*". The BLF boosts the energy label class of many biomass heaters to class A+ or A++.

The use of the BLF is no longer proposed in this working document for local space heaters. The political context regarding the use of biomass in local combustion installations has shifted since 2015. The main three reasons are:

1. Combustion of solid biomass in particular is increasingly known to cause an extraordinary contribution to local air pollution in the form of particulate matter (PM). Studies show that solid fuel combustion in households is responsible for only 2.7% of total energy consumption in the EU28 but contributes more than 45% to total emissions of fine particulate matter, i.e. three times more than road transport[3,4]. Combustion of solid fuels, including biomass, is also associated with other harmful emissions such as OGC (organic gaseous compounds), CO (carbon monoxide) and NOX (nitrous oxides). In the "zero pollution action plan" (COM/2021/400 final) the EU aims to reduce the number of premature deaths caused by air pollution by 55% in 2030 [5]. Reducing emissions from local solid fuel combustion will contribute to this goal - for this reason it is proposed to include PM emissions as supplementary information on the label for solid fuel appliances and possibly apply a rating (similar to noise levels);
2. Second, in order for the combustion of solid biomass in a heater to be considered climate neutral, the sustainable sourcing of the fuel (according LULUCF rules [6]) and the sequestration of the carbon

[2] Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, OJ L 328, 21.12.2018, p. 210–230, Annex, point (1) replacing footnote 3, in Annex IV of Directive 2012/27/EU
[3] https://ec.europa.eu/environment/air/pdf/clean_air_outlook_combustion_sources_report.pdf
[4] https://www.euro.who.int/__data/assets/pdf_file/0009/271836/ResidentialHeatingWoodCoalHealthImpacts.pdf
[5] https://ec.europa.eu/environment/strategy/zero-pollution-action-plan_en
[6] https://ec.europa.eu/clima/eu-action/european-green-deal/delivering-european-green-deal/land-use-forestry-and-agriculture_en

emitted in the short carbon cycle[7,8] needs to be ensured. Moreover, it appears that many users of solid fuel heaters may use biomass and fossil solid fuel intermittently, depending on fuel availability, prices and other local or temporary conditions[9]. The supplier and dealer of the heater cannot ensure that sourcing and/or carbon emissions of the fuels combusted in the heater are correctly accounted for;

3. Third, the BLF is a bonus increasing the energy efficiency index (EEI) of the appliance, giving the impression to consumers that this model requires less fuel to create the same amount of useful heat (as this is what 'energy efficiency' here represents, heat output by fuel input). This appears at odds with the approach set out in the Energy Labelling Framework Regulation 2017/1369 as worded in recital (2) as "*Energy labelling enables customers to make informed choices based on the energy consumption of energy-related products*" and Article 16.3(b) which states that "*the A to G steps of the classification shall correspond to significant energy and cost savings and appropriate product differentiation from the customer's perspective*". The application of the BLF does not mean that this heater is more efficient and requires less wood, pellets or other biomass to produce a unit of heat.

The above argumentation does not mean that biomass heating should be avoided. Energy from woody biomass can be positive for the climate, particularly when applying sustainable forest management practices, and when the biomass is used efficiently and combusted in a clean manner. The topic to discuss here is whether a BLF is still the correct way to promote responsible use of biomass. All fuels or energy carriers have benefits and drawbacks to consider and all require prudent use of the resource, but the particular benefits of using solid biomass do not lie in a better combustion efficiency which is how the BLF takes effect. In this working document it is proposed to avoid the use of a BLF in the label for solid fuel heaters.

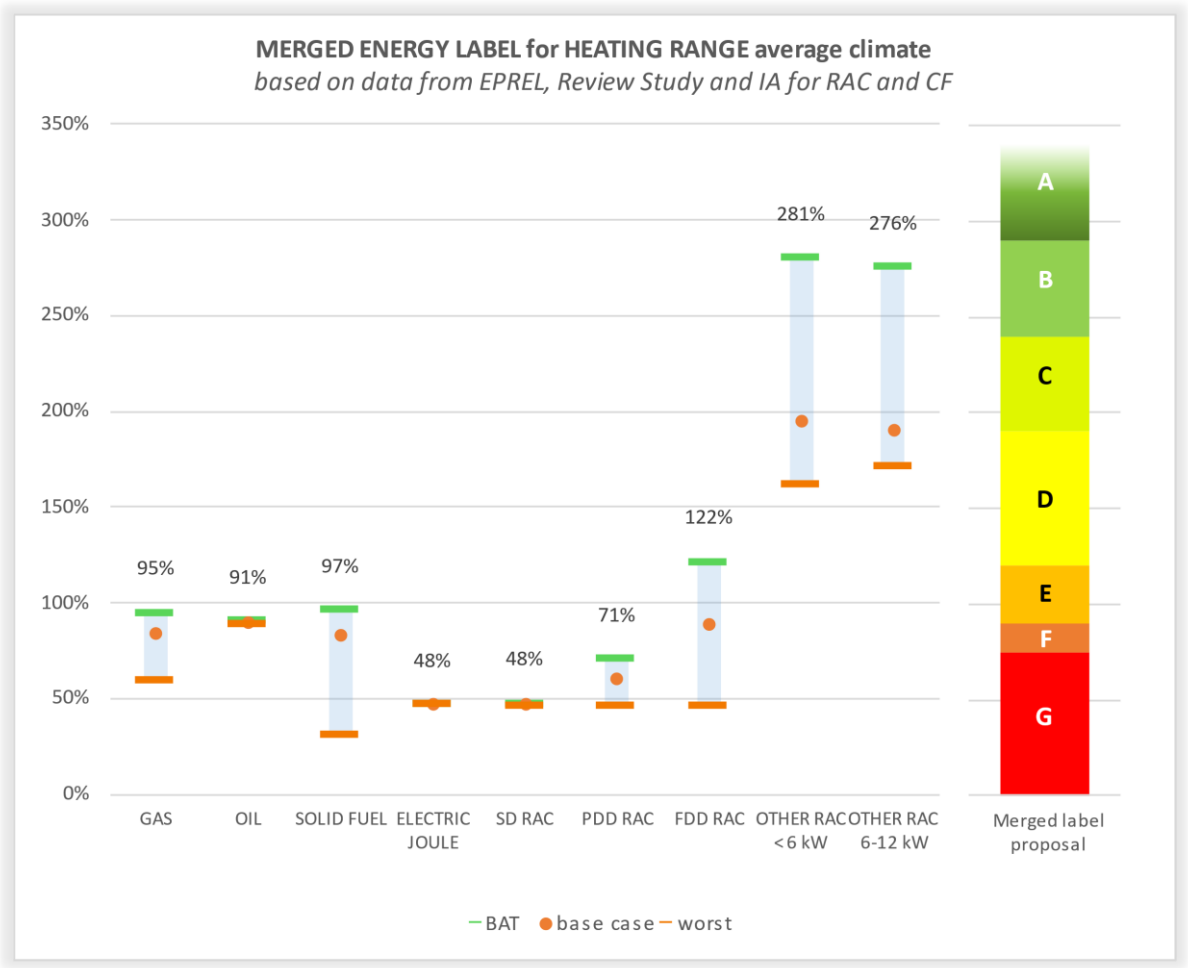
1.3.3.2 Room heaters

Following the above proposed method it can be calculated that the primary energy efficiencies of room heaters (without prejudice to revised ecodesign requirements) will range from a minimum of 43% for the simplest electric room heaters, to approximately 280% (SCOP 5,9 for the 'BAT'/best available technology of heat pumps in EPREL, with all control options). Fuel heaters will occupy the zone between roughly 40% (open combustion / uncontrolled air supply) to above 95% for best-in-class pellet and gas heaters.

The energy classes for room heating will allow fuel fired heaters to occupy the bottom E-F-G classes whereas the electric heaters, including (portable) heat pumps, may occupy the whole A-G range.

[7] https://ec.europa.eu/clima/eu-action/forests-and-agriculture/sustainable-carbon-cycles_en
[8] https://ec.europa.eu/environment/3-billion-trees_en#ecl-inpage-929
[9] Poland Central Statistical Office, Energy Consumption in Households in 2009

Figure 3. Overview of range of efficiencies ("standard efficiency") of products and label classes proposed



As already described in the review study for RACs, the single duct room heat pump has a negative heating capacity at colder outdoor conditions (from a certain outdoor temperature, in some cases as high as 8ºC, the unit actually actively cools the space rather than heats it, because as indoor air is expelled outside it is replaced with colder outdoor air, as if one is heating with the windows open).

Even if the overall seasonal heating energy efficiency is close to SCOP=1 or a tad higher (because of increased efficiency at elevated outdoor temperatures) the fact that the capacity is negative when you need heating the most means this product should not be used as heater and subsequently this Working Document does not contain a method to establish the heating energy efficiency of a Single Duct room heat pump.

Double duct room heat pumps may also draw in colder outdoor air (as the outgoing air flow rate may be higher than air supply flow rate), but this effect is taken into consideration when tested using the room calorimeter method and reflected in the values for COP, etc. The test method for double duct operation is identical to that of split and other 'fixed' room heat pumps including testing at multiple part loads at various outdoor conditions.

1.3.3.3 Room air conditioners

This Working Document builds upon the policy option presented in the draft ACT for a revised label for (reversible) room air conditioners for using a single metric (seasonal values = SEER, for both fixed and portable units). The proposed calculation method is in principle the same: Consideration of the heat loss from ducts and infiltration air (of SD in particular), and consideration of variable speed / inverter type operation.

In this Working Document however the labelling of the heating efficiency of (reversible) room air conditioners / room heat pumps is combined in a single scale with efficiencies from other local space heaters.

This Working Document also proposes to apply a correction for control features in the cooling (and heating) energy efficiency of room air conditioners, as is proposed for other room heaters as well.

The energy label design proposed in this Working Document includes a numerical efficiency value placed prominently on the label so that even if products carry the same energy label class, the efficiency value can guide consumers to the more efficient ones within that class (improved granularity of the label).

The label classes for the cooling efficiency, of (reversible) room air conditioners, follows the proposals discussed earlier in the context of the revision of the RAC regulation (apart from the proposed correction of control features).

1.3.3.4 What if the RAC/RHP allows multiple forms of operation

Some portable RACs/ RHPs can operate either as single duct or as double duct, depending on how the consumer installs the product. Such products therefore may have considerable differences in energy efficiencies depending on how it is installed/used.

The proposal currently requires the product to be labelled assuming the least efficient installation, so that efficiencies can only be equal to or better than shown on the label. The data for other forms of installation can nonetheless be required in the technical information sheet and made available via EPREL.

For portable double ducts that can be operated as single ducts by simply disconnecting the outdoor air supply hose this unit then functions as a single duct, and no heating performance may be indicated.

NOTE to CF

The members are invited to reflect on the option to not indicate a heating performance for products that can operate as single ducts. In practice this may come down to not indicating a heating performance for any portable double duct room heat pump (as the switch from double duct to single duct may be as simple as disconneting a flexible hose).

1.3.3.5 Comfort fans

The proposed energy labelling scale for comfort fans in this Working Document uses the *service value* (m^3/min per W input) corrected for control options and standby electricity consumption as basis for labelling. However, this Working Document proposes to base the energy efficiency classes not on **rotor diameter** (as presented in the Addendum for the review study), but on basis of the **air flow rate**.

Using air flow rate as parameter can avoid problems with establishing the "diameter" of (the rotor of) "bladeless fans" (with hidden rotor), fans that function as air multipliers (flow increased beyond impeller diameter or nozzle perimeter), "tower" fans (with barrel-shaped tangential or cross-flow fans the diameter of which cannot be directly compared with that of axial fans[10]), or fans that comprise multiple axial fans[11].

In this Working Document a single labelling scale for both ceiling and 'other' fans has been elaborated as this provided in sufficient coverage of available models in energy classes.

The single scale for both ceiling and other fans basically shows which fan is more efficient in moving a volume of air, and is consistent with the overall approach in this WD of using a single labelling scale for products providing the same function. A negative effect from increasing average power consumption as people may

[10] At the moment the IEC 60879 describes a method to establish an equivalent diameter for 'tower' fans by taking the perimeter (similar to circumference of rotor) of the air outlet (grille or nozzle) and dividing the value by 'pi' (3.14). This method however cannot be applied to e.g. bladeless fans, and requires careful description of how/where to measure the perimeter.

[11] See for example: https://www.sonnenkoenig.ch/en/products/clime/fans.html, with 'Noblade' as bladeless fan, 'Pisa', 'Victoria' as tower fans and 'Dolmen' and 'Vind-3' as fans with multiple rotors.

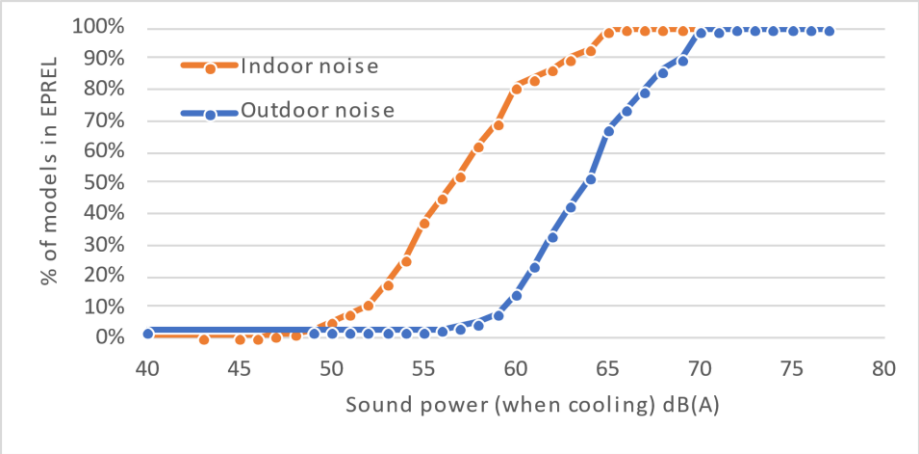
choose larger, more efficient fans, over smaller fans is not expected as the *Fan Affinity Laws* show that larger fans can move higher volumes of air with the same power[12].

A more elaborate discussion of labelling options for comfort fans is included in the Supplement section for comfort fans, at the end of this Working Document.

1.3.4 Sound power classes

In the draft act for air conditioners no differentiation was made for (labelling of) indoor or outdoor sound power levels. This Working Document presents differentiated sound power label classes, for both indoor and outdoor noise.

Figure 4. Indoor and outdoor sound power of RACs when cooling



Outdoor noise by RACs and RHPs ranges from approximately 50 dB(A) to over 70 dB(A) and has received a lot of attention in the past couple of years and is regulated by local authorities in varying degree. As values are slightly higher than indoor noise new labelling classes are proposed to achieve a better spread of appliances across categories.

Table 1. Outdoor sound power label classes of room air conditioners and room heaters

Outdoor sound power (dB(A))	***Sound power label class***	***Share of models meeting proposed outdoor limits (cumulative)***		***Limits for 'indoor' noise***	***Share of models (outdoor noise) that meet "indoor" limits (cumulative)***
dB < 52	A	<2% of RACs		dB < 45	<2% of RACs
52 ≤ dB < 57	B	4% of RACs		45 ≤ dB < 50	2% of RACs
57 ≤ dB < 62	C	33% of RACs		50 ≤ dB < 55	2% of RACs
62 ≤ dB < 67	D	80% of RACs		55 ≤ dB < 60	14% of RACs
dB ≥ 67	E	rest, to 100% of RACs		dB ≥ 60	to 100% of RACs

[12] According the fan affinity laws an increase of the (axial) fan diameter by a factor 1,25 (e.g from 15 cm to 19 cm), will almost double the flow and triple the power input if speed is kept constant. But if the fan speed is then reduced by 50% the air flow rate of the larger diameter fan is back at the original level whereas power input is reduced to almost 40% of the original value, improving overall SV by a factor 2,5. Similarly, if a 50 cm impeller is reduced to 25 cm and the same flow has to be achieved, the speed has to increase by a factor 8 and the SV reduces to just 6% of the original value. (https://en.wikipedia.org/wiki/Affinity_laws)

The indoor noise classification A-E is proposed to apply to room air conditioners, room heaters as well as comfort fans as the values found in studies are relatively close to each other.

For RACs, the range is from 45 dB to 65 dB. The sound power ranges by comfort fans ranges from 38 dB to over 65 dB.

Table 2. Indoor sound power classes of room air conditioners, room heaters and comfort fans

Indoor sound power (dB(A))	*Sound power label class*	*Share of models in EPREL (indoor noise) that meets thresholds*
dB < 45	A	<0,5% RACs
45 ≤ dB < 50	B	6% of RACs
50 ≤ dB < 55	C	38% of RACs
55 ≤ dB < 60	D	81% of RACs
dB ≥ 60	E	rest, up to 100%

1.3.5 Label content/design

As the scope of the merged regulations is relatively wide the proposal presents numerous label designs. The 'look-and' feel' of the label is aligned with that of recently introduced labels. The labels presented in this WD contain design elements not discussed before in a Consultation Forum. These elements relate to 'granularity', how to show performances for other climates and whether final energy consumption should be included.

1.3.5.1 Granularity

The proposals for the design of the label for room heaters, room air conditioners and comfort fans include options that aim to improve the recognizability of more efficient products even if carrying the same energy label class: The efficiency value is placed prominently next to the label class and shown in a context of an arrow pointing upwards showing the direction of improved efficiency.

The rest of the label is kept simple, with only elementary supplementary information shown.

It should be noted that the European Commission has initiated multiple consumer surveys that will investigate how consumer perceive clues on the numerical efficiency value shown on labels, plus other aspects linked to label design. Conclusions of these studies will feed into the proposals for labels as shown.

1.3.5.2 One or three climates on the label

The existing energy label for heat pumps and (reversible) air conditioners, and also other WDs, proposed to introduce an energy label for heat pumps showing efficiencies in three climates, of which the average climate would be mandatory information. Having three climates on a label and just one label classification creates an issue related to the "empty A-class" requirement from the framework regulation.

For heat pumps, the inclusion of the warmer climate on the label would require an increase of the A-class limit because heat pump efficiencies are higher in the warmer climate and no appliances should be present in class A when the labelling requirements start to apply. The higher A-class limit would put more heat pumps, assessed for average and colder climates, into the same class B, C, D etc. because the class width would increase due to the higher A-class limit, thus reducing granularity of label information. The option to rate all heat pumps based on their performance for the warmer climate was discarded, as heat pumps will in any case be rated for the average climate for the ecodesign regulations which would reduce overall regulatory consistency and coherence. The option to have label class limits specific for each climate was disregarded as this would nullify the need to show different climates on the label.

This WD proposes to show only the 'average' climate performance on the label, under the presumption that if appliance A is more efficient for the average climate it will be more efficient in the other climates as well. This presumption was tested using the EPREL data of RACs that registered performances in other climates.

Unfortunately the presumption proved to be only partly true. In many cases a better performance under 'average' means a better performance in 'warmer' or 'colder' climates, but not always.

The tables below show the occurrence of unique products in EPREL that have the same energy class for the 'average' climate (first column), and carry the same or different energy class for the other climates, based on the label class limits proposed (second to fourth/fifth column).

Table 3. Occurrence of RAC products in classes for 'average' and 'warmer'

Merged label average vs warmer	Label class in 'warmer'			
Label class in 'average'	**A**	**B**	**C**	**D**
B	53%	47%		
C	8%	69%	23%	
D		38%	63%	
E				100%

Table 4. Occurrence of RAC products in classes for 'average' and 'colder'

Merged label average vs colder	Label class in 'colder'		
Label class in 'average'	**B**	**C**	**D**
B	17%	50%	33%
C		12%	88%

The tables show that even if products carry the same class for the 'average' climate, there is reasonable chance that they would carry different labels for the 'other' climates (a B-class room heat pump in the 'average' climate, could either carry A or B for the warmer climate, the split is almost 50/50) which means the 'average' climate is not in all situations a reasonable proxy for performance in other climates.

To avoid the problem of needing to increase the A-class limit, it is proposed to only show the label for the 'average' climate and only (numerical) efficiency values for the other climates (without energy class however) so that comparison of performances in other climates is still possible.

1.3.5.3 Final energy consumption on the label?

The current labels of (reversible) room air conditioners show the final energy consumption (kWh per annum or 60 min) on the label. The labels for local space heaters do not show a final energy consumption.

In this WD it is proposed not to show the final energy consumption as it is a difficult parameter to use for consumers when comparing products on a merged scale: The value does not only depend on the energy efficiency of the model, but also on the capacity of the product (larger, more powerful products will consume more energy even if the efficiency is the same or higher) and the operating hours assumed. Also the units of final energy consumption should be recognisable for consumers leading to values in for example *kWh* for electric products, m^3 for products using gas, *liters* for products using oil, and *kg* for products using wood. If expressed in terms of primary energy (GJ) this is probably more difficult to interpret for most consumers and hardly offers more information than the efficiency value itself. At the same time, the main interest for consumers probably lies in the final heating costs which differ per energy carrier, country, time of day, season, etc. Unlike the more straightforward whitegoods labels the number of variables for the room heaters is wider and therefore reduces the usefulness of final energy as label parameter. Nonetheless the values can be included in the product information sheet, accessible through EPREL.

1.3.5.4 Miscellaneous

The label for solid fuel room heaters contains a reference to the emissions of particulate matter. See the section under "Energy label classes - BLF-biomass label factor" for a discussion on parameters for solid fuel heaters.

1.3.6 Obligations of suppliers and dealers

The proposed method for establishing the seasonal energy efficiency takes into account the presence of various control features of the product. Certain models however may be sold by dealers without control options incorporated. In the present LSH regulation this applies to 'slave heaters' but it also applies to various models that can be combined with separate controllers either from the same brand/supplier or from third-party suppliers: Heaters that simply plug into mains sockets (often IR panels) can be equipped with sophisticated controllers that are placed between the model cord plug and the mains socket and can be operated remotely. Other products offer control via apps (smart home, etc.) and possible control options are determined by software (if supported by the hardware obviously).

Figure 5. Example of controls supplied separately [13]

When a dealer sells a model plus controller(s) to a consumer he/she is obliged to provide (labelling) information on that 'configuration', also if sold through web shops. This means that suppliers and dealers may find themselves in one of the below described situations:

Table 5. Overview of obligations of suppliers & dealers

Supplier: places on market and ...		**Dealer:**	**Dealer must do the following**
1)	registers in EPREL a model with controls integrated	sells just the model 'as supplied' (control corrections determined by supplier)	dealer shows label from supplier or label/info from EPREL
2)	registers in EPREL the combo of model plus separate controls, using a unique model identifier		
3)	registers in EPREL a model without controls		
Supplier of model	**Supplier of control**	sells a 'dealer package' of model plus controls	dealer must create package label by either: - look up EPREL data and use EC label generator; - use third-party API to extract EPREL data and create label; - look up EPREL data for model and controller correction factor and create label 'on its own'
4) registers in EPREL a model without controls	registers in EPREL controller info (i.e. the correction factor) - **this means controllers have to be included in labelling scope as well**		

[13] Source : https://www.polarheat.nl/ph-optima-draadloos-plugheat/

5)	registers in EPREL a model without controls	did not register controller info in EPREL	sells a 'dealer package' of model plus controls	dealer must create 'package' label by: - looking up EPREL data for model data, calculating controller correction (by interpreting control features and their scores), and creating 'dealer' label 'by hand'

In order to avoid placing too many responsibilities on dealers of these (often high volume selling) products the WD proposes to limit the obligations for registration in EPREL and labelling to the first three situations, i.e. the supplier is responsible for the label shown with the product when displayced in the (web)shop.

This approach may not be followed in other product groups (space and water heaters notably) as in these groups in many cases an installer is presumed to be responsible for the specification of the configuration, and capable of creating correct product or package labels for informing consumers.

2 Proposal for LABELLING of room heaters, room air conditioners and comfort fans

Proposal for COMMISSION DELEGATED REGULATION (EU) xxx/yyy

[etc.]

HAS ADOPTED THIS REGULATION

[to complete]

3 Article 1 - Subject matter and scope

This Regulation establishes requirements for the labelling of, and the provision of supplementary product information on:

- room heaters that cannot also function as room air conditioners having a rated heating capacity of 12 kW or less;
- room air conditioners having a rated cooling capacity of 12 kW or less;
- and comfort fans with a nominal fan power input of 125 W or less.

This Regulation shall not apply to:

a) room heaters specified for purposes other than to reach and maintain a certain thermal comfort of human beings;

b) room heaters that are specified for outdoor use only;

c) room heaters the direct heat output of which is less than 6 % of the combined direct and indirect heat output at nominal heat output;

d) solid fuel room heaters that are specified for the combustion of non-woody biomass only;

e) solid fuel room heaters that are not factory assembled, or are not provided as prefabricated components or parts by a single manufacturer which are to be assembled on site;

f) flueless fuel fired room heaters;

g) luminous local space heaters and tube local space heaters;

h) space heating products covered by Regulation (EU) 811/2013 (labelling "Lot 1");

i) residential ventilation units covered by Regulation (EU) 1254/2014;

j) solid fuel boilers covered by Regulation (EU) 2015/1187 (labelling "Lot 15 SFB")

k) air heating products covered by Regulation (EU) 2016/2281 (ecodesign "Lot 21");

l) sauna stoves.

Note to CF: Computer room air conditioners are not included in the present scope. The EC is considering covering these in the context of other refrigeration measures.

4 Article 2 - Definitions

For the purposes of this Regulation, the following definitions shall apply:

1) 'Room heater' means a device of which the main purpose is to contribute to a certain level of human thermal comfort by providing heat output into an enclosed space in which the product is situated, also if

combined with heat output to other spaces, predominantly through combustion of gaseous, liquid or solid fuels, capture of ambient heat and/or conversion of electricity into useful heat;

2) 'Room heat pump' means a room heater:

   a) which relies on a vapour compression cycle to lift heat captured from ambient air (outdoor or indoor air) to temperatures useful for heating rooms;

   b) which expels the cooled down air from which energy is captured to outdoors;

   c) which may be equipped with an electric heater using the Joule effect to heat up indoor air in case the cycle described under a) does not suffice to satisfy the heat demand or is not operable; and;

   d) which may provide additional functionalities such as dehumidification, filtration of air and ventilation, but is not intended to supply outdoor air for ventilation purposes; and

   e) the vapour compression cycle of which may operate in reverse in which case the device is considered a room air conditioner as well;

3) 'Electric room heater' means a room heater using the electric Joule effect to generate heat and needs to be connected to a mains power source to operate;

4) 'Fuel fired room heater' means a room heater that emits heat from combustion of fuels;

5) 'Gaseous fuel room heater' means a fuel fired room heater using gaseous fuels for the combustion process;

6) 'Liquid fuel room heater' means a fuel fired room heater using liquid fuels for the combustion process;

7) 'Solid fuel room heater' means a fuel fired room heater using solid fuels for the combustion process;

8) 'Solid fuel' means a fuel which is solid at normal indoor room temperatures, including solid biomass and solid fossil fuel;

9) 'Biomass' means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste;

10) 'Woody biomass' means biomass originating from trees, bushes and shrubs, including log wood, chipped wood, compressed wood in the form of pellets, compressed wood in the form of briquettes, and sawdust;

11) 'Non-woody biomass' means biomass other than woody biomass, including, inter alia, straw, miscanthus, reeds, kernels, grains, olive stones, olive cakes and nut shells;

12) 'Solid fossil fuel' means solid fuel other than biomass, including anthracite and dry steam coal, hard coke, low temperature coke, bituminous coal, lignite, a blend of fossil fuels or a blend of biomass and fossil fuel; for the purposes of this Regulation it also includes peat;

13) 'Preferred fuel' means the single fuel which is to be preferably used for the local space heater according to the supplier's instructions;

14) 'Other suitable fuel' means a fuel, other than the preferred fuel, which can be used in the local space heater according to the supplier's instructions and includes any fuel that is mentioned in the instruction manual for installers and end-users, on free access websites of manufacturers and suppliers, in technical or promotional material and in advertisements;

15) 'Rated heating capacity' (P_{ratedh}) means the heat output of the room heater at the standard rating conditions for heating;

16) 'Direct heat output' (Pdirect) means the part of the heat output of a room heater that is not the heat output of the product to a heat transfer fluid, expressed in kW;

17) 'Indirect heat output' (Pindirect) means the part of the heat output of a room heater to a heat transfer fluid by the same heat generation process that provides the direct heat output of the product, expressed in kW;

18) 'Room air conditioner' means a device:

a) of which the main purpose is to contribute to a certain level of human thermal comfort by removing heat from the air in the enclosed space in which the product is situated, also if combined with the capacity to remove heat from other spaces;

b) which relies on a refrigeration cycle using vapour compression driven by an electric motor to move heat from indoor air to ambient air outside;

c) which may provide additional functionalities such as dehumidification, filtration of air and ventilation, but is not intended to supply outdoor air for ventilation purposes;

d) the refrigeration cycle of which may operate in reverse in which case the device is considered a room heat pump as well;

19) 'Reversible' means a device that can function as a room heat pump and as a room air conditioner;

20) 'Rated cooling capacity' (P_{ratedc}) means the cooling capacity of the room air conditioner at the standard rating conditions for cooling;

21) 'Comfort fan' means an device for creating air movement around or on (part of) a human body for cooling purposes, also if combined with other functions such as lighting;

22) 'Nominal fan power input' means the electric power input of a comfort fan operating at the maximum fan flow rate, measured with the oscillating mechanism active (if applicable), expressed in watt (W);

23) ‘luminous local space heater’ means a room heater, using gaseous or liquid fuels which is to be installed above head level within an enclosed space, directed towards the place of use so that the heat emission of the burner, being predominantly infrared radiation, directly warms the subjects to be heated and which emits the products of combustion in the space where it is situated;

24) ‘tube local space heater’ means a room heater, using gaseous or liquid fuels, which is to be installed above head level, near the subjects to be heated, which heats the space primarily by infrared radiation from the tube or tubes heated by the internal passage of products of combustion and of which the products of combustion are evacuated through a flue duct;

25) 'Sauna stove' means a heater, incorporated in, or declared to be used in, dry or wet saunas or similar environments;

26) ‘specified for outdoor use’ means the product is declared suitable for safe operation outside enclosed spaces, including possible use in outdoor conditions;

27) ‘point of sale’ means a location where room heaters, room air conditioners and/or comfort fans are displayed or offered for sale, hire or hire-purchase.

28) ‘equivalent model’ means a model which has the same technical characteristics relevant for the technical information to be provided, but which is placed on the market or put into service by the same manufacturer, importer or authorised representative as another model with a different model identifier;

29) ‘model identifier’ means the code, usually alphanumeric, which distinguishes a specific product model from other models with the same trademark or the same manufacturer's, importer's or authorised representative's name;

30) ‘product database’ means a collection of data concerning products, which is arranged in a systematic manner and consists of a consumer-oriented public part, where information concerning individual product parameters is accessible by electronic means, an online portal for accessibility, and a

compliance part with clearly specified accessibility and security requirements, as laid down in Regulation (EU) 2017/1369;

Additional definitions are set out in Annex I or in Regulation (EU) 2017/1369.

5 Article 3 - Obligations of suppliers

1) Suppliers shall ensure that:

   a) each 'room heater', 'room air conditioner', 'reversible' and 'comfort fan' (from here on 'model') is supplied with a printed label in the format as set out in Annex III;

   b) an electronic label in the format and containing the information, as set out in Annex III, is made available to dealers for each model;

   c) an electronic product information sheet, as set out in Annex V, is made available to dealers for each model.

   d) if specifically requested by the dealer, the product information sheet shall be made available in printed form;

   e) the **content** of the product information sheet, as set out in Annex V, is entered into the 'product database';

   f) the content of the technical documentation, set out in Annex VI, is entered into the product database;

   g) any visual advertisement for a specific model, including on the internet, contains the energy efficiency class and the range of energy efficiency classes available on the label, in accordance with Annex VII and Annex VIII;

   h) any technical promotional material concerning a specific model, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VII and Annex VIII;

2) The energy efficiency classes and the sound power classes are defined in Annex II and shall be measured and calculated in accordance with Annex IV.

6 Article 4 - Obligations of dealers

Dealers shall ensure that:

(a) each 'room heater', 'room air conditioner' or 'comfort fan' (from here on 'model'), at the point of sale, including at trade fairs, bears the label provided by suppliers in accordance with point 1(a) of Article 3(a), with the label displayed in such a way as to be clearly visible;

(b) in the event of distance selling, the label and product information sheet are provided in accordance with Annexes VII and VIII;

(c) any visual advertisement for a specific model, including on the internet, contains the energy efficiency class and the range of efficiency classes available on the label, in accordance with Annexes VII and VIII;

(d) any technical promotional material concerning a specific model, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annexes VII and VIII.

7 Article 5 - Obligations of internet hosting platforms

Where a hosting service provider as referred to in Article 14 of Directive 2000/31/EC of the Parliament and of the Council[14] allows the direct selling of a 'room heater', 'room air conditioner' or 'comfort fan' through its internet site, the service provider shall enable the showing of the electronic label and electronic product information sheet provided by the dealer on the display mechanism in accordance with the provisions of Annex VIII and shall inform the dealer of the obligation to display them.

8 Article 6 - Measurement methods

The information to be provided pursuant to Articles 3 and 4 shall be obtained by reliable, accurate and reproducible measurement and calculation methods, which take into account the recognised state-of-the-art measurement and calculation methods set out in Annex IV

9 Article 7 - Verification procedure for market surveillance purposes

Member States shall apply the verification procedure laid down in Annex IX when performing the market surveillance checks referred to in point 3 of Article 8 of Regulation (EU) 2017/1369.

10 Article 8 - Review

The Commission shall review this Regulation in the light of technological progress and present the results of this assessment, including if appropriate, a draft revision proposal, of this review to the Consultation Forum no later than *[insert date: e.g. five years after its entry into force of the present regulation]*. The review shall among other matters assess:

a) the measurement and calculation methods for establishing the seasonal room heating energy efficiency, seasonal room cooling energy efficiency or seasonal comfort fan efficiency;

b) the measurement and calculation methods for establishing the flue gas emissions to air from solid fuel room heaters;

c) the limit values for the energy efficiency classes an/or sound power classes;

d) the possibility to address circular economy objectives (as supplementary information) in energy labels.

11 Article 9 - Repeal

Regulation (EU) No 626/2011 is repealed with effect from [date].

12 Article 10 - Transitional measures

As from [day of entry into force of this Regulation] until [date], the product fiche required under point 1(b) of Article 3 of Regulation (EU) No 626/2011 may be made available through the product database instead of being provided in printed form with the product. In that case the supplier shall ensure that if specifically requested by the dealer, the product fiche shall be made available in printed form.

13 Article 11 - Entry into force and application

This Regulation shall enter into force on the twentieth day following its publication in the Official Journal of the European Union.

It shall apply from [date]. However, Article 10 shall apply from [x months after date entry into force of this Regulation] and point xx of Article 3 shall apply from [date].

This Regulation shall be binding in its entirety and directly applicable in all Member States.

[14] Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (Directive on electronic commerce) (OJ L 178 , 17.07.2000, p. 1).

14 ANNEX I - Definitions

The following definitions shall apply:

14.1 For room heaters

1) 'seasonal room heating efficiency' (eta_{rh}) means the ratio of useful room heat output per unit of primary energy input, including corrections related to control options, auxiliary electricity consumption and permanent ignition device consumption (where applicable), for the heating season the unit is marketed for, expressed in percentage points;

14.2 For fuel fired room heaters

2) 'open combustion / uncontrolled air supply' means a fuel fired room heater connected to a chimney or flue duct for the evacuation of products of combustion that uses combustion air taken from the room in which the room heater is situated and the intake of which cannot be controlled by the user in order to regulate the combustion process and which contains no hob or oven;

3) 'open combustion / controllable air supply' means a fuel fired room heater connected to a chimney or flue duct for the evacuation of products of combustion that uses combustion air taken from the room in which the room heater is situated and the intake of which can be controlled by the user, or by the model itself, in order to regulate the combustion process and which contains no hob or oven;

4) 'balanced combustion' means a fuel fired room heater connected to a chimney or flue duct for the evacuation of products of combustion, the combustion chamber of which is sealed from the room in which the product is fitted, uses combustion air taken from outside, the intake of which is controlled by the user or the model itself in order to regulate the combustion process, and which contains no hob or oven;

5) 'cooker' means a fuel fired room heater, using solid fuels, that integrates in one enclosure the function of a room heater, and a hob, oven or both to be used for preparation of food and connected to a chimney or flue duct for the evacuation of products of combustion that uses combustion air taken from the room in which the room heater is situated;

6) 'flueless heater' means a fuel fired room heater that emits the products of combustion into the room where the product is situated, and is not a luminous local space heater;

7) 'nominal heat output' (Pnom) means the heat output of a fuel fired room heater of both direct heat output and indirect heat output (where applicable), when operating at the setting for the maximum heat output that can be maintained over an extended period, as declared by the supplier, expressed in kW;

8) 'minimum heat output' (Pmin) means the heat output of a local space heater comprising both direct heat output and indirect heat output (where applicable), when operating at the setting for the lowest heat output, as declared by the supplier, expressed in kW;

9) 'nominal efficiency' (eta_nom) means the ratio of the heat output of a fuel fired room heater by nominal fuel input, as declared by the supplier, expressed in kW;

10) 'part load efficiency' (eta_min) means the ratio of the heat output of a fuel fired room heater by minimum fuel input, as declared by the supplier, expressed in kW;

11) 'permanent ignition device fuel input' means the fuel consumption of a burner intended to light a separate main burner that provides the nominal or part load heat output, when lit for more than five minutes before the main burner is on, expressed in kW;

12) 'nitrogen oxides emissions' means the emissions of nitrogen oxides at nominal heat output expressed in mg/kWh of fuel input based on GCV for gaseous or liquid fuel local space heaters and commercial local space heaters;

13) ‘net calorific value’ (NCV) means the total amount of heat released by a unit quantity of fuel with an appropriate moisture content, when it is burned completely with oxygen, and when the products of combustion are not returned to ambient temperature;

14) ‘gross calorific value moisture free’ (GCV) means the total amount of heat released by a unit quantity of fuel dried of inherent moisture, when it is burned completely with oxygen, and when the products of combustion are returned to ambient temperature; this quantity includes the condensation heat of the water vapour formed by the combustion of any hydrogen contained in the fuel;

15) ‘moisture content’ means the mass of water in the fuel in relation to the total mass of the fuel as used in the local space heater.

16) ‘electric power consumption at nominal heat output’ (elmax) means the electric power consumption of the fuel fired room heater while providing the nominal heat output. The electric power consumption shall be established without consideration of the power consumption of a circulator in case the product offers indirect heating functionality and a circulator is incorporated, expressed in kW;

17) ‘electric power consumption at minimum heat output’ (elmin) means the electric power consumption of the fuel fired room heater while providing the minimum heat output. The electric power consumption shall be established without consideration of the power consumption of a circulator in case the product offers indirect heating functionality and a circulator is incorporated, expressed in kW;

18) ‘electric power requirement in standby mode’ (elsb) means the electric power consumption of the fuel fired room heater while in standby mode, expressed in kW;

14.3 For electric room heaters

19) Standard electric room heater means an electric room heater which is not an storage electric room heater or underfloor electric room heater;

20) Storage electric room heater means an electric room heater designed to store heat in an accumulating isolated core and to discharge it for several hours after the accumulation phase;

21) Underfloor electric room heater means an electric room heater which is to be incorporated in the building structure or building finishing;

14.4 For room heat pumps

22)

23) Single duct room heat pump (SD) means a 'room heat pump' in which, when installed and used as described by the supplier, the evaporator intake air is introduced from the space containing the unit and discharged outside this space;

24) ‘design load for heating’ (Pdesignh) means the room heating load at the reference design temperature, as declared by the manufacturer, expressed in kilowatt (kW);

25) ‘part load for heating’ (Ph(Tj)) means the heating load at a specific outdoor temperature, calculated as the design load for heating multiplied by the part load ratio, expressed in kilowatt (kW);

26) ‘part load ratio for heating’ (plh(Tj)) means the outdoor temperature minus 16 °C, divided by the reference design temperature minus 16 °C;

27) declared heating capacity (Pdh(T_j), is the heat output of the refrigeration cycle of the room heat pump, pertaining to a specified outdoor temperature (T_j), indoor temperature (T_{in}) and load condition, expressed in kilowatt (kW); The parameter can also be written as Pd(outdoor temperature;load) as in for example "Pd(27;100%)";

28) ‘supplementary capacity for heating’ (elbu(Tj)) is the heat output of a real or assumed supplementary heater with COP of 1 that supplements the declared capacity for heating (Pdh(Tj)) in order to meet the

part load for heating (Ph(Tj)) in case Pdh(Tj) is less than Ph(Tj) for the outdoor temperature (Tj), expressed in kilowatt (kW);

29) ‘maximum supplementary capacity for heating’ (elbu_max) means the maximum heating capacity of portable room heat pumps when the vapour compression cycle has been switched off;

30) ‘declared coefficient of performance’ (COPd(Tj)) means the ratio of heat output per unit of final energy input at a specified bin (j) with outdoor temperature (Tj) and load condition;

31) 'corrected coefficient of performance' (COPinf(Tj)) means the coefficient of performance established per bin, including corrections related to infiltration and cycling behaviour;

32) ‘bin-specific coefficient of performance’ (COPbin(Tj)) means the coefficient of performance specific for every bin j with outdoor temperature Tj in a season, derived from the declared coefficient of performance (COPd(Tj)) for specific bins (j), when necessary corrected for on/off cycling, and calculated for other bins through inter/extrapolation;

33) ‘capacity ratio for heating’ (CRh) means for fixed RHP and other portable RHP the part load ratio for heating (Ph(Tj) divided by the declared heating capacity (Pdh(Tj)) and for single duct room heat pumps the part load ratio for heating (Ph(Tj) divided by the corrected declared capacity for heating (Pdh_corr(Tj));

34) ‘corrected declared capacity for heating’ (Pdh_corr(Tj)) means the capacity of the vapour compression cycle of a single duct heat pump corrected for infiltration losses, expressed in kilowatt (kW);

35) ‘active mode seasonal coefficient of performance’ (SCOPon) means the average coefficient of performance of the unit in active mode for the designated heating season, constructed from the part load, supplementary capacity for heating (where required) and bin-specific coefficients of performance (COPbin(Tj) and weighted by the bin hours the bin condition occurs;

36) ‘seasonal coefficient of performance’ (SCOP) means the ratio of the 'seasonal room heating demand (QH) divided by the 'seasonal final energy consumption for heating' (Qhe) of a 'room heat pump', for the heating season indicated, expressed in percentage points (%);

37) ‘seasonal room heating demand’ (QH) means the room heating demand pertaining to a designated heating season, to be used as basis for calculation of SCOP and calculated as for room heat pumps the product of the design load for heating (Pdesignh) or for fuel room heaters or electric room heaters the nominal capacity multiplied by the equivalent active mode hours for heating (Hhe), for the heating season indicated, expressed in kilowatt hour per annum (kWh/a);

38) ‘equivalent active mode hours for heating’ (Hhe) means the assumed annual number of hours the unit must provide the design load for heating (Pdesignh) to satisfy the seasonal room heating demand, as set out in Annex IV, Table 5, expressed in hours per annum (h/a);

14.5 For room air conditioners

39) Fixed room air conditioner (fixed RAC) means a 'room air conditioner ' which is intended to be used while fastened in a specific location and which, when installed and used as described by the supplier, removes heat from indoor air and expels this heat to the outdoor side;

40) Other portable room air conditioner (other RAC) means a 'room air conditioner ' which allows use while not fastened in a specific location and which, when installed and used as described by the supplier, removes heat from indoor air and expells this heat to the outdoor side;

41) Single duct room air conditioner (SD RAC) means a 'room air conditioner ' the condenser intake air is introduced from the space containing the unit and discharged outside this space;

42) ‘seasonal energy efficiency ratio’ (SEER) is the overall energy efficiency ratio of the room air conditioner, representative of the cooling season, calculated as the seasonal room cooling demand (QC) divided by the seasonal final energy consumption for cooling (Qce);

43) ‘active mode seasonal energy efficiency ratio’ (SEERon) means the average energy efficiency ratio of the unit in active mode for the cooling function, constructed from the corrected part load for cooling and bin-specific energy efficiency ratio's (EERbin(Tj)) and weighted by the bin hours the bin condition occurs;

44) ‘seasonal room cooling demand’ (QC) means the cooling demand pertaining to a designated cooling season, to be used as basis for calculation of SEER and calculated as the product of the design load for cooling (Pdesignc) and the equivalent active mode hours for cooling (Hce), expressed in kilowatt hours per annum (kWh/a);

45) ‘design cooling load’ means the space cooling (Pdesignc) load declared by the manufacturer at Tdesignc conditions respectively, expressed in kilowatt (kW);

46) ‘equivalent active mode hours for cooling’ (Hce) means the assumed annual number of hours the unit must provide the design load for cooling (Pdesignc) to satisfy the seasonal room cooling demand, as set out in Annex IV, Table 5, expressed in hours per annum (h/a);

47) ‘seasonal final energy consumption for cooling’ (Qce) means the energy consumption required to meet the seasonal room cooling demand and is calculated as the seasonal room cooling demand QC divided by the active mode seasonal energy efficiency ratio (SEERon) and the electricity consumption of the unit for the thermostat-off mode, standby, off and crankcase heater mode during the cooling season, expressed in kilowatt (kWh);

48) ‘active mode seasonal energy efficiency ratio’ (SEERon) means the average energy efficiency ratio of the unit in active mode for the cooling function, constructed from part load for cooling and bin-specific energy efficiency ratio's (EERbin(Tj)) and weighted by the bin hours the bin condition occurs;

49) ‘declared energy efficiency ratio’ (EERd(Tj)) means the energy efficiency ratio at a limited number of specified bins (j) with outdoor temperature (Tj) calculated as the corrected declared cooling capacity divided by the rated power input for cooling;

50) 'declared cooling capacity' (Pdc(T_j)), is the cooling output of the refrigeration cycle of the room heat pump, pertaining to a specified outdoor temperature (T_j), indoor temperature (T_{in}) and load condition, expressed in kilowatt (kW). The parameter can also be written as "Pdc(27;100%)" where "27" refers to the outdoor temperature Tj and "100%" to the part load condition plr(Tj);

51) ‘bin-specific energy efficiency ratio’ (EERbin(Tj)) means the energy efficiency ratio specific for every bin j with outdoor temperature Tj in a season, derived from the declared energy efficiency ratio (EERd(Tj)) for specific bins (j), when necessary corrected for on/off cycling, and calculated for other bins through inter/extrapolation;

52) ‘corrected cooling load’ (Pc_corr) means the building load curve (BLc(Tj)) at a specific outdoor temperature below the equilibrium temperature and the corrected declared cooling capacity (Pdc_corr(Tj)) above the equilibrium temperature, expressed in kilowatt (kW);

53) ‘building load curve for cooling’ (BLc(Tj)) means the rated capacity multiplied with the outdoor temperature minus 23 °C divided by 35 °C minus 23 °C;

54) ‘capacity ratio for cooling (CRc) means the ratio of the required cooling load over the delivered cooling output;

55) ‘corrected declared cooling capacity’ (Pdc_corr(Tj)) means the capacity of the vapour compression cycle of the unit for cooling corrected for infiltration (if applicable) and part load operation, expressed in kilowatt (kW);

56) ‘equilibrium temperature’ means the temperature at which the building load (BLc(Tj)) and the corrected declared cooling capacity (Pdc_corr(Tj)) of single duct room air conditioners (Teq_SD) or other portable room air conditioners (Teq_op) are equal, expressed in degrees Celsius (°C);

14.6 For room heat pumps, room air conditioners and reversibles

57) ‘season’ means a predefined set of bins;

58) ‘bin’ (j) means a combination of a specific outdoor temperature (Tj) and the bin hours (hj) as indicated in Annex IV, Table 11 for cooling and Table 12 for heating;

59) ‘bin hours’ (hj) means the annual hours a specific outdoor temperature occurs, as set out in Annex IV, Table 11 for cooling and Table 12 for heating, expressed in hours (h);

60) 'Outdoor temperature' (T_j) means the dry (and wet, if indicated) bulb temperature of the air at the inlet side of the (outdoor) heat exchanger (evaporator), expressed in degrees Celsius (°C);

61) 'Indoor temperature' (T_{in}) means the dry (and wet, if indicated) bulb temperature of the air, expressed in degrees Celsius (°C) at the inlet side of the (indoor) heat exchanger (condenser) of the room heat pump, expressed in degrees Celsius (°C);

62) 'Load condition' means the heat output of the device expressed in percentage of a specified maximum heat output;

63) 'Standard rating condition' means the combination of indoor temperature (T_{in}), outdoor temperature (T_j) and load condition to be applied when establishing the rated heating capacity, rated cooling capacity, outdoor air flow rate and sound power level, where applicable, for the respective room heat pump or room air conditioner, as set out in Annex III, Table XX;

64) ‘reference design conditions’ means the combination of requirements for the reference design temperature and the temperature below which the room heat pump switches off Thp,off, as set out in Annex IV, Table 6;

65) ‘reference design temperature’ means the outdoor temperature for cooling (Tdesignc) or heating (Tdesignh) as described in Annex IV at which the part load ratio is equal to 1 and which is specific for each cooling or heating season, expressed in degrees Celsius (°C);

66) ‘switch temperature heat pump off’ (Thp,off) means the temperature below which the vapour compression cycle of the room heat pump is switched off and heat is only provided by the supplementary heater;

67) ‘bivalent temperature’ (Tbiv) means the outdoor temperature (Tj) declared by the manufacturer at which the declared heating capacity equals the part load for heating and below which the declared capacity must be supplemented with electric supplementary heater capacity in order to meet the part load for heating, expressed in degrees Celsius (°C);

68) ‘operation limit temperature’ (Tol) means the outdoor temperature declared by the manufacturer, below which the room heat pump will not be able to deliver any heating capacity and the declared capacity is equal to zero, expressed in degrees Celsius (°C);

69) ‘active mode’ means the mode corresponding to the hours with a cooling or heating load of the building and whereby the cooling or heating function of the unit is activated. This condition may involve on/off-cycling of the unit in order to reach or maintain a required indoor air temperature;

70) ‘thermostat-off mode’ means a mode corresponding to the hours with no cooling or heating load whereby the cooling or heating function of the unit is switched on but the unit is not operational. This condition is therefore related to outdoor temperatures and not to indoor loads. Cycling in active mode is not considered as thermostat-off mode;

71) ‘thermostat-off mode power consumption’ (Pto) means the power consumption of the unit while in thermostat-off mode, expressed in kilowatt (kW);

72) ‘thermostat-off mode operating hours’ (Hto) means the annual number of hours the unit is considered to be in thermostat-off mode, the value depends on the designated season and function, expressed in hours per annum (h/a);

73) ‘standby mode’ means a condition where the unit is connected to the mains power source, depends on energy input from the mains power source to work as intended and provides only the following functions, which may persist for an indefinite time: reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or information or status display;

74) ‘standby mode power consumption’ (Psb) means the power consumption of the unit while in standby mode, expressed in kilowatt (kW);

75) ‘standby mode operating hours’ (Hsb) means the annual number of hours the unit is considered to be in standby mode, the value of which depends on the designated season and function, expressed in hours per annum (h/a);

76) ‘crankcase heater mode’ means a condition where the unit has activated a heating device to avoid the refrigerant migrating to the compressor to limit the refrigerant concentration in oil at compressor start;

77) ‘crankcase heater mode power consumption’ (PCK) means the power consumption of the unit while in crankcase heater mode, expressed in kilowatt (kW);

78) ‘crankcase heater mode operating hours’ (HCK) means the annual number of hours the unit is considered to be in crankcase heater mode, the value of which depends on the designated season and function, expressed in hours per annum (h/a);

79) ‘off mode’ is a condition in which the room air conditioner or comfort fan is connected to the mains power source and is not providing any function. Also considered as off mode are conditions providing only an indication of off mode condition, as well as conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2004/108/EC of the European Parliament and of the Council ;

80) ‘off-mode power consumption’ (P_{off}) means the power consumption of the unit while in off-mode, expressed in kilowatt (kW);

81) ‘off-mode operating hours’ (H_{off}) means the annual number of hours the unit is considered to be in off-mode, the value of which depends on the designated season and function, expressed in hours per annum (h/a);

82) ‘reactivation function’ means a function facilitating the activation of other modes, including active mode, by remote switch including remote control, internal sensor, timer to a condition providing additional functions, including the main function;

83) ‘information or status display’ is a continuous function providing information or indicating the status of the equipment on a display, including clocks;

84) ‘networked standby’ means a condition in which the equipment is able to resume a function by way of a remotely initiated trigger from a network connection;

85) ‘network’ means a communication infrastructure with a topology of links, an architecture, including the physical components, organisational principles, communication procedures and formats (protocols);

86) ‘degradation coefficient’ means a factor taking into account the efficiency loss due to cycling (compressor switching on/off in active mode) during cooling (Cdc) or heating (Cdh), which if not determined by measurement is equal to 0,25;

87) 'sound power level' means the sound power of the device established at the indoor and/or outdoor side of the device at standard rating conditions, expressed in A weighted decibels (dB(A));

88) 'outdoor air flow rate' means the volumetric air flow rate of air (can be outdoor air or indoor air also exhaust air) that passes the outdoor heat exchanger of a room heat pump at standard rating conditions, and part load conditions where applicable, expressed in cubic meters per seconds (m^3/s);

89) ‘fixed capacity’ means a room air conditioner or room heat pump which cannot change the volumetric flow rate of the refrigerant;

90) ‘variable capacity’ means a room air conditioner or room heat pump the volumetric flow rate of its refrigerant can be changed or varied in series of two or more steps;

14.7 For comfort fans

91) 'seasonal comfort fan efficiency' (eta_{cf}) means the service value of the comfort fan, corrected for control features and standby electricity consumption:

92) ‘service value’ (SV) means the ratio of the maximum fan flow rate and the fan power input, expressed in cub meters per minute per watt (m^3/min)/W;

93) ‘Fan flow rate’ (F) means the volumetric air flow rate of the comfort fan at its maximum speed position, expressed in cubic meters per minute (m^3/min);

94) ‘fan power input’ (P_{fan}) means the electric power input of the comfort fan, expressed in watt (W);

95) ‘ceiling fan’ means a comfort fan with two or more propeller blades, to be suspended from the ceiling of a room so that the blades rotate in a horizontal plane;

96) 'other comfort fan' means a comfort fan that is not a ceiling fan;

97) ‘fan diameter’ means the diameter of the circle traced out by the extreme tips of the fan, or the circumference of the air outlet of a tower or bladeless fan, divided by 3,14;

98) ‘fan sound power level’ means the A-weighted sound power level of the comfort fan while providing its maximum fan flow rate, measured at the outlet side, expressed in A-weighted decibels (dB(A));

14.8 For the control correction factors

99) 'Control correction factor ' (Fcorr) means the sum of the individual factors for each control feature present in the model supplied;

100) ’multiple heating or cooling output levels‘ means the model offers two or more discrete levels that are selectable by the user for heating output in case of room heater, or fan flow rate in case of comfort fan;

101) ’modulating heating or cooling output‘ means the room heater or room air conditioner can automatically and without direct user intervention vary its heating or cooling output in accordance with the difference in set and actual room temperature;

102) ’charge limiter‘ means the state of charge to be achieved by the electric storage heater can be set by the user;

103) ’weather dependent charging‘ means the state of charge to be achieved by the electric storage heater can be made dependent on the outdoor temperature;

104) ’basic temperature control‘ means the user can set the room heater or air conditioner to reach and maintain a specific room temperature;

105) ’programmable temperature control‘ means the user can set the room heater and/or air conditioner to reach and maintain the set room temperature for user-selectable time periods per day or per day of the week;

106) ’working time limiter’ means the room heater, room air conditioner or comfort fan can turn itself off or to standby after a pre-set time period selected by the user;

107) ’room temperature controlled fan air flow rate‘ means the comfort fan can automatically change the volumetric air flow rate it produces based on the room temperature;

108) ’presence detection‘ means the room heater, room air conditioner or comfort fan is equipped with a device that reduces or switches off the heating or cooling output (for comfort fans the air flow) when no person is detected in the room, and resumes operation when a person is detected in the room or after user intervention;

109) ’open window detection‘ means the room heater or room air conditioner is equipped with a device that can detect that a door or window is opened and responds by reducing or turning off its heating or cooling output for a time period, until the unit detects the window or door is closed again and/or user input is received;

110) ’black bulb sensor‘ means the model is equipped with a device that measures air and mean radiant temperature as input for room temperature control, that measures air and radiant temperature;

111) ’Auxiliary electricity consumption‘ means the electricity consumption during on-mode and standby-mode operation for fuel-fired room heaters;

14.9 General terms

112) ‘conversion coefficient’ (CC) means the default coefficient for primary energy per kWh electricity referred to in Directive (EU) 2018/2002 of the European Parliament and of the Council [15] amending Directive 2012/27/EU, the value of which is 2,1;

113) ‘marketed’ means placed on the market specifically for the mentioned operating condition or application, as evidenced by the technical documentation, information on the packaging and any advertising or marketing materials;

114) ‘display mechanism’ means any screen, including tactile screen, or other visual technology used for displaying internet content to users;

115) ‘nested display’ means visual interface where an image or data set is accessed by a mouse click, mouse roll-over or tactile screen expansion of another image or data set;

116) ‘tactile screen’ means a screen responding to touch, such as that of a tablet computer, slate computer or a smartphone;

117) ‘alternative text’ means text provided as an alternative to a graphic allowing information to be presented in non-graphical form where display devices cannot render the graphic or as an aid to accessibility such as input to voice synthesis applications.

118) ‘quick response (QR) code’ means a matrix barcode included on the energy label of a product model that links to that model’s information in the public part of the product database;

15 ANNEX II - Energy label classes

Energy label classes for room heaters

The seasonal room heating efficiency of a room heater (eta_{rh}) shall be assigned an energy label class as set out in Table 6.

15.1 Room heaters

Table 6. Label classes for seasonal room heating efficiency

Energy label class for room heaters	***Seasonal room heating efficiency (η_{rh}) (%)***
A (most efficient)	$\eta_{s,h} \geq 290$
B	$240 \leq \eta_{s,h} < 290$
C	$190 \leq \eta_{s,h} < 240$
D	$120 \leq \eta_{s,h} < 190$
E	$90 \leq \eta_{s,h} < 120$
F	$75 \leq \eta_{s,h} < 90$
G (least efficient)	$\eta_{s,h} < 75$

[15] Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, OJ L 328, 21.12.2018, p. 210–230, Annex, point (1) replacing footnote 3, in Annex IV of Directive 2012/27/EU

The seasonal space heating energy efficiency (η_{rh}) of a room heater shall be determined in accordance with points [..] of Annex IV.

NOTE to CF

Energy classes proposed for room heaters, and possible alternative approaches, can be discussed in the Consultation Forum.

Energy label classes for room air conditioners

The seasonal room cooling efficiency of a room air conditioner (η_{rc}) shall be assigned an energy label class as set out in .

15.2 Room air conditioners

Table 7. Label classes for seasonal room cooling efficiency

Energy label class	***Seasonal room cooling efficiency (η_{rc}) (%)***
A (most efficient)	$\eta_{s,c} \geq 550$
B	$395 \leq \eta_{s,c} < 550$
C	$295 \leq \eta_{s,c} < 395$
D	$215 \leq \eta_{s,c} < 295$
E	$160 \leq \eta_{s,c} < 215$
F	$115 \leq \eta_{s,c} < 160$
G (least efficient)	$\eta_{s,c} < 115$

The seasonal space cooling energy efficiency (η_{rc}) of a room air conditioner shall be determined in accordance with points [..] of Annex IV.

NOTE to CF

The energy classes proposed for room air conditioners, and possible alternative approaches, can be discussed in the Consultation Forum .

Energy label classes for comfort fans

The seasonal comfort fan efficiency shall be assigned an energy label class as set out in Table 8.

15.3 Comfort fans

NOTE to CF

This Working Document presents two alternatives for labelling of comfort fans: One classification scale for both ceiling fans and other fans combined, or two separate scales respectively.

The class limits for the seasonal service value (SV_seasonal) depend on the (maximum) air flow rate declared for the product.

In the **Supplement Comfort Fans** (at the end of this Working Document) the distribution of the efficiency classes per option are presented.

Table 8. Label classes for comfort fan efficiency - Combined CF label

Combined label			
	SV_seasonal shall be minimum (whichever is highest)		
A	0.60	or	0.18 * (fan air flow rate)$^{0.9}$
B	0.45	or	0.11 * (fan air flow rate)$^{0.9}$
C	0.30	or	0.06 * (fan air flow rate)$^{0.9}$
D	0.20	or	0.04 * (fan air flow rate)$^{0.9}$
E	0.10	or	0.02 * (fan air flow rate)$^{0.9}$
F	0.05	or	0.01 * (fan air flow rate)$^{0.9}$
G	0		

With fan air flow rate expressed in m^3/min per W.

The seasonal comfort fan efficiency of a comfort fan (SV_seasonal) shall be determined in accordance with points [..] of Annex IV.

15.4 Sound power classes

The sound power of room heaters, room air conditioners and comfort fans shall be assigned a sound power label class as set out Table 4.

Table 10. Indoor sound power classes of room air conditioners, room heaters and comfort fans

Sound power label class	***Indoor sound power (dB(A))***
A	dB < 45
B	45 ≤ dB < 50
C	50 ≤ dB < 55
D	55 ≤ dB < 60
E	dB ≥ 60

Table 11. Outdoor sound power classes of room air conditioners and room heaters

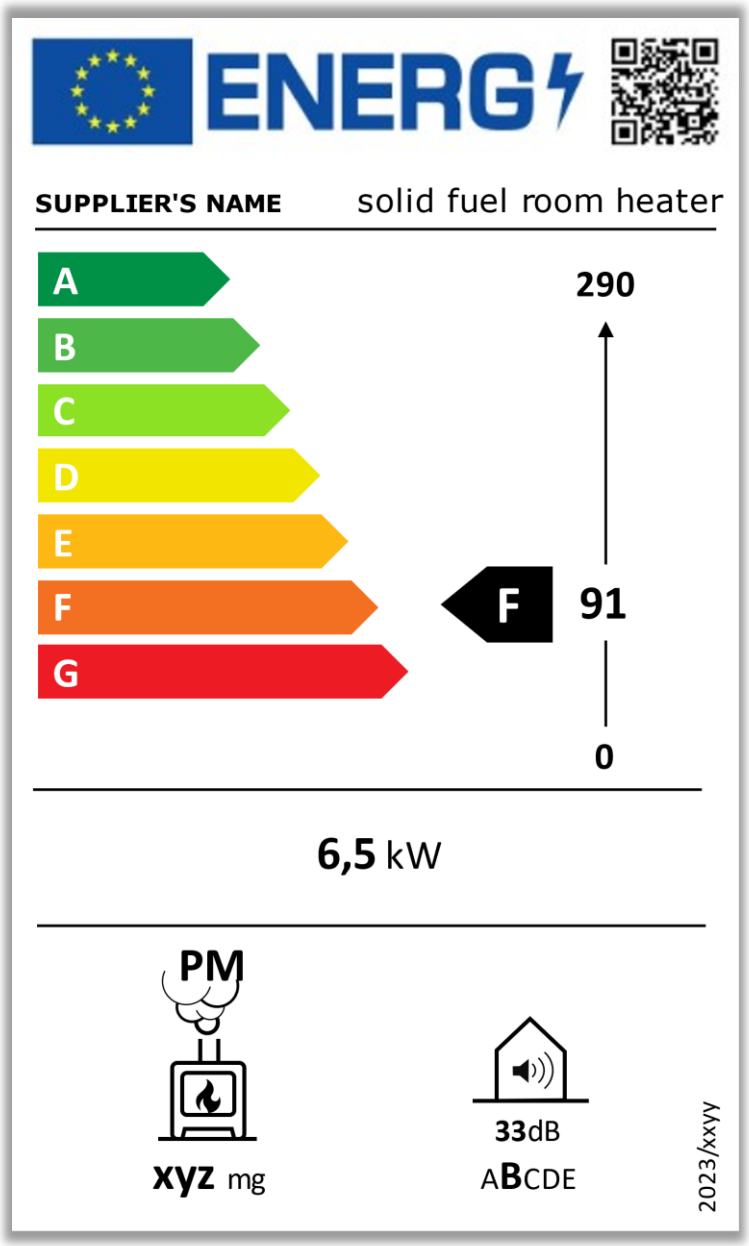
Sound power label class	***Outdoor sound power (dB(A))***
A	dB < 52
B	52 ≤ dB < 57
C	57 ≤ dB < 62
D	62 ≤ dB < 67
E	dB ≥ 67

The sound power of room air conditioners, room heaters and comfort fans shall be determined in accordance with points xx of Annex IV.

16 ANNEX III - Labels

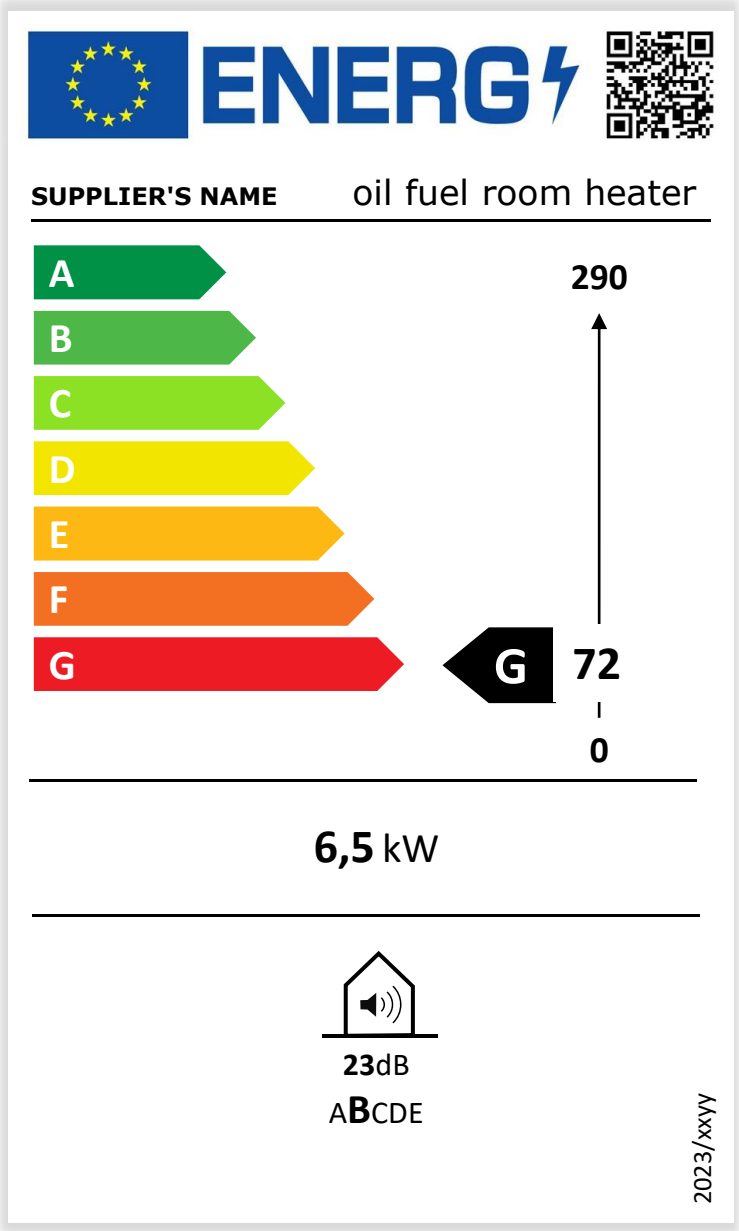
16.1 Label for solid fuel room heater

(1) Label



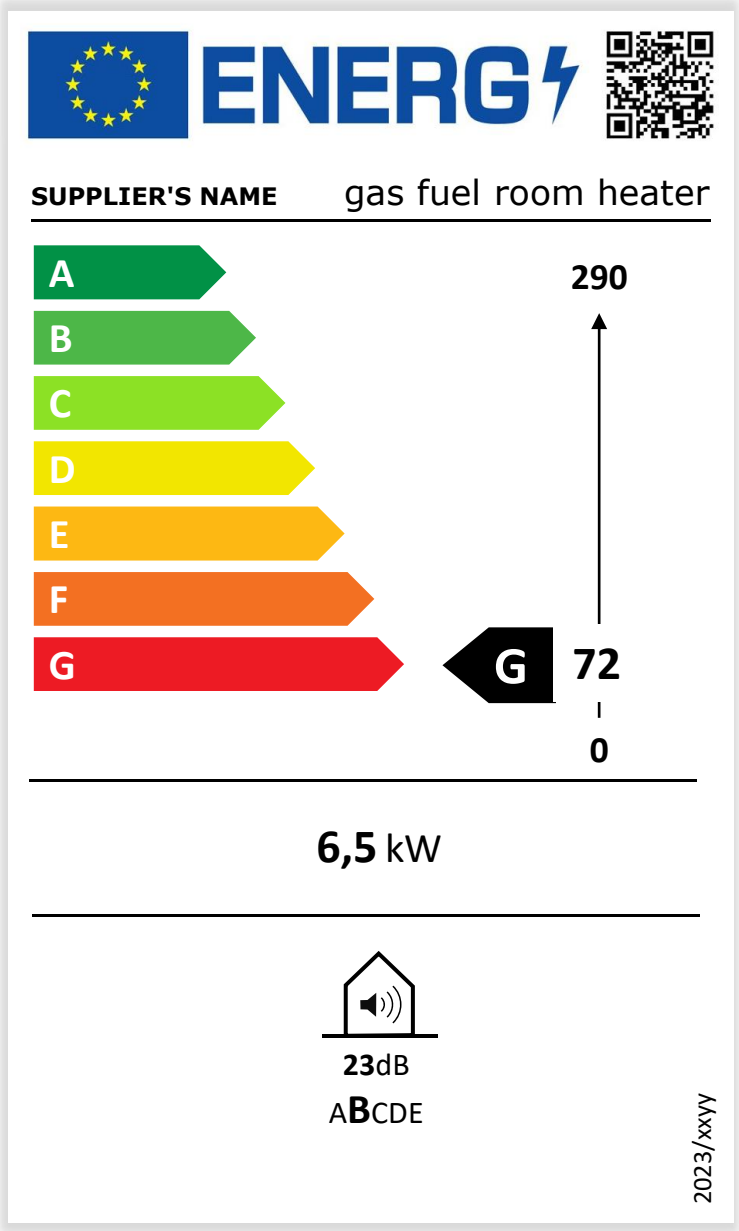
16.2 Label for oil fuel room heater

(2) Label



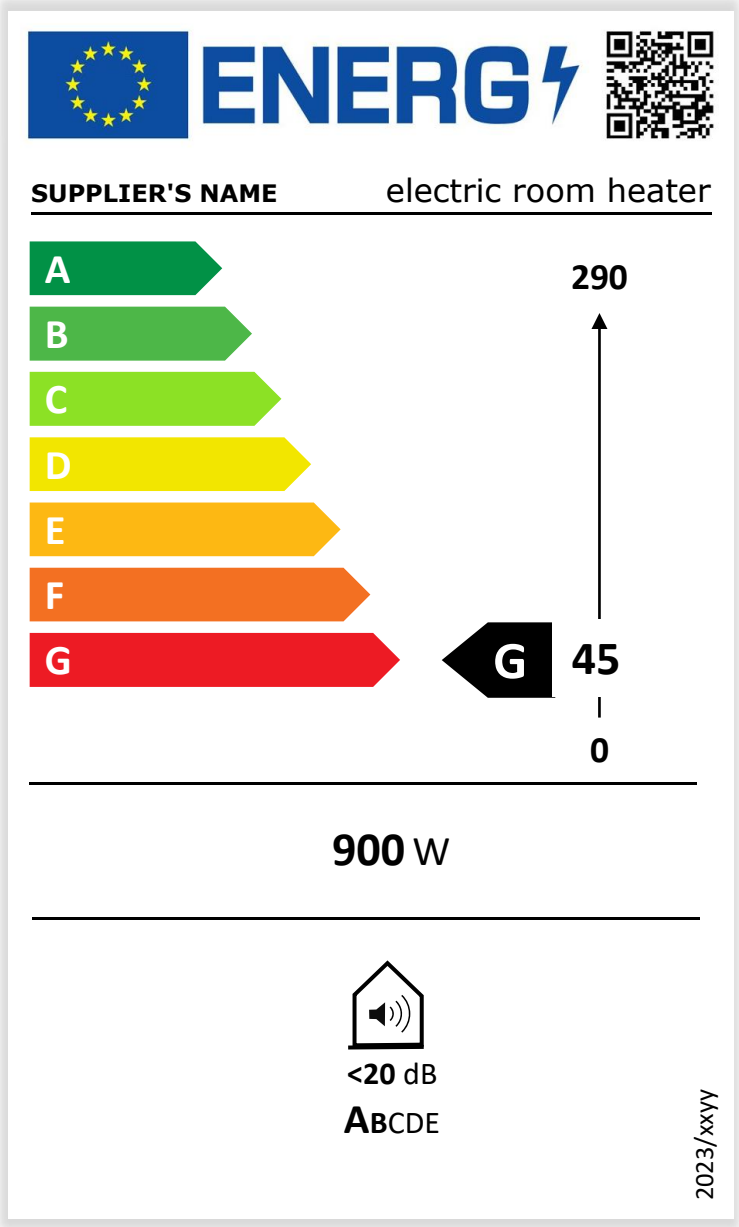
16.3 Label for gas fuel room heater

(3) Label



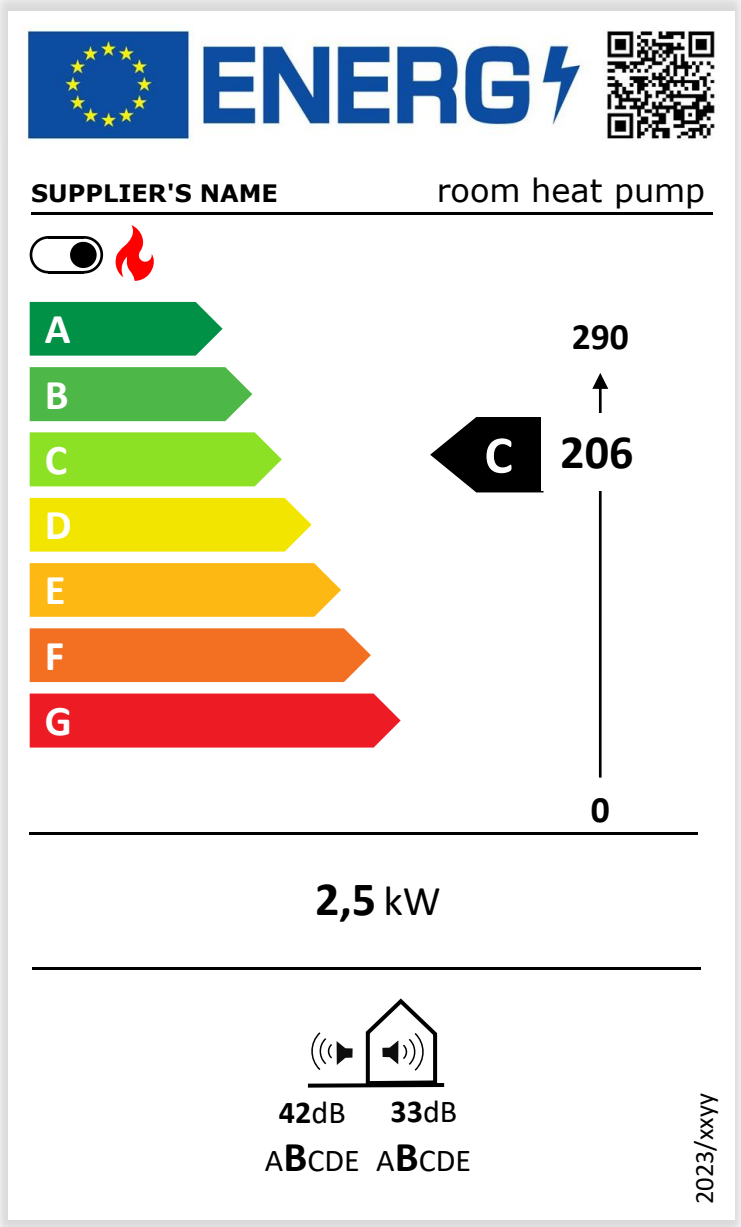
16.4 Label for electric room heater

(4) Label

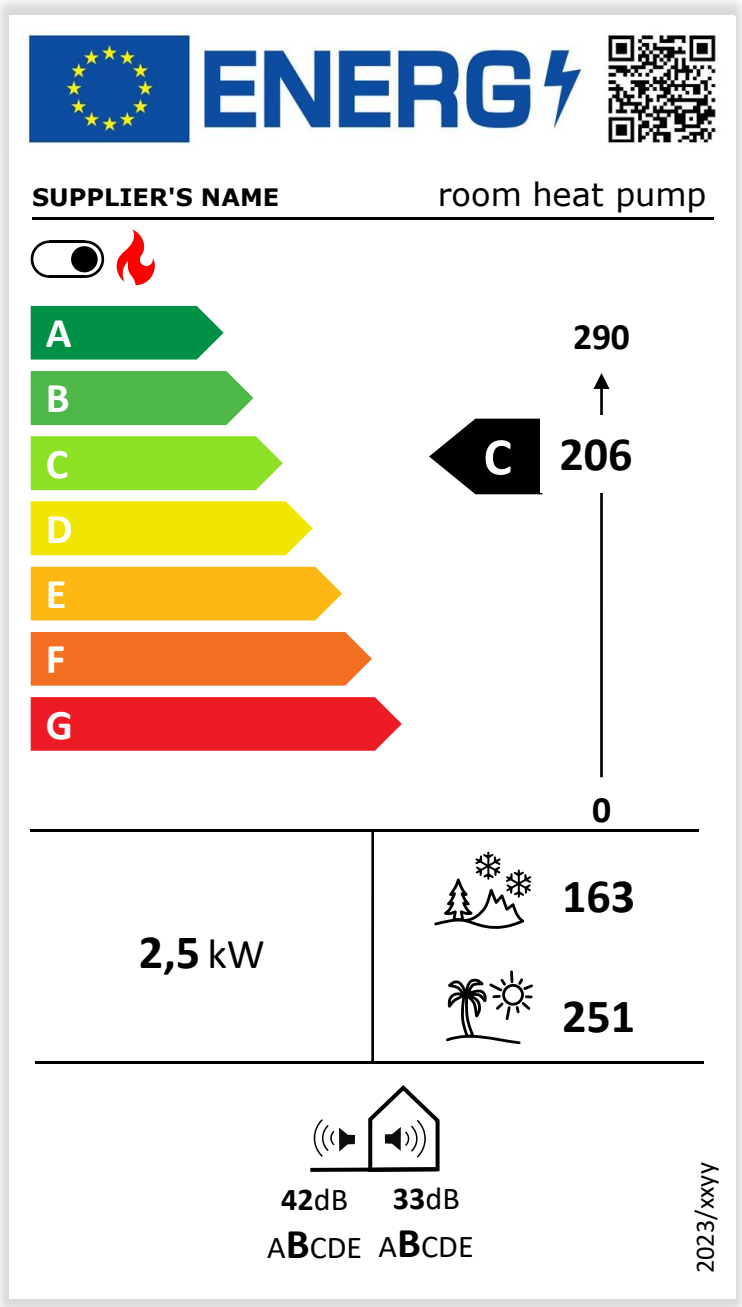


16.5 Label for room heat pump (heating only)

(5) Label / Average climate only

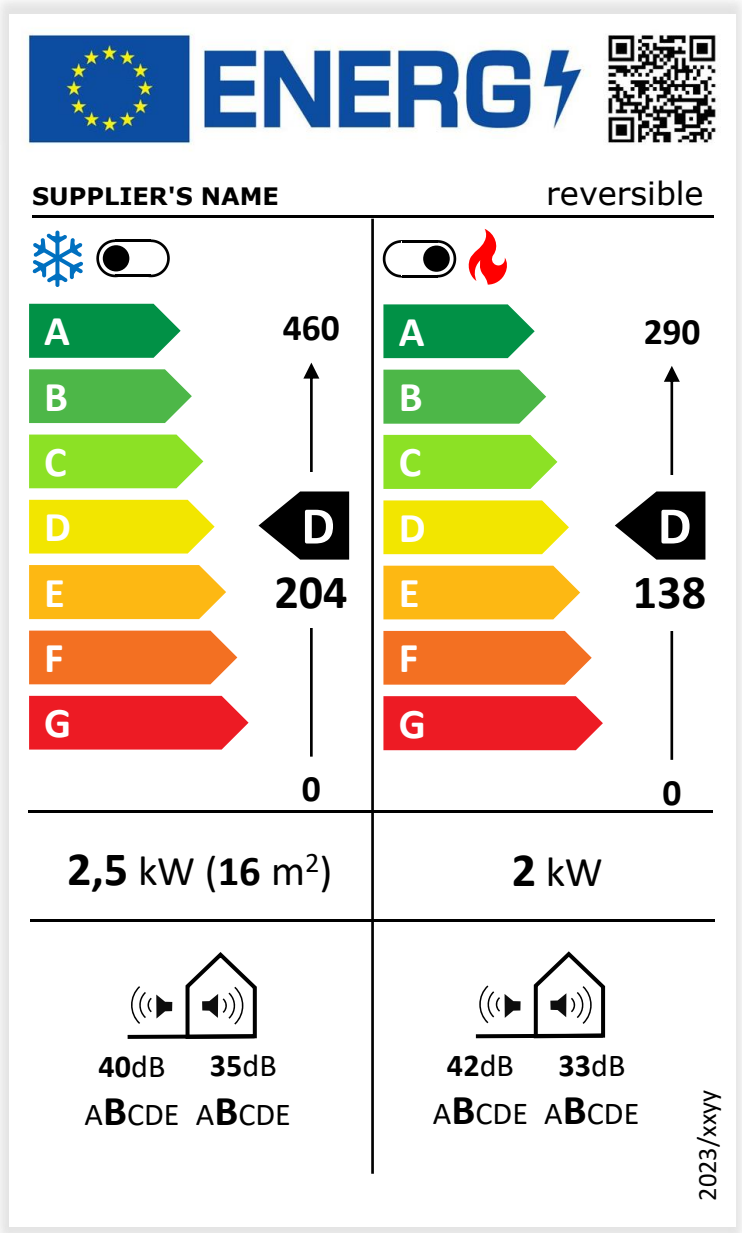


(6) Label / Average + other climates

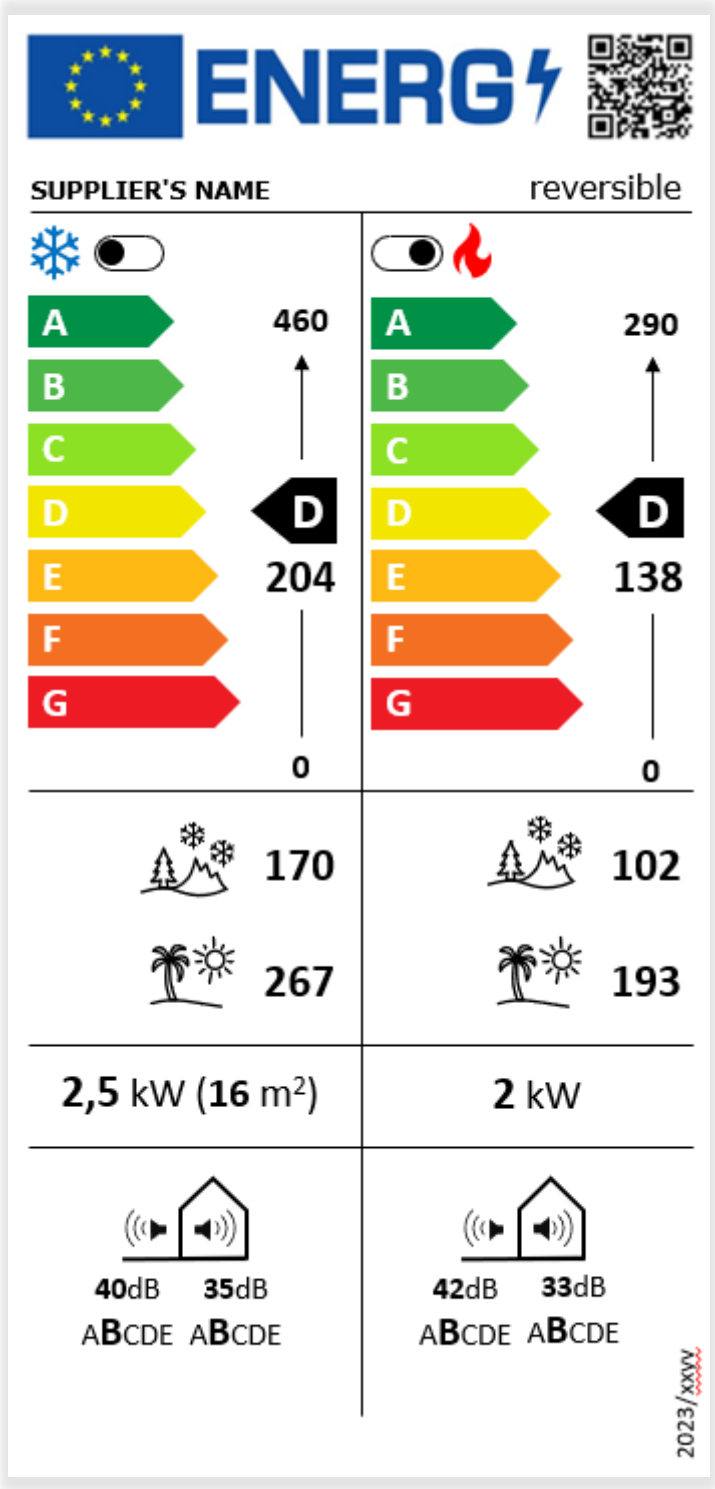


16.6 Label for reversible room air conditioners / heat pumps

(7) Label / Average climate only

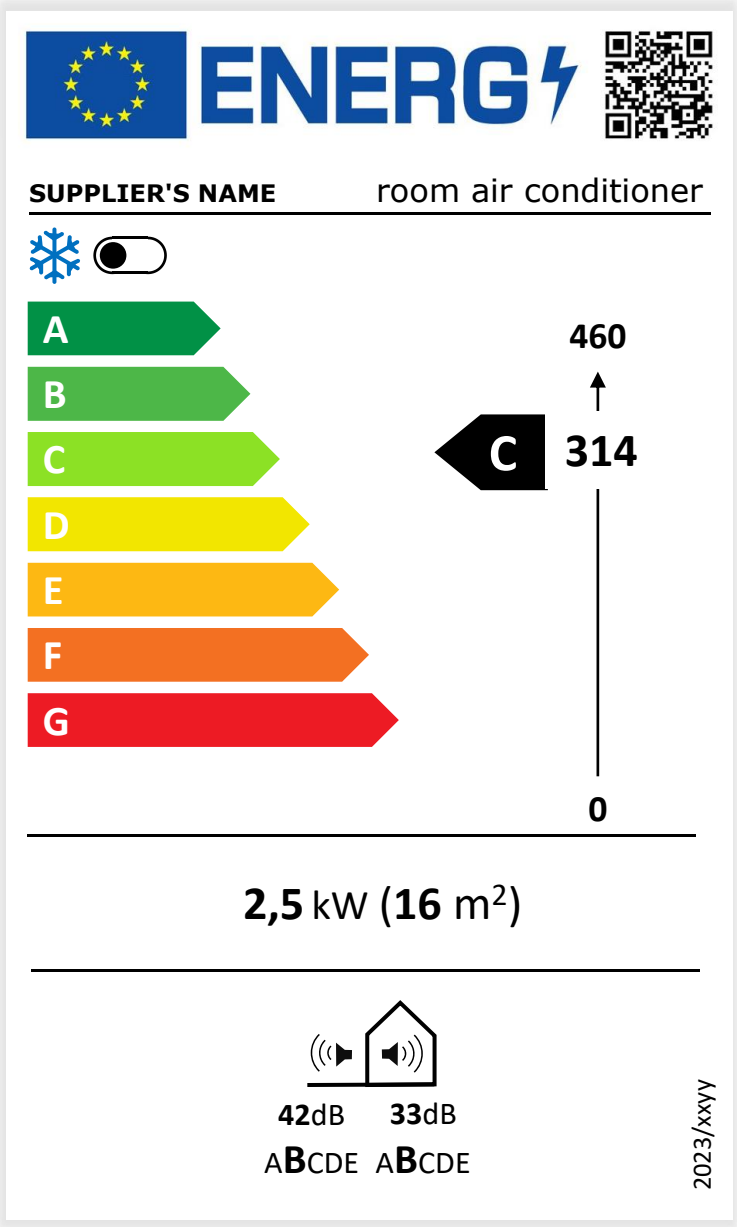


(8) Label / Average + other climates

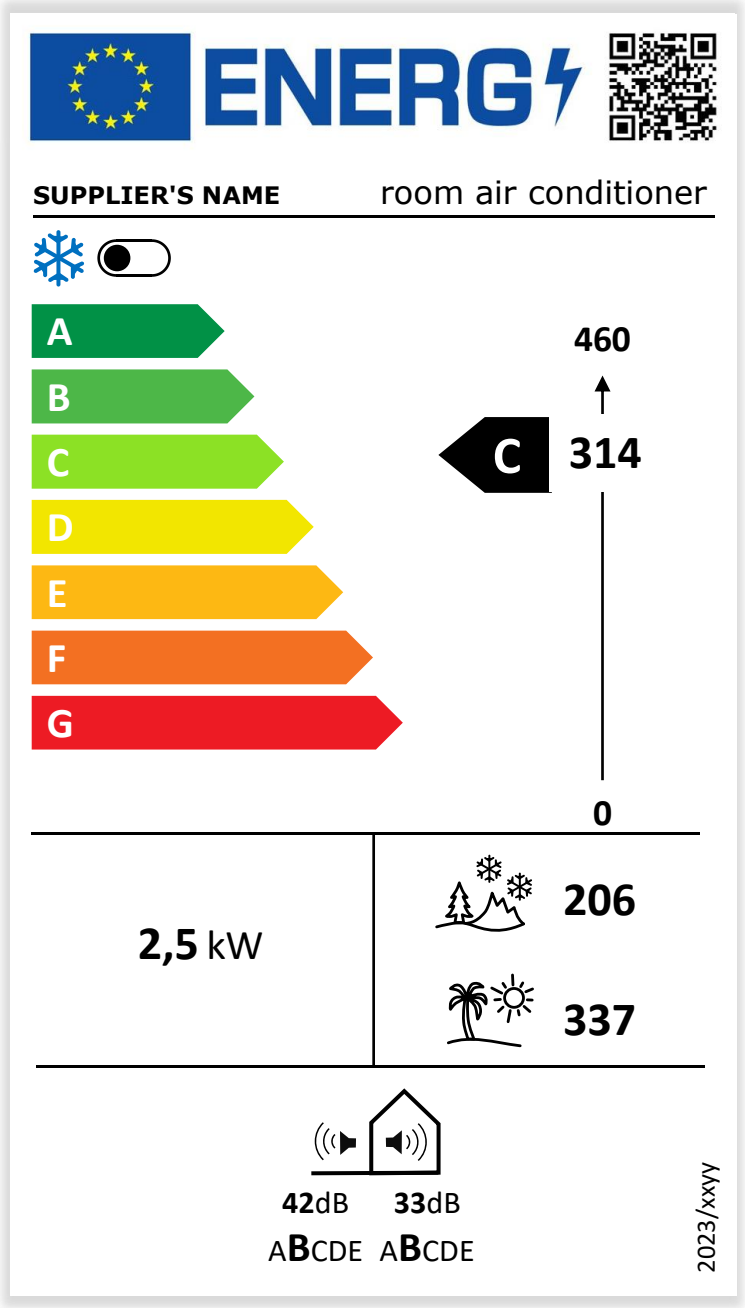


16.7 Label for room air conditioner (cooling only)

(9) Label / Average climate only

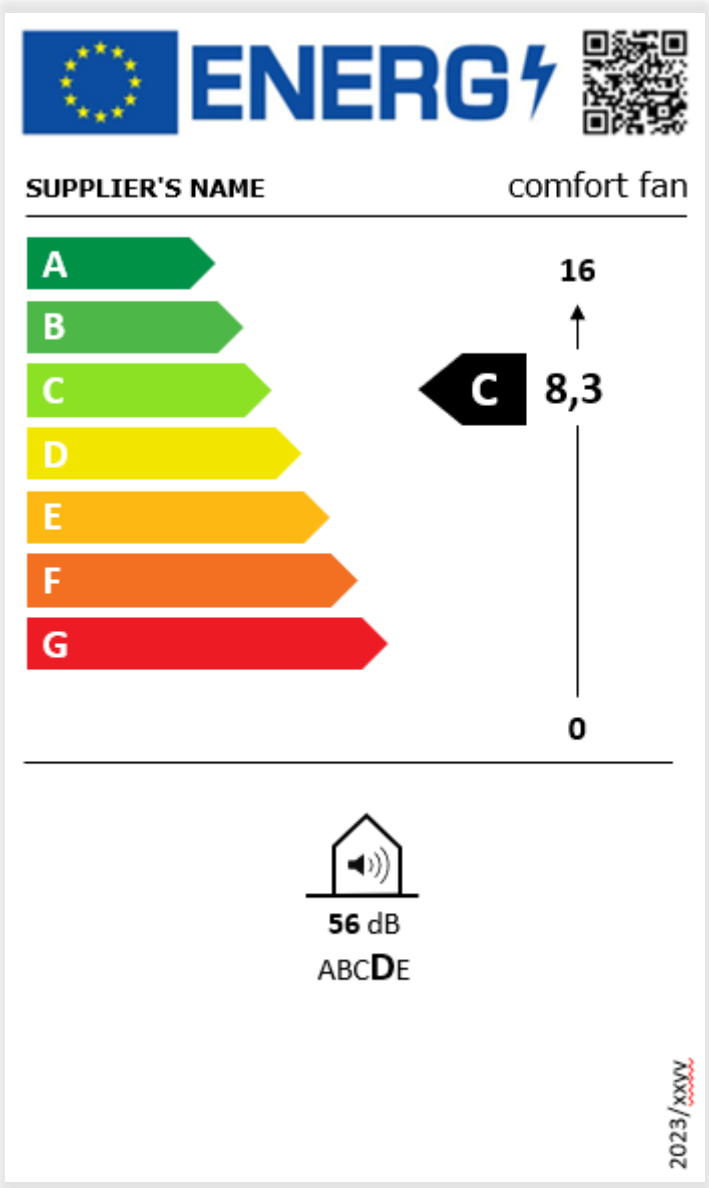


(10) Label / Average + other climates



16.8 Label for comfort fan

(11) Label



16.9 Label elements (indicative)

(12) The following information shall be included in the label for

Note to CF: The list below is indicative - to assign correctly in a final version

If the unit can be used as a 'single duct' as well as an 'other portable' air conditioner or heat pump, e.g. the user can opt to install the product using one or two ducts, the label shall show the energy class and supplementary information pertaining to the installation situation that gives the **least favourable** performance and efficiency (in general this will be the 'single duct' configuration).

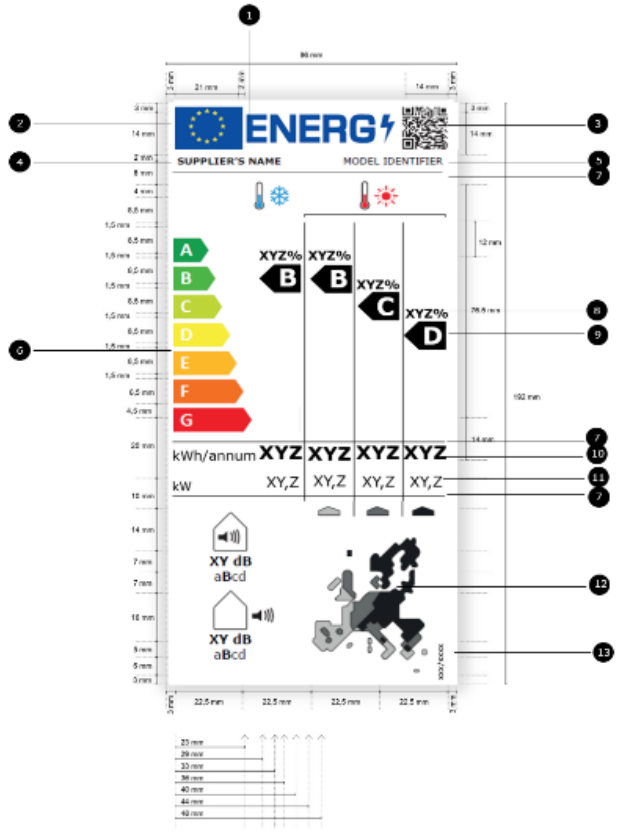
Heat pumps, air conditioners (and reversibles) show the energy class and supplementary information pertaining to the average climate by default. Information of performance in other climates can be shown on the label as well. The technical information sheet could show a message if a unit is not suitable for use in other climates.

These requirements may be repeated in Article 3 & 4 (Obligations for suppliers, dealers) if needed/preferred.

I. the QR code;
II. the supplier's name or trademark;
III. the supplier's model identifier;
IV. the symbol for cooling;
V. the symbol for heating;
VI. the range in label classes for cooling;
VII. the label class for cooling;
VIII. the direction of increasing efficiency;
IX. the seasonal cooling energy efficiency in the average climate;
X. the range in label classes for heating;
XI. the label class for heating;
XII. the direction of increasing efficiency;
XIII. the seasonal heating energy efficiency in the average climate
XIV. the symbol for the colder climate;
XV. the seasonal cooling efficiency in the colder climate;
XVI. the symbol for the warmer climate;
XVII. the seasonal cooling efficiency in the warmer climate;
XVIII. the symbol for the colder climate;
XIX. the seasonal heating efficiency in the colder climate;
XX. the symbol for the warmer climate;
XXI. the seasonal heating efficiency in the warmer climate;
XXII. the rated cooling capacity;
XXIII. the indicative floor area for cooling;
XXIV. the rated heating capacity;
XXV. the outdoor respectively indoor sound power levels when cooling;
XXVI. the outdoor, respectively indoor sound power levels when heating;
XXVII. the emissions of particulate matter (solid fuel heaters only)
XXVIII. the reference of the regulation.

1) Label design [not the proposed design - to be completed once draft is agreed]

a) Label for solid fuel room heaters, etc...



[label above is for illustration only - not the proposed design]

17 ANNEX IV - Measurement and calculation methods

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art methods and are in line with the provisions set out below. The reference numbers of these harmonised standards are published for this purpose in the Official Journal of the European Union

17.1 Room heaters

This section describes the measurement and calculation methods for establishing the:

- rated heating capacity & sound power level;
- seasonal room heating efficiency;

of room heaters covered by this regulation.

17.1.1 Fuel fired room heaters

Fuel fired room heaters shall be tested using the preferred fuel declared.

The nominal efficiency (eta_{nom}), rated heating capacity (Pratedh), direct and indirect heat output (Pdirect, Pindirect) of a fuel fired room heater are established while the model provides the nominal heat output.

The sound power shall be established while the model provides the nominal heat output.

The part load efficiency ($eta_{\_min}$) of a fuel fired room heater is established while providing the minimum heat output.

The electric power consumption at nominal heat output, minimum heat output and standby power shall be established while the model is in its respective modes.

Seasonal room heating efficiency

The seasonal room heating energy efficiency is calculated as:

Equation 1

$$eta_{rh} = eta_{nom} * \left(0{,}9 + 0{,}1 * \sum_{i}^{xii} F_{corr} \right) * Faux * Fign$$

Where

eta_nom	is the nominal efficiency of the room heater
Fcorr(i-xii)	is the summation of the applicable Fcorr values, using table XX
Faux	is the correction factor for the auxiliary electricity consumption (fuel fired room heaters only)
Fign	is the correction factor for the permanent ignition device fuel input (fuel fired room heaters only)

The correction factor for auxiliary electricity consumption F_{aux} applies to fuel fired room heaters and is calculated as:

Equation 2

$$F_{aux} = \frac{1}{1 + \left(CC * \frac{0{,}2 * el_{max} + 0{,}8 * el_{min} + 1{,}3 * el_{sb}}{P_{nom}} \right)}$$

Where:

elmax is the electric power consumption at nominal heat output of the fuel fired room heater, expressed in kW;

elmin is the electric power consumption at minimum heat output of the fuel fired room heater, expressed in kW. In case the product does not offer a minimum heat output the value for the electric power consumption at nominal heat output shall be used;
elsb is the electric power consumption in standby mode of the fuel fired room heater, expressed in kW,
Pnom is the nominal heat output of the fuel fired room heater, expressed in kW

Example
If elmax = 30W, elmin = 8 W, elsb = 1 W, Pnom = 6 kW;
Faux = 1 / (1+ {2,1*((0,2*0,03+0,8*0,008+1,3*0,001)/6) }) = 0,9952

The correction factor for permanent ignition device fuel consumption F_{ign} applies to fuel fired room heaters only and is calculated as:

Equation 3

$$F_{ign} = \frac{1}{1 + \frac{0{,}5 * P_{ign}}{P_{nom}}}$$

Where
Pign is the permanent ignition device fuel consumption of the fuel fired room heater, expressed in kW,
Pnom is the nominal heat output of the fuel fired room heater, expressed in kW.

Example
If Pign = 400W, Pnom = 6 kW;
Faux = 1 / 1 + {0,5*0,4/6 } = 0,97

Emissions to air

Measurement of particulate matter (PM), organic gaseous compounds (OGC), carbon monoxide (CO) by solid fuel room heaters and nitrogen oxides (NOx) emissions and permanent ignition device fuel input by any type of fuel fired room heater (if applicable) shall be established in accordance with the standards indicated in Annex IV.

17.1.2 Electric room heaters

The seasonal room heating energy efficiency of electric room heaters is calculated as:

Equation 4

$$eta_{rh} = \frac{100\%}{CC} * \left(0{,}9 + 0{,}1 * \sum_{i}^{xii} F_{corr} \right)$$

Where
CC is the conversion efficiency, default 2,1
Fcorr(i-xii) is the summation of the applicable Fcorr values, using table XX

17.1.3 Room heat pumps

Room heat pumps that can function as a single duct room heat pumps shall not show a seasonal room heating energy efficiency on the label or the product information sheet and no method is described for these products.

The seasonal room heating energy efficiency of room heat pumps, **excluding room heat pumps that can function as a single duct room heat pump**, is calculated as:

Equation 5

$$eta_{rh} = \frac{SCOP}{CC} * \left(0{,}9 + 0{,}1 * \sum_{i}^{xii} F_{corr} \right)$$

Where

SCOP	is the seasonal coefficient of the room heat pump
CC	is the conversion efficiency, default 2,1
Fcorr(i-xii)	is the summation of the applicable Fcorr values, using Table 28

The value for Fcorr is established in accordance with section 17.4.

The seasonal coefficient of performance (SCOP) for RAC is established in accordance with the relevant standards identified in Annex IVa, noting that the measurement and calculation methods laid out in this document will prevail in case of discrepancies. The SCOP shall be established while taking into account the following aspects:

1. the part load conditions for heating, as set out in Table 12;
2. the reference design conditions, as set out in Table 13;
3. the European average heating season, as set out in Table 19, and;
    a. if the unit is marketed for cold climates, the European colder heating season, as set out in Table 19;
    b. if the unit is marketed for warm climates, the European warmer heating season, as set out in Table 19;

Table 12. Part load conditions for room heat pumps

Test conditions	**Inlet temperature dry(wet) bulb °C**		**Part load ratio (%) per heating season**			**Parameters established**
	Outdoor temperature (evaporator)	**Indoor temperature (condensor)**	**Average (mandatory)**	**Warmer**	**Colder**	
A (bin Tj = -7°)	-7(-8)	+20(+15)	88%	n/a	61%	Pdh(Tj), COPd(Tj)
B (bin Tj = +2°)	+2(+1)		54%	100%	37%	
C (bin Tj = +7°)	+7(+6)		35%	64%	24%	
D (bin Tj = +12°)	+12(+11)		15%	29%	11%	
E (bin Tj = Tol)	Tol (hp,off)		(Tol-16)/(Tdesignh-16) %			
F (bin Tj = Tbiv)	Tbiv		(Tbiv-16)/(Tdesignh-16) %			
G (bin Tj = -15°)	-15		n/a	n/a	82	

The values for $T_{design,h}$, T_{biv} and $T_{hp,off}$ are stated in Table 13 reference conditions.

Table 13. Reference conditions for RHP

Function	Season	Reference design temperature (°C) dry bulb (wet bulb)	Bivalent temperature maximum (°C)	Operation limit temperature maximum (°C)
		$T_{design,h}$	T_{biv}	$T_{hp,off}$
Heating	Average	- 10 (- 11)	+ 2	- 7
	Warmer	2 (-1)	7	2
	Colder	-22 (-23)	-7	-15

The bins for the calculation of SCOP for the heating season considered:

Table 19. Heating season (bins) for room heat pumps

Bin j (#)	Outdoor temperature T_j (°C)	bin hours for all room heat pumps bin hours h_j (h/a)		
		Warmer	Average	Colder
1 to 8	-30 to -23	0	0	0
9	-22	0	0	1
10	-21	0	0	6
11	-20	0	0	13
12	-19	0	0	17
13	-18	0	0	19
14	-17	0	0	26
15	-16	0	0	39
16	-15	0	0	41
17	-14	0	0	35
18	-13	0	0	52
19	-12	0	0	37
20	-11	0	0	41
21	-10	0	1	43
22	-9	0	25	54
23	-8	0	23	90
24	-7	0	24	125
25	-6	0	27	169
26	-5	0	68	195
27	-4	0	91	278
28	-3	0	89	306
29	-2	0	165	454

30	-1	0	173	385
31	0	0	240	490
32	1	0	280	533
33	2	3	320	380
34	3	22	357	228
35	4	63	356	261
36	5	63	303	279
37	6	175	330	229
38	7	162	326	269
39	8	259	348	233
40	9	360	335	230
41	10	428	315	243
42	11	430	215	191
43	12	503	169	146
44	13	444	151	150
45	14	384	105	97
46	15	294	74	61
	Total hours:	3 590	4 910	6 446

The part load ratio for heating $plr_h(Tj)$ per bin is calculated as:

Equation 16

$$plr_h(Tj) = \frac{(Tj - 16)}{(Tdesign - 16)}$$

Where
Tj is the outdoor air temperature for the bin assessed
Tdesign is the reference design temperature for the heating season the unit is marketed for, in accordance with table XX.

The seasonal coefficient of performance (SCOP) is calculated as:

Equation 6

$$SCOP = \frac{Q_H}{Q_{HE}}$$

Where
Q_H is reference annual heating demand
Q_{HE} is the reference electricity consumption for heating

The reference annual heating demand Q_H is calculated as:

Equation 7

$$Q_H = P_{design,h} * H_{HE}$$

Where

$P_{design,h}$	is the design heat load (kW)
H_{HE}	is the equivalent active mode hours for heating

The annual electricity consumption for heating (Q_{HE}) is calculated as

Equation 9

$$Q_{HE} = \frac{Q_H}{SCOP_{on}} + (H_{to} * P_{to}) + (H_{sb} * P_{sb}) + (H_{ck} * P_{tock}) + (H_{off} * P_{off})$$

Where

QH	is the equivalent active mode hours for heating
SCOPon	is active mode seasonal efficiency ratio SCOPon
Hto to Hoff	are the annual hours for respectively thermostat off-mode, standby-mode, crankcase heater mode and off-mode as provided in Table 14
Pto to Poff	is the power consumption for respectively thermostat off-mode, standby-mode, crankcase heater mode and off-mode

The electric power input in thermostat-off mode, standby mode, crankcase heating mode and off-mode shall include the networked standby electric power input where applicable.

The number of hours per mode to be used for the calculation of SCOP are:

Table 14. Operational hours for room heat pumps

Function	**Season**	**Operational hours**				
		Equivalent active mode hours for heating	Thermostat Off mode	Standby mode	Off mode	Crankcase heater mode
		H_{HE}	**H_{TO}**	**H_{SB}**	**H_{off}**	**H_{CK}**
Heating only Room heat pump	Average	1 400	179	0	3 672	3672
	Colder	2 100	131	0	2 184	2315
	Warmer	1 400	755	0	4 345	4416
Reversible room heat pump	Average	1400	179	0	0	3672
	Colder	2100	131	0	0	2184
	Warmer	1400	755	0	0	4416

The active mode seasonal efficiency ratio SCOPon is calculated as:

Equation 10

$$SCOP_{on} = \frac{\sum_{j=1}^{n} h_j * P_h(Tj)}{\sum_{j=1}^{n} h_j * \left[\frac{P_h(Tj) - elbu(Tj)}{COP_{bin}(Tj)} + elbu(Tj)\right]}$$

Where

n	is the total of bins for the heating season the unit is marketed for;

j is the bin number;
hj is the number of hours the bin conditions occur in a heating season;
Ph is the heat load per bin;
elbu(Tj) is the heating capacity supplied by the (assumed) backup heater, using a COP of 1;
COPinf is the coefficient of performance of the RHP for the corresponding bin, including corrections related to part load behaviour;

The heat load Ph(Tj) for each bin is calculated as:

Equation 13

$$Ph(Tj) = P_{design,h} * \frac{(16 - Tj)}{(16 - T_{design,h})}$$

The declared capacity Pdh(Tj) for each bin is the actual capacity for the Tj of each applicable test condition of Table 12 and interpolated or extrapolated from the closest measured values for the other bins.

The bin-specific coefficient of performance COPbin(Tj) takes into account effects of degradation from cycling behaviour and is calculated as:

Equation 11

$$COPbin(Tj) = COPd(Tj) * \frac{CR(Tj)}{(Cdh \times CR(Tj) + (1 - Cdh))}$$

Values for bins that are not test conditions are calculated on the basis of inter- and extrapolations from the closest known COPbin values derived from the test conditions.

For multi-split air-to-air heat pumps, the COPbin(Tj) used for the calculation of the SCOPon shall include the energy consumption of the outdoor units and indoor units.

The value for the degradation coefficient for heating Cdh shall be established either by measurement according the applicable standards mentioned in Annex VIIa, or by using the default value of 0.25.

The capacity ratio CR(Tj) is established for each bin applicable, and is calculated as:

Equation 12

$$CR(Tj) = \frac{P_h(Tj)}{P_{dh}(Tj)}$$

Where
Ph is the heat load for bin Tj
Pdh is the declared heating capacity for bin Tj

The rated heating capacity Pratedh and the sound power of room heat pumps shall be established with the unit operating in the standard rating conditions as stated in Table 16 .

Table 16. Standard rating conditions for room heat pumps

Product (sub)group	**Inlet temperature dry(wet) bulb °C**		**Load condition**	**Parameters measured**
	Outdoor temperature (evaporator)	Indoor temperature (condensor)		
Room heat pump	+7(+6)	+20(+15)	Maximum heat output attainable in this condition (using the vapour compression cycle only)	Pratedh (kW), sound power (indoor/outdoor)

17.2 Room air conditioners

17.2.1 Fixed room air conditioners

This section describes the measurement and calculation methods for establishing the:

- rated cooling capacity & sound power level;
- seasonal room cooling efficiency;

of fixed room air conditioners covered by this regulation.

The seasonal room cooling energy efficiency of fixed room air conditioners is calculated as:

Equation 22

$$eta_{rc} = \frac{SEER}{CC} * \left(0{,}9 + 0{,}1 * \sum_{i}^{xii} F_{corr} \right)$$

Where

SEER	is the seasonal coefficient of the fixed room air conditioner
CC	is the conversion efficiency, default 2,1
Fcorr(i-xii)	is the summation of the applicable Fcorr values, using Table 30

The value for Fcorr is established in section 17.4.

The seasonal energy efficiency ratio (SEER) for fixed RAC is established in accordance with the relevant standards identified in Annex IVa, noting that the measurement and calculation methods laid out in this document will prevail in case of discrepancies. The part load conditions for cooling as set out in Table 17, the reference design conditions as set out in Table 18 and European average heating season as set out in Table 19 shall be taken into account.

Table 17. Part load conditions for fixed room air conditioners

Product (sub)group and test condition	**Inlet temperature dry(wet) bulb °C**		**Load condition**	**Parameters established**
	Outdoor temperature (condensor)	Indoor temperature (evaporator)		
Fixed room air conditioners				
A = $P_{rated,c}$	35	27 (19)	100% of Pdesignc	Prated,c=Pdc(Tj), EERd(Tj), sound power
B	30	27 (19)	74% of Pdesignc	Pdc(Tj), EERd(Tj)
C	25	27 (19)	47% of Pdesignc	Pdc(Tj), EERd(Tj)
D	20	27 (19)	21% of Pdesignc	Pdc(Tj), EERd(Tj)

The value for Tdesign,c is stated in Table 29.

Table 18. Reference conditions for RAC

Function	**Reference design temperature (°C)** dry bulb (wet bulb)
	$T_{design,c}$

Cooling	35 (24)

The cooling season for fixed RACs is:

Table 19. Cooling season (bins) for fixed room air conditioners

Bin j (#)	**Outdoor temperature** T_j (°C)	**Fixed room air conditioners** bin hours h_j (h/a)
1	17	205
2	18	227
3	19	225
4	20	225
5	21	216
6	22	215
7	23	218
8	24	197
9	25	178
10	26	158
11	27	137
12	28	109
13	29	88
14	30	63
15	31	39
16	32	31
17	33	24
18	34	17
19	35	13
20	36	9
21	37	4
22	38	3
23	39	1
24	40	0

The seasonal energy efficiency ratio (SEER) is calculated as:

Equation 6

$$SEER = \frac{Q_C}{Q_{CE}}$$

Where
QC is reference annual cooling demand
QCE is the reference electricity consumption for cooling

The reference annual cooling demand Q_C is calculated as:

Equation 7

$$Q_C = P_{design,c} * H_{CE}$$

Where

$P_{design,c}$	is the design cooling load (kW)
HCE	is the equivalent active mode hours for cooling, from Table 23

The annual electricity consumption for cooling (Q_{CE}) is calculated as:

Equation 9

$$Q_{HE} = \frac{Q_C}{SEER_{on}} + (H_{to} * P_{to}) + (H_{sb} * P_{sb}) + (H_{ck} * P_{tock}) + (H_{off} * P_{off})$$

Where

QC	is the equivalent active mode hours for heating
SEERon	is active mode seasonal energy efficiency ratio
Hto to Hoff	are the annual hours for respectively thermostat off-mode, standby-mode, crankcase heater mode and off-mode for cooling as provided in Table 23;
Pto to Poff	is the power consumption for respectively thermostat off-mode, standby-mode, crankcase heater mode and off-mode for cooling.

The active mode seasonal energy efficiency ratio SEERon is calculated as:

Equation 10

$$SEER_{on} = \frac{\sum_{j=1}^{n} h_j * [P_c(Tj)]}{\sum_{j=1}^{n} h_j * \left[\frac{P_c(Tj)}{EER_{bin}(Tj)}\right]}$$

Where

n	is the total of bins for the heating season the unit is marketed for;
j	is the bin number;
hj	is the number of hours the bin conditions occur in a heating season;
Pc	is the heat load per bin;
EERbin	is the energy efficiency ratio of the RAC for the corresponding bin, including corrections related to part load behaviour;

The cooling load Pc(Tj) for each bin is calculated as:

Equation 13

$$Pc(Tj) = P_{design,c} * \frac{(16 - Tj)}{(16 - T_{design,c})}$$

The declared cooling capacity Pdc(Tj) for each bin is the actual cooling capacity for the Tj of each applicable test condition of Table 17 and interpolated or extrapolated from the closest measured values for the other bins.

The bin-specific energy efficiency ratio EERbin(Tj) takes into account effects of degradation from cycling behaviour and is calculated as:

Equation 11

$$EERbin(Tj) = EERd(Tj) * \frac{CR(Tj)}{(Cdc \times CR(Tj) + (1 - Cdc))}$$

Values for bins that are not test conditions are calculated on the basis of inter- and extrapolations from the closest known EERbin values derived from the test conditions.

For multi-split air-to-air heat pumps, the EERbin(Tj) used for the calculation of the SEERon shall include the energy consumption of the outdoor units and indoor units.

The value for the degradation coefficient for cooling Cdc shall be established either by measurement according the applicable standards mentioned in Annex VIIa, or by using the default value of 0.25.

The capacity ratio CR(Tj) is established for each bin applicable, and is calculated as:

Equation 12

$$CR(Tj) = \frac{P_c(Tj)}{P_{dc}(Tj)}$$

Where
Pc is the cooling load for bin Tj
Pdc is the declared cooling capacity for bin Tj

The electric power input in thermostat-off mode, standby mode, crankcase heating mode and off-mode shall include the networked standby electric power input where applicable. The number of hours per mode to be used for the calculation of SEER are:

Table 23. Operational hours for fixed room air conditioners

Function	**Operational hours**				
	On-mode (equivalent active mode hours for cooling)	Thermostat Off mode	Standby mode	Off mode	Crankcase heater mode
	H_{CE} (cooling)	H_{TO}	H_{SB}	H_{off}	H_{CK}
Cooling only RAC	350	221	2142	5088	2363
Reversible RAC	350	221	2142	0	2363

The rated cooling capacity $P_{rated,c}$ and the sound power of fixed room air conditioners is established with the room air conditioner operating in the standard rating conditions as stated in Table 24.

Table 24. Standard rating conditions for fixed room air conditioners

Product (sub)group	**Inlet temperature dry(wet) bulb °C**		**Load condition**	**Parameters measured**
	Outdoor temperature (evaporator)	Indoor temperature (condensor)		
fixed RHP	35(24*)	27(19)	Maximum cooling output attainable in this condition	Pratedc (kW), sound power

17.2.2 Portable room air conditioners

This section describes the measurement and calculation methods for establishing the:

- rated cooling capacity & sound power level;
- seasonal room cooling efficiency;

of portable room air conditioners covered by this regulation.

The seasonal room cooling energy efficiency of portable room air conditioners is calculated as:

Equation 22

$$eta_{rc} = \frac{SEER}{CC} * \left(0{,}9 + 0{,}1 * \sum_{i}^{xii} F_{corr} \right)$$

Where
SEER is the seasonal coefficient of the portable room air conditioner
CC is the conversion efficiency, default 2,1
Fcorr(i-xii) is the summation of the applicable Fcorr values, using Table 30

The value for Fcorr is established in section 17.4.

The seasonal energy efficiency ratio (SEER) for portable RAC is established in accordance with the relevant standards identified in Annex IVa, noting that the measurement and calculation methods laid out in this document will prevail in case of discrepancies. The part load conditions for cooling as set out in Table 25, the reference design conditions as set out in Table 23 and European average heating season as set out in Table 24 shall be taken into account.

Table 25. Part load conditions for portable room air conditioners

Product (sub)group and test condition	Inlet temperature dry(wet) bulb °C		Load condition	Parameters established
	Outdoor temperature (condensor)	Indoor temperature (evaporator)		
Other portable room air conditioners				
maximum cooling capacity at 27ºC = Prated,c	27	27(19)	full load	Prated,c = Pdc(27;100%), EERd(27;100%) sound power
maximum cooling capacity at 35ºC	35	27 (19)	full load	Pdc(35;100%), EERd(35;100%)
if the unit is capable of variable capacity, a part load condition is added	27	27(19)	35% of full load	Pdc(27;33%), EERd(27;33%)

The value for Tdesign,c is stated in Table 23.

Table 23. Reference conditions for portable RAC

Function	Reference design temperature (°C) dry bulb (wet bulb)
	$T_{design,c}$
Cooling	35 (24)

The cooling season for portable RACs is:

Table 24. Cooling season (bins) for portable room air conditioners

Bin	Portable room air conditioners

j (#)	**Outdoor temperature** T_j (°C)	bin hours h_j (h/a)
1	17	(not used)
2	18	
3	19	
4	20	
5	21	
6	22	
7	23	218
8	24	197
9	25	178
10	26	158
11	27	137
12	28	109
13	29	88
14	30	63
15	31	39
16	32	31
17	33	24
18	34	17
19	35	13
20	36	9
21	37	4
22	38	3
23	39	1
24	40	0

The seasonal energy efficiency ratio (SEER) of portable room air conditioners is calculated as:

Equation 23

$$SEER = \frac{Q_C}{Q_{CE}}$$

Where
QC is reference annual cooling demand for portable RACs
QCE is the reference electricity consumption for cooling for portable RACs

The reference annual cooling demand Q_C for portable RACs is calculated as:

Equation 25

$$Q_C = \frac{10}{24} * \sum_{j=1}^{n} hj * Pc\_corr(Tj)$$

Where
Pc_corr(Tj) is the corrected cooling load at bin Tj
h(Tj) is the bin cooling hours at bin Tj from Table 19

The annual electricity consumption for cooling Q_{CE} for portable RACs is calculated as

Equation 26

$$Q_{CE} = \frac{Q_C}{SEERon} + (Pto * Hto) + (Psb * Hsb)$$

Where

Q_C	is the reference annual cooling demand QC for portable RACs
SEERon	is active mode seasonal energy efficiency ratio
Hto & Hsb	are the annual hours for respectively thermostat off-mode and standby-mode for cooling as provided in Table 23
Pto & Psb	is the power consumption for respectively thermostat off-mode and standby-mode for cooling.

Power consumption in thermostat-off mode and standby shall be established in accordance with the standards mentioned in Annex IVa. The electric power input in thermostat-off mode and standby mode shall include the networked standby electric power input where applicable.

The number of hours per mode to be used for calculation of SEER are:

Table 23. Operating hours for portable room air conditioners

Function	**Operational hours**	
	Thermostat Off mode H_{TO}	Standby mode H_{SB}
Portable room air conditioners		
Cooling only	218	750
Reversible	218	750

The active mode seasonal energy efficiency ratio (SEERon) of portable room air conditioners is calculated as:

Equation 24

$$SEERon = \frac{\sum_{j=1}^{n} hj * Pc(Tj)}{\sum_{j=1}^{n} hj * \left(\frac{Pc(Tj)}{EERbin(Tj)}\right)}$$

Where

Tj	is the bin temperature
j	is the bin number
hj	is the number of hours the bin at Tj occurs in a season
n	is the amount of bins per season
Pc(Tj)	is cooling load for the corresponding temperature Tj
EERbin(Tj)	is the EER value for the corresponding temperature Tj
Hto, Hsb	is the number of hours the unit works in thermostat-off mode and standby mode respectively
Pto, Psb	is the power consumption (kW) of the unit when in thermostat-off mode and standby mode respectively

The cooling load Pc(Tj) is calculated:

Equation 27

$$Pc(Tj) = P_{dc(27;100\%)} * \frac{Tj - 23}{35 - 23}$$

Where

Pc(Tj)	is the cooling load per bin;
Pdc(27;100%)	is the cooling capacity at full load

The bin specific energy efficiency ratio (EERbin(Tj)) is calculated for the EERd in the test conditions:

- for portable RACs with fixed capacity as:

Equation 32 $$\boldsymbol{EER_{bin}(Tj) = EER_d(Tj) * \left(1 - Cdc * \left(1 - CR(Tj)\right)\right)}$$

- for portable RACs with variable capacity, for Tj where CR $\geq$ 0,33 as:

Equation 33 $$\boldsymbol{EER_{bin}(Tj) = EER_d(Tj) * \left(1 + PLc * \left(1 - CR(Tj)\right)\right)}$$

- and for portable RACs with variable capacity, for Tj where CR < 0,33 as:

Equation 34 $$\boldsymbol{EER_{bin}(Tj) = EER_d(Tj) * \left(1 + PLc * (1 - 0,33)\right) * \left(1 - Cdc * \left(1 - \frac{CR(Tj)}{0,33}\right)\right)}$$

The capacity ratio for cooling CRc is calculated as:

Equation 35

$$CRc(Tj) = \frac{P_c(Tj)}{P_{dc}(Tj)}, with\ minimum\ 0\ and\ maximum\ 1$$

Where
Pc(Tj) is the cooling load per bin;
Pdc(Tj) is the declared cooling capacity per bin

The declared cooling capacity Pdc(Tj) is calculated for each bin:

Equation 34

$$\boldsymbol{Pdc_{corr}(Tj) = Pdc(27;100\%) + \frac{Pdc(35;100\%) - Pdc(27;100\%)}{8} \times (Tj - 27)}$$

Where
Tj is the outdoor temperature, in °C
Pdc(27;100%) is maximum cooling capacity for Tj = 27 °C, in kW (equal to Prated,c)
Pdc(35;100%) is the maximum cooling capacity for for Tj = 35 °C, in kW

The part load coefficient PLc for portable RAC with variable capacity is calculated as:

$$PL_c = \frac{EER(27;33\%) - EER(27;100\%)}{EER(27;100\%)} * \frac{P_{dc}(27;100\%)}{P_{dc}(27;100\%) - P_{dc}(27;33\%)}$$

Where:
EERd(27;33%) is the energy efficiency at the part load condition at 27ºC outdoor temperature and 33% of maximum cooling capacity
EERd(27;100%) is the energy efficiency at 27ºC outdoor temperature and maximum cooling capacity
Pdc(27;33%) is the cooling capacity at the part load condition at 27ºC outdoor temperature and of 33% of maximum cooling capacity
Pdc(27;100%) is the maximum cooling capacity at 27ºC outdoor temperature

The energy efficiency ratio EERd(Tj) for bins that are not test conditions is calculated as:

$$EERd(Tj) = EER(27;100) + \frac{(EERd(35;100) - EERrated)}{8} \times (Tj - 27\,°C)$$

The cooling load Pc(Tj) for portable RACs is calculated for each bin as:

Equation 27

$$Pc(Tj) = P_{dc(27;100\%)} * \frac{Tj - 23}{35 - 23}$$

Where
Pc(Tj) is the building load per bin (if plotted for all bins in the season it forms a curve);
Pdc(27;100%) is the declared cooling capacity at Tj=27ºC and the compressors runs at maximum load.

The corrected declared cooling capacity Pdc_corr(Tj) is calculated differently for other portable RACs and single duct RACs.

The rated cooling capacity $P_{rated,c}$ and the sound power of other portable and single duct room air conditioners is established with the room air conditioner operating in the standard rating conditions as stated in .

Table 27. Standard rating conditions for other portable and single duct room air conditioners

Product (sub)group	**Inlet temperature dry(wet) bulb** °C		**Load condition**	**Parameters measured**
	Outdoor temperature (condenser)	**Indoor temperature (evaporator)**		
single duct (SD)	27(19)	27(19)	Maximum cooling output attainable in this condition	Pratedc (kW), sound power, infiltration air flow rate
portable double duct (DD)	27(19)	27(19)	Maximum cooling output attainable in this condition	Pratedc (kW), sound power

17.2.3 Single duct RACs

This section describes the measurement and calculation methods for establishing the:

- rated cooling capacity & sound power level;
- seasonal room cooling efficiency;

of single duct room air conditioners covered by this regulation.

The seasonal room cooling energy efficiency of single duct room air conditioners is calculated as:

Equation 22

$$eta_{rc} = \frac{SEER}{CC} * \left(0{,}9 + 0{,}1 * \sum_{i}^{xii} F_{corr} \right)$$

Where
SEER is the seasonal coefficient of the portable room air conditioner
CC is the conversion efficiency, default 2,1
Fcorr(i-xii) is the summation of the applicable Fcorr values, using Table 30

The value for Fcorr is established in section 17.4.

The seasonal energy efficiency ratio (SEER) for portable RAC is established in accordance with the relevant standards identified in Annex IVa, noting that the measurement and calculation methods laid out in this document will prevail in case of discrepancies. The part load conditions for cooling as set out in xx, the reference design conditions as set out in xx and European average heating season as set out in xx shall be taken into account.

Table 25. Part load conditions for portable room air conditioners

Product (sub)group and test condition	**Inlet temperature dry(wet) bulb °C**		**Load condition**	**Parameters established**
	Outdoor temperature (condensor)	Indoor temperature (evaporator)		
Single duct room air conditioners				
Maximum cooling capacity Prated,c	27	27(19)	full load	Prated,c = Pdc(27;100%), EERd(27;100%) sound power
if the unit is capable of variable capacity, a part load condition is added	27	27(19)	33% of full load	Pdc(27;33%), EERd(27;33%)

The cooling season for portable RACs is:

Table 24. Cooling season (bins) for portable room air conditioners

Bin j (#)	**Outdoor temperature** T_j (°C)	**Portable room air conditioners** bin hours h_j (h/a)
1	17	(not used)
2	18	
3	19	
4	20	
5	21	
6	22	
7	23	218
8	24	197
9	25	178
10	26	158
11	27	137
12	28	109
13	29	88
14	30	63
15	31	39
16	32	31
17	33	24
18	34	17
19	35	13
20	36	9

21	37	4
22	38	3
23	39	1
24	40	0

The seasonal energy efficiency ratio (SEER) of single duct room air conditioners is calculated as:

Equation 23

$$SEER = \frac{Q_C}{Q_{CE}}$$

Where
Q_C is reference annual cooling demand for single duct RACs
Q_{CE} is the reference electricity consumption for cooling for single duct RACs

The reference annual cooling demand Q_C for single duct RACs is calculated as:

Equation 25

$$Q_C = \frac{10}{24} * \sum_{j=1}^{n} hj * Pc\_corr(Tj)$$

Where
Pc_corr(Tj) is the corrected cooling load at bin Tj
h(Tj) is the bin cooling hours at bin Tj from Table 19

The annual electricity consumption for cooling Q_{CE} for portable RACs is calculated as

Equation 26

$$Q_{CE} = \frac{Q_C}{SEERon} + (Pto * Hto) + (Psb * Hsb)$$

Where
Q_C is the reference annual cooling demand QC for portable RACs
SEERon is active mode seasonal energy efficiency ratio
Hto & Hsb are the annual hours for respectively thermostat off-mode and standby-mode for cooling as provided in Table 23
Pto & Psb is the power consumption for respectively thermostat off-mode and standby-mode for cooling.

Power consumption in thermostat-off mode and standby shall be established in accordance with the standards mentioned in Annex IVa. The electric power input in thermostat-off mode and standby mode shall include the networked standby electric power input where applicable.

The number of hours per mode to be used for calculation of SEER are:

Table 23. Operating hours for portable room air conditioners

Function	**Operational hours**	
	Thermostat Off mode H_{TO}	Standby mode H_{SB}
Portable room air conditioners		
Cooling only	91	750
Reversible	91	750

The active mode seasonal energy efficiency ratio (SEERon) of single duct room air conditioners is calculated as:

Equation 24

$$SEERon = \frac{\sum_{j=1}^{n} hj * Pc\_corr(Tj)}{\sum_{j=1}^{n} hj * \left(\frac{Pc\_corr(Tj)}{EERbin(Tj)}\right)}$$

Where

Tj	is the bin temperature
j	is the bin number
hj	is the number of hours the bin at Tj occurs in a season
n	is the amount of bins per season
Pc_corr(Tj)	is corrected cooling load for the corresponding temperature Tj
EERbin(Tj)	is the EER value for the corresponding temperature Tj
Hto, Hsb	is the number of hours the unit works in thermostat-off mode and standby mode respectively
Pto, Psb	is the power consumption (kW) of the unit when in thermostat-off mode and standby mode respectively

The corrected cooling load Pc_corr(Tj) is calculated:

- For $T_j \leq$ Teq_SD as:

Equation 25 $\boldsymbol{P_{c\_corr(Tj)} = BLc(Tj)}$

- For $T_j >$ Teq_SD as:

Equation 26 $\boldsymbol{P_{c\_corr(Tj)} = P_{dc\_corr(Tj)}}$

The cooling load Pc for single duct foom air conditioners is established

for Tj < Teq as:

Equation 43

$$P_c(Tj) = P_{c(27;100\%)} * \frac{Tj - 23}{35 - 23}$$

Where

Pdc(27;100%)	is the cooling capacity at full load

for Tj ≥ Teq. the cooling load Pc(Tj) equals the cooling capacity at Tj equal to the equilibrium temperature (this means the set indoor temperature will not be maintained anymore):

Equation 43

$$P_c(Tj) = P_{dc\_corr}(Teq.)$$

Where

P_{dc_corr}(Teq.)	is the corrected cooling capacity at Tj equals Teq.

The equilibrium temperature for single duct room air conditioners (Teq_SD) is the temperature where the building load curve BLc(Tj) intersects with the corrected capacity Pdc_corr(Tj) and is calculated as:

Equation 28

$$T_{eq\_SD} = \frac{P_{dc(27,100\%)} + \left(AF * 19.96 * \frac{27}{35 - 27}\right) + \left(P_{dc(27,100\%)} * \frac{23}{35 - 23}\right)}{\frac{P_{dc(27,100\%)}}{35 - 23} + \frac{INF_{35;27}}{35 - 23}}$$

where:

Tj the outdoor temperature in °C

AF the infiltration air flow rate, expressed in m³/s

19,96 is the difference in result of rho_air35*spec.enth35 - rho_air27*spec.enth27, with values respectively (1,15*72,5 - 1,17*54,2):

- rhoair27 density of air at 27 °C, equal to 1,17 kg/m³;
- rhoair35 density of air at 35 °C, equal to 1,15 kg/m³;
- h27 the specific enthalpy of infiltration air at 27 °C dry bulb and 19 °C wet bulb temperature per kg dry air, equal to 54,2 kJ/kgda;
- h35 the specific enthalpy of infiltration air at 35 °C dry bulb and 24 °C wet bulb temperature per kg dry air, equal to 72,5 kJ/kgda.

The corrected cooling capacity for single duct room air conditioners for bins corresponding to outdoor temperature Tj is calculated for each bin as:

Equation 47

$$P_{dc_{corr}}(Tj) = P_{dc(27,100\%)} + P_{inf,c}(Tj)$$

Where:

$P_{dc(27,100\%)}$ is the maximum cooling capacity at Tj = 27 °C, equal to P_{ratedc} for single duct RACs, in kW

$P_{inf,c}(Tj)$ is the infiltration loss for cooling, in kW

The infiltration loss for cooling $P_{inf,c}(Tj)$ is calculated:

- for outdoor temperatures Tj ≤ 27 °C as:

Equation 30

$$P_{inf,c}(Tj) = \frac{(27 - Tj)}{(27 - 20)} \times \mathrm{AF} \times 12.77$$

where:

Tj the outdoor temperature in °C

AF the infiltration air flow rate, expressed in m³/s

12.77 is the difference in result of rho_air27*spec.enth27 - rho_air20*spec.enth20, with values respectively (1,17*54,2 - 1,20*42,2):

- rhoair20 density of air at 20 °C, equal to 1,20 kg/m³;
- rhoair27 density of air at 27 °C, equal to 1,17 kg/m³;
- h20 the specific enthalpy of infiltration air at 20 °C dry bulb and 15 °C wet bulb temperature per kg dry air, equal to 42,2 kJ/kgda;
- h27 the specific enthalpy of infiltration air at 27 °C dry bulb and 19 °C wet bulb temperature per kg dry air, equal to 54,2 kJ/kgda;

- for outdoor temperatures Tj > 27 °C as:

Equation 31

$$P_{inf,c}(Tj) = \frac{(27 - Tj)}{(35 - 27)} \times \mathrm{AF} \times 19{,}96$$

where:

Tj the outdoor temperature in °C

AF the infiltration air flow rate, expressed in m³/s

19,96 is the difference in result of rho_air35*spec.enth35 - rho_air27*spec.enth27, with values respectively (1,15*72,5 - 1,17*54,2):

- rhoair27 density of air at 27 °C, equal to 1,17 kg/m³;
- rhoair35 density of air at 35 °C, equal to 1,15 kg/m³;
- h27 the specific enthalpy of infiltration air at 27 °C dry bulb and 19 °C wet bulb temperature per kg dry air, equal to 54,2 kJ/kgda;
- h35 the specific enthalpy of infiltration air at 35 °C dry bulb and 24 °C wet bulb temperature per kg dry air, equal to 72,5 kJ/kgda

The EERbin(Tj) is calculated for each bin:

- for fixed capacity single duct RACs as:

Equation 32 $$EER_{bin}(Tj) = EER_{corr}(Tj) * \left(1 - Cdc * \left(1 - min(CR(Tj); 1)\right)\right)$$

- for variable capacity single ducts with CR ≥ 0,33 as:

Equation 33 $$EER_{bin}(Tj) = EER_{corr}(Tj) * \left(1 + PLc * \left(1 - min(CR(Tj); 1)\right)\right)$$

- and for variable capacity single ducts with CR < 0,33 as:

Equation 34 $$EER_{bin}(Tj) = EER_{corr}(Tj) * \left(1 + PLc * \left(1 - 0,33\right)\right) * \left(1 - Cdc * \left(1 - \frac{min(CR(Tj);1)}{0,33}\right)\right)$$

Where:

EERcorr(Tj)	is the corrected energy efficiency ratio for outdoor condition Tj
Cdc	is the cycling degradation factor for cooling, either measured or default 0.25
CR(Tj)	is the capacity ratio for outdoor condition Tj
PLc	is the part load correction for cooling

The corrected energy efficiency ratio EER_{corr}(Tj) is calculated:

- for Tj ≤ Teq. as:

Equation 32 $$EER_{corr}(Tj) = P_{dc\_corr}(Tj) * \frac{EER_{(27;100\%)}}{P_{(27;100\%)}}$$

Where:

Pdc_corr(Tj)	is the corrected cooling capacity at outdoor condition Tj
$P_{dc(27,100\%)}$	is the maximum cooling capacity at Tj = 27 °C, equal to P_{ratedc} for single duct RACs, in kW
$EERd_{(27;100\%)}$	is the energy efficiency ratio at Tj = 27 °C and maximum cooling capacity

- for Tj > Teq. as:

Equation 33 $$EER_{corr}(Tj) = P_{dc_{corr}}(Teq) * \frac{EER_{(27;100\%)}}{P_{(27;100\%)}}$$

Where:

Pdc_corr(Teq.)	is the corrected cooling capacity at Tj is Teq.
$P_{dc(27,100\%)}$	is the maximum cooling capacity at Tj = 27 °C, equal to P_{ratedc} for single duct RACs, in kW
$EERd_{(27;100\%)}$	is the energy efficiency ration at Tj = 27 °C and maximum cooling capacity

The capacity ratio for cooling CRc(Tj) is calculated as:

Equation 35

$$CRc(Tj) = \frac{P_c(Tj)}{P_{dc\_corr}(Tj)}, with\ minimum\ 0\ and\ maximum\ 1$$

Where

Pc(Tj)	is the cooling load per bin;
Pdc_corr(Tj)	is the declared cooling capacity per bin

The part load coefficient PLc is calculated as:

$$PL_c = \frac{EER(27;33\%) - EER(27;100\%)}{EER(27;100\%)} * \frac{P_{dc}(27;100\%)}{P_{dc}(27;100\%) - P_{dc}(27;33\%)}$$

Where:

$EERd_{(27;33\%)}$	is the energy efficiency ratio at Tj = 27 °C and 33% of the maximum cooling capacity

$EERd_{(27;100\%)}$ is the energy efficiency ratio at Tj = 27 °C and maximum cooling capacity
$Pdc_{(27;33\%)}$ is the cooling capacity at Tj = 27 °C and 33% of the maximum cooling capacity
$Pdc_{(27;100\%)}$ is the cooling capacity at Tj = 27 °C and maximum cooling capacity

17.3 Comfort fans

The test shall be carried out at an ambient temperature of 20 °C;

The rated voltage and the rated frequency shall be used for the test. If the fan is specified for two or more distinct rated voltages, the tests shall be carried out at the most unfavourable voltage. When a rated voltage range is given, the test voltage shall be:

- the highest and the lowest values of the range when the voltage range is in excess of 10 % of the mean of the range;
- the mean of the upper and lower limits when the voltage range is 10 % or less of the mean of the range.

For a fan with a range of frequencies, the tests shall be made at the frequency which gives the most unfavourable results;

The fan is set at maximum speed, with the oscillating mechanism (if any) turned 'off'. The maximum flow rate is calculated by summing the maximum air flow rates established at measurement points that are positioned at incrementing distances from the vertical axis of the fan. See for the starting position and increments.

The maximum flow rate at each distance is calculated by multiplying the air velocity measured at maximum speed at each distance by the surface area of the annulus, with radius in , over which is measured;

Air velocity measurements start at the initial position, as set out in . From that position, measurements shall be done in increments along a horizontal line until the air velocity falls below 24 m/min for ceiling fans or 9 m/min for other comfort fans;

Table 29. Air velocity readings for determining the maximum air flow of comfort fans and maximum air velocity

Type comfort fan	Start position (mm)	Increment step (mm) along semi-diagonal of test chamber	Increment impeller radius / annulus (mm)	Air velocity limit (m^3/min)
Ceiling fans	40 mm from axis of fan blades	80 mm	80 mm	9
Other fans	20 mm from the vertical axis	40	40	24

The maximum fan power input is measured with capacitors (if any) retained in the circuit, and with the oscillating mechanism 'on', and with other electric or electronic circuitry required or allowing control over the fan air flow turned 'on' (this can include remote control, thermostat functions, etc.). Functions that are not related to control of fan flow rate such as lighting, music, etc. can be turned 'off'.

The service value SV in (m^3/min)/W for comfort fans shall be calculated as follows:

Equation 43

$$SV = \frac{F}{PF}$$

where
F is the maximum fan flow rate in m^3/min;

P_{fan} is the fan power input at maximum flow, in W;

For electric power in stand-by (Psb) and off-mode (P_{off}) the same testing methods apply as for room heat pumps.

The seasonal comfort fan efficiency (eta_{cf}) is calculated as the product of the service value and the sum of the applicable correction factors F_{corr}:

Equation 44

$$seasonal\ comfort\ fan\ efficiency\ =\ SV * \left(0{,}9 + 0{,}1 * \sum_{i}^{xii} F_{corr}\right) * F_{aux}$$

The correction for auxiliary comfort fan electricity consumption F_{aux} is calculated as:

Equation 45

$$F_{aux} = \frac{1}{1 + \left(\frac{1{,}3 *\ el_{sb}}{P_{fan}}\right)}$$

Where:
el_{sb} is the standby power input of the comfort fan, in W,
P_{fan} is the nominal fan power input at maximum flow, in W

17.4 Correction factors

For the models within the scope of this regulation the standard efficiencies shall be corrected by a control correction factor Fcorr, which is based upon the sum of the corrections for each control feature, where applicable.

Table 30. Corrections for control features

Control factor to sum for Fcorr	Product (sub)group, values in percentage points							
	fuel fired room heater	electric room heater (ERH)			room heat pump and/or room air conditioner			comfort fan
		standard ERH	storage ERH	under-floor ERH	single duct	portable split/dd	fixed	
i. multiple output levels	20%	20%	15%	20%	--	--	--	40%
ii. modulating output	20%	15%	--	10%	--	--	--	--
iii. charge limiter	--	--	10%	--	--	--	--	--
iv. weather dependent charging	--	--	10%	--	--	--	--	--
v. basic room temperature control	20%	15%	20%	15%	25%	25%	25%	--
vi. programmable room temperature control	10%	15%	15%	30%	15%	30%	30%	--
vii. working time limiter	10%	15%	10%	10%	25%	10%	10%	20%
viii. room temperature controlled fan air flow rate	--	--	--	--	--	--	--	20%
ix. presence detection	10%	10%	10%	--	20%	20%	20%	20%
x. open window detection	10%	10%	10%	--	15%	15%	15%	--
xi. black bulb sensor	20%	15%	20%	15%	-	-	-	--
Maximum score (Fcorr)	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

17.5 Sound power level

17.5.1 For room air conditioners and room heat pumps

The indoor and/or outdoor sound power levels shall be established with the unit operating in standard rating conditions established in this document (this may be a test mode as long as fan and compressor frequencies are identical to the frequencies applied in standard rating conditions).

The **indoor** sound power stated on the label and product information sheet shall either be the noise radiated by the inlet and outlet and the casing, the noise radiated by the unit, or the noise radiated by the unit inlet and outlet openings on the indoor-side.

The **outdoor** sound power stated on the label and product information sheet shall either be the noise radiated by the inlet and outlet and the casing, or the noise radiated by the unit inlet and outlet openings on the outdoor-side.

Measurement and calculation methods other than described above shall be in accordance with the test standard for indoor and outdoor sound power levels identified in Annex IV.

17.5.2 For fuel fired or electric room heaters and comfort fans

While establishing the sound power level of room heaters that are not room heat pumps the sound power shall be declared for the room heater providing the nominal heat output.

For comfort fans the operating condition shall be the maximum speed.

18 ANNEX IVa - Transitional methods

Product group - Parameter	**Reference of test standard/clause**	**Notes**

18.1 Solid fuel fired room heaters

- nominal efficiency (at nominal heat output) - part load efficiency (at minimum heat output, if applicable)	if pellet fired: EN 14785:2006 § 6.4.2, A.4.7 & A.4.8 if slow heat release: EN 15250:2007-06 § 6.3, A.4.6 & A.5 & A.6.2.2 if not pellet-fired or slow heat release: EN 16510-1:2013 § 7.3, A.6.2	
- nominal heat output - minimum heat output	pellet-fired: EN 14785:2006 § 6.5, A.4.7 & A.4.8 slow heat release: EN 15250:2007-06 § 6.3 & A.6.2.2 other: EN 16510-1:2013 A.4.7 & A.4.8	Pnom corresponds to PN in EN 16510-1:2013. Pmin corresponds to reduced heat output in EN 16510-1:2013. Pmin corresponds to reduced heat output in EN 14785:2006. Pnom corresponds to P in EN 15250:2007. Pmin is not described in EN 15250:2007, but shall be established (if applicable) in a similar way as the nominal heat output
- direct heat output -	EN 14785:2006, A 6.2.4 EN 15250:2007, A.6.2.2 EN 16510-1:2013, A.6.2.4	
- indirect heat output	EN 14785:2006 A.6.2.3 EN 16510-1:2013 A.6.2.3	For slow heat release stoves no heat output to water calculation is presented. In case the appliances do have such output, the measurement and calculation methods of prEN16510-1 shall be used.
- Electrical power consumption at nominal heat output, elmax	EN 15456:2008-06 § 3.4.1 & § 5.1.3.1	Corresponds to Paux 100. EN16510-1 requires 'electrical auxiliary energy, in W, if applicable' to be shown on the appliance marking, but no methods to establish this has been provided. The principal EN15456 shall be used.
- Electrical power consumption at minimum heat output, elmin	EN 15456:2008-06 § 3.4.1 & § 5.1.3.	As minimum heat output shall be used the minimum output as declared by the manufacturer of the appliances. Corresponds to Paux,30.
- Electrical power consumption in standby mode, elsb	EN 15456:2008-06 § 3.4.1 & § 5.1.3.3 or IEC 62301 Ed. 2.0 b:2011 § 5.3	Corresponds to Paux sb Corresponds to power consumption in standby mode in IEC 62301 Ed. 2.0: 2011.

- Emissions of particulate matter (PM)	for measurement according (heated filter) EN 16510-1:2013, G.2	
- Emissions of organic gaseous compounds (OGC)	CEN EN 16510-1:2013, F.4	
- Emissions of carbon monoxide (CO)	CEN EN 16510-1:2013 A.4.4.2 and A.6.2.6	
- Emissions of nitrogen oxides (NOx)	CEN EN 16510-1:2013 Annex E.5	
- Test fuel specifications	CEN prEN 16510-1:2013 Annex B	
- Sound power (dB(A))	ISO 3746	If sound pressure is measured, sound power can be approximated using the "measurement surface envelope" method defined in the ISO 3746 method

18.2 Gas fired room heaters

- Direct heat output	EN 613:2000 EN 1266:2002 § 3.5.1.3 & § 3.5.1.4 and § 7.12. EN 13278:2013 Open fronted gas-fired independent space heaters § 6.3 & § 6.12 & § 7.12 & § 7.3.1 EN 449:2002+A1:2007	This is the heat output to the space the product is installed in. Corresponds to Qout in EN 1319:2009 and EN 1266:2002 and EN 13278:2013 and shall be calculated with the equation Qout = QN * ηN, where QN is the nominal heat input and ηN is the nominal efficiency. Qout shall be calculated as gross calorific value
- Indirect heat output	See remark	The indirect heat output of gas fired local space heaters is not described in EN standards. For the purpose of declaration and verification the principles as applied in EN 15610-1 may be used
- nominal efficiency - part load efficiency	prEN 613:2000 § 7.11.2 EN 1266:2002 § 6.12 & § 7.12 EN 13278:2013 § 6.12 & § 7.12	EN 613 ηth, nom and ηth, min shall be calculated as η in conditions applicable to the nominal and minimum heat output, if relevant. ηth, nom corresponds to η if determined with nominal heat input. ηth, min corresponds to η if determined with minimum heat input in EN 1266:2002 and EN 13278:2013. All values shall be based on net calorific value
- Nominal heat output - minimum heat output	prEN 613:2000 EN 1266:2002 § 6.3.1 & § 7.3.1 and § 6.12 & § 7.12 EN 13278:2013 § 6.3.1 & § 7.3.1 EN 449:2202+A1:2007	EN 613 Pnom shall be determined as Pnom = Qn * η applicable to nominal output conditions. For Qn see § 7.3.1. Pmin shall be determined as Pmin = Qmin * η for minimum output conditions. For Qmin see § 7.3.5. P nom shall be determined with Pnom = Qn * ηth nom and Pmin shall be determined with Pmin = Qm * ηth, min. in EN 1266:2002 and EN 13278:2013. All values shall be based on net calorific value.
- Electrical power consumption at nominal heat output, elmax	EN15456:2008 06: § 3.4.1	elmax corresponds to Paux 100 in EN15456:2008, measured at nominal load operation.

- Electrical power consumption at minimum heat output, elmin	EN15456:2008 06: § 3.4.1	elmin corresponds to Paux 30, measured at an applicable part load operation
- Electrical power consumption in standby mode, elsb	EN15456:2008-06: § 3.4.1 or IEC 62301 Ed. 2.0 b:2011 § 5.3	elsb corresponds to either Paux sb in EN15456:2008 or to the power consumption in standby mode in IEC 62301 Ed. 2.0: 2011
- Emissions of nitrogen oxides (NOx)	prEN 613:2000 § 7.7.4 EN 1266:2002 § 6.7.2 & § 7.7.4 and Annex G EN 13278:2013 § 6.7.2 & § 7.7.4 and Annex H	prEN61, EN1266 and EN13278 establish NOx emissions as weighted values over full-modulating-minimum load conditions. For declaration and verification purposes the emission at full load NOx(max) applies
- permanent ignition device fuel input	according EN1266:2002, § 7.3.1	prEN613 and EN13278 do not have a clause that describes how to calculate the heat input of the ignition device

18.3 Oil fired room heaters

- Direct heat output	EN 1:1998§ 6.6.2 EN 13842:2000: § 6.3 and § 6.6	The direct heat output is the heat capacity according EN 1:1998§ 6.6.2 In EN 13842 the direct heat output can be calculated as: Q0 * (1-qA) All values shall be based on net calorific value.
- Indirect heat output		The indirect heat output of liquid fuel fired local space heaters is not described in EN standards. For the purpose of declaration and verification the principles as applied in EN 15610-1 may be used
- nominal efficiency - part load efficiency	EN 1:1998 § 6.6.1.2 EN 13842: § 6.6.	Following EN 1:1998 ηth, nom corresponds to η at maximum oil flow rate, ηth, min shall be determined as η at minimum oil flow rate. Following EN 13842 ηth, nom shall be calculated as ηth, nom = 1-qa, with qa measured at nominal heat input or at minimum heat input (where applicable). All values shall be based on net calorific value.
- Nominal heat output - minimum heat output	EN 1:1998-05 § 6.6.2 EN 13842:2000: § 6.3 and § 6.6.	Following EN 1:1998 Pnom corresponds to P at maximum (is nominal) and minimum oil flow rate. Following EN 13842 the nominal heat output can be calculated as: Q0 * (1-qA) for nominal and minimum heat output conditions
- Electrical power consumption at nominal heat output, elmax	EN15456:2008-06 Heating boilers. Electrical power consumption for heat generators. System boundaries. Measurements, § 3.4.1. & § 5.1.3.1	elmax corresponds to Paux 100 in EN15456:2008
- Electrical power consumption at	EN15456:2008-06, § 3.4.1. & § 5.1.3.2	Corresponds to auxiliary power requirement Paux 30 in EN15456:2008

	minimum heat output, elmin		
-	Electrical power consumption in standby mode, elsb	EN15456:2008, § 3.4.1. & § 5.1.3.2. or IEC 62301 Ed. 2.0 b:2011§ 5.3	Corresponds to Paux sb in EN15456:2008 electrical power consumption Paux Corresponds to power consumption in standby mode in IEC 62301 Ed. 2.0: 2011.
-	Emissions of nitrogen oxides (NOx)	EN 1:1998 § 6.6.4	EN 13842 does not describe NOx measurement, although § 5.3.2 sets a maximum requirement. For declaration and verification the method according EN 1 shall be used
-	permanent ignition device fuel input	EN1266:2002, § 7.3.1	For declaration and verification of such a power requirement the method as in EN1266:2002, § 7.3.1 shall be used

18.4 Electric room heaters

-	Nominal heat output (Pnom)	(see Note) for conventional and underfloor electric heaters: IEC/EN 60675 ed 2.1; 1998 § 16 for electric storage heaters: IEC/EN 60531:1999 § 9	The identification of the nominal heat output is not measured in standards. The electric power input at nominal heat output is considered representative for the nominal heat output. Pnom corresponds to the following applicable standards: IEC/EN 60335-1: Household and similar electrical appliances — safety — rated voltage: 250 V for single-phase appliances, up to 480 V for others, not intended for appliances for domestic use as usual. IEC/EN 60335-2-30: Household and similar electrical appliances — safety — particular requirements for room heaters IEC/EN 60335-2-61: Household and similar electrical appliances — safety — particular requirements for thermal storage room heaters. IEC/EN 60531:1991. Household electric thermal storage room heaters — methods for measuring performance IEC/EN 60335-2-96: Household and similar electrical appliances — safety — particular requirements for flexible sheet heating elements for room heating. IEC/EN 60335-2-106: Household and similar electrical appliances — safety — particular requirements for heated carpets and for heating units for room heating
-	Electrical power consumption in standby mode, elsb	IEC 62301 Ed. 2.0 b:2011§ 5.3	Corresponds to power consumption in standby mode in IEC 62301 Ed. 2.0: 2011.

18.5 Room heat pumps

- Pratedh	EN 14511-3:2018, Clause 4.4.4 insofar compliant with the approach laid down in this regulation	The calculation methods, and the underlying measurement methods based on EN 14511-3:2018 can be applied but the conditions and adaptations to calculation methods as laid down in this regulation shall be observed
- Pdesignh	This document, see remarks right	for fixed RHP and portable split/dd: Pdesignh is declared by the supplier; for single duct: The supplier declares the Tol for the model. If Tol≤ Tdesign: Pdesignh = Pratedh + elbu(Tj = Tdesignh); If Tol > Tdesignh: Pdesignh = elbu(Tj = Tdesignh).
- plh(Tj)	EN 14528:2016, Clause 7.5	plh(Tj) = (Tj-16)/(Tdesign-16)
- Ph(Tj)	EN 14528:2016, Clause 7.5	Ph(Tj) = plh(Tj)*Pdesignh (for the heating season the unit is marketed for)
- Pdh	EN 14511-3:2018	As established for the part load conditions described in this document
- outdoor air flow rate	EN 14511-3:2018, Clause 6 and Annex I, as used for establishing the Pratedh, Pdh, COPd and noise in the relevant conditions	The outdoor volume air flow rate shall be declared for SD by the supplier for the standard rating condition and the part load condition as desribed in this regulation and declared by the supplier in this regulation.
- Pinfh	This document	See Annex IV Measurement & calculation methods
- elbu(max)	This document	This is the maximum electric input power when providing heating. The value is declared by the supplier. For SD the backup heater shall be incorporated in the product in case Tol is declared to be higher than Tdesign
- elbu(Tj)	This document	This is the backup electric input power calculated for a heat load of a bin
- COPd	EN 14511-3:2018	
- COPbin	This document	See Annex IV Measurement & calculation methods
- Cdh	EN 14511-3:2018, Clause 8.4.3 or this document	The supplier shall either declare the Cdh as established through testing or use the defualt value provided by this regulation
- SCOP	EN 14825:2018 Clause 7.2 - calculation of SCOP, insofar compliant with the approach laid down in this regulation	The calculation methods, and the underlying measurement methods based on the series EN 14511-1:2018 to EN 14511-4:2018, can be applied but the conditions and adaptations to calculation methods as laid down in this regulation shall be observed, in particular for SD units as the approach and methods to calculate the SCOP for these units deviates from EN 14825:2018

- eta_rh	This document	Note that the seasonal room heating energy efficiency deviates from the calculation method descrbed in EN 14825:2018 for RHPs.
- Pto	EN 14825:2016, Clause 9.1	
- Psb	EN 14825:2016, Clause 9.2	
- Pck	EN 14825:2016, Clause 9.3	
- P_{off}	EN 14825:2016, Clause 9.4	
- Sound power	EN 12102-1:2017 Chapter 7	The unit shall be tested (can be a test mode) using the same fan and compressor frequencies as applied when establishing the rated capacity (Pratedh). Annex A, Clause A.4 for variable speed units shall be disregarded as the rated capacity to be observed is established with the unit running at its highest heat output and not a lower part load condition declared for bin Tj = +7 °C (as stated in Clause A.4). The indoor sound power stated on the label and product information sheet shall either be the noise radiated by the inlet and outlet and the casing ('1'), the noise radiated by the unit ('3'), or the noise radiated by the unit inlet and outlet openings ('4') on the indoor-side, whichever applies and is highest. The outdoor sound power stated on the label and product information sheet shall either be the noise radiated by the inlet and outlet and the casing ('1'), or the noise radiated by the unit inlet and outlet openings ('2') on the outdoor-side, whichever applies and is highest.

18.6 Room air conditioners

- Pratedc	EN 14511-3:2018, Clause 4.4.4 insofar compliant with the approach laid down in this regulation	The calculation methods, and the underlying measurement methods based on EN 14511-3:2018 can be applied but the conditions and adaptations to calculation methods as laid down in this regulation shall be observed
- Pdesignc	This document	Pdesignc equals the rated cooling capacity
- Pc(Tj) = BLc(Tj)	EN 14825:2016, Clause 7.5	Pc(Tj) = BLc(Tj)*Pdesignc
- Pdc	EN 14511-3:2018	As established for the part load conditions described in this document
- Pinfc	This document	See Annex IV Measurement & calculation methods
- outdoor air flow rate	EN 14511-3:2018, Clause 6 and Annex I, as used for establishing the Pratedc, Pdc, EERd and noise in the relevant conditions	The outdoor air flow rate shall be declared for SD by the supplier for the standard rating condition and the part load condition as desribed in this regulation and declared by the supplier in this regulation.
- energy efficiency ration, EERd(Tj)	EN 14511-3:2018	
- SEER	EN 14825:2018	

- Pto	EN 14825:2016, Clause 9.1	
- Psb	EN 14825:2016, Clause 9.2	
- Pck	EN 14825:2016, Clause 9.3	
- P_{off}	EN 14825:2016, Clause 9.4	
- Sound power	EN 12102-1:2017 Chapter 7	The unit shall be tested (can be a test mode) using the same fan and compressor frequencies as applied when establishing the rated capacity (Pratedh). Annex A, Clause A.4 for variable speed units shall be disregarded as the rated capacity to be observed is established with the unit running at its highest heat output and not a lower part load condition declared for bin Tj = +7 °C (as stated in Clause A.4). The indoor sound power stated on the label and product information sheet shall either be the noise radiated by the inlet and outlet and the casing ('1'), the noise radiated by the unit ('3'), or the noise radiated by the unit inlet and outlet openings ('4') on the indoor-side, whichever applies and is highest. The outdoor sound power stated on the label and product information sheet shall either be the noise radiated by the inlet and outlet and the casing ('1'), or the noise radiated by the unit inlet and outlet openings ('2') on the outdoor-side, whichever applies and is highest. (numbers relate to possible sources of sound, depending on type of model)

18.7 Comfort fans

- Fan flow rate	IEC 60879:2019, Clause 5.2.2.5 & 5.2.2.7	Nominal air flow rate
- fan power input	IEC 60879:2019, Clause 5.4	
- fan diameter	See remark	This is the sweep size of the fan rotor (the outer diameter of the circal in which the fan blades rotte). For tower and bladeless fans it calculated as the circumference of the fan outlet or nozzle divided by 3.14, according definition 3.20 of IEC 60879:2019
- Service value	See regulation text, Annex IV on comfort fans	
- electric power in stand-by (PSB)	IEC 60879:2019, Clause 5.6	
- comfort fan sound power	IEC 60704-2-7:2020-1	Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-7: Particular requirements for fans
- electric power in off-mode (P_{off})		IEC 62301 Ed. 2.0 b:2011 § 5.3

19 ANNEX V_ - Product information sheet

1) Pursuant to point 1(b) of Article 3, the supplier shall enter into the product database the information as set out in to , as applicable.

2) Values shall be rounded in accordance with the decimal places where indicated in the tables.

19.1 Solid fuel fired room heaters

Table 31. Product information sheet for room heat pumps

Supplier's name or trademark:			
Supplier's address[a]:			
Model identifier:			
Type of product:	select: - open combustion / uncontrolled air supply - open combustion / controllable air supply - balanced combustion		
Preferred fuel:	log wood / pellets / other		
Slow heat release:	yes / no		
Indirect heat output:	yes / no		
Product parameters:			
Seasonal room heating efficiency (η_{rh}) (%)	xyz	Energy efficiency class	[A/B/C/D/E/F/G]
Rated heating capacity (kW)	xy	seasonal energy consumption for heating (Q_{HE}) ([unit]/a)	xyz
Nominal efficiency	x,x	Part load efficiency	x,x
Direct heat output (kW)	x,x	Indirect heat output (kW)	x,x
PM emissions (mg/Nm^3)	x,x	OGC emissions (mg/Nm^3)	x,x
CO emissions (mg/Nm^3)	x,x	NOx emissions (mg/Nm^3)	x,x
Indoor sound power (dB(A))	xy	Indoor sound power class	[A/B/C/D]
Control correction factor	x,x		
Power consumption elmax W	x,x		
Power consumption elmin W	x,x		
Power consumption standby W	x,x		
Minimum duration of the guarantee offered by the supplier[a]: xy (years)			
Additional information: - other fuels allowed - product weight - product dimensions **Information to use when filtering EPREL on product features ?**			
The weblink to the supplier's website, where the information in point 3 of Annex II of Commission Regulation (EU) XXXX/XXX[16] *[insert Regulation number of the accompanying Ecodesign Regulation on room air conditioners, room heaters and comfort fans]* is found.			

[a] changes to these items shall not be considered relevant for the purposes of point 4 of Article 4 of Regulation (EU) 2017/1369.

[16] Commission Regulation (EU) XXXX/XXX *[enter the number of the Regulation]* of *[enter the date]* laying down ecodesign requirements for room air conditioners, room heat pumps and comfort fans to Directive 2009/125/EC of the European Parliament and of the Council (*[enter the references to the OJ]*).

19.2 Gas/oil fired room heaters

Table 32. Product information sheet for gas or oil-fired room heaters

Supplier's name or trademark:			
Supplier's address[a]:			
Model identifier:			
Type of room heater:	select: - open combustion / uncontrolled air supply - open combustion / controllable air supply - balanced combustion		
Type of fuel:	gas / oil		
Indirect heat output:	yes / no		
Product parameters			
Seasonal room heating efficiency (η_{rh})	x %	Energy efficiency class	[A/B/C/D/E/F/G]
Rated heating capacity	x kW	seasonal energy consumption for heating (Q_{HE}) ([unit]/a) if gas, use as unit m^3/a if oil, use as unit L/a	x [unit]/a
Direct heat output (kW)	x,x kW	Indirect heat output (kW)	x,x kW
Nominal efficiency	x,x	Part load efficiency	x,x
Indoor sound power (dB(A))	x	Indoor sound power class	[A/B/C/D]
Control correction factor	x,x		
permanent ignition device fuel input kW	x,x		
Power consumption elmax W	x,x		
Power consumption elmin W	x,x		
Power consumption standby W	x,x		
Product specific parameters:			
xxx	x,x	yyy	x,x
Minimum duration of the guarantee offered by the supplier[a]: xy (years)			
Additional information: - other fuels allowed - product weight - product dimensions **Information to use when filtering EPREL on product features ?**			
The weblink to the supplier's website, where the information in point 3 of Annex II of Commission Regulation (EU) XXXX/XXX[17] *[insert Regulation number of the accompanying Ecodesign Regulation on room air conditioners, room heaters and comfort fans]* is found.			

[a] changes to these items shall not be considered relevant for the purposes of point 4 of Article 4 of Regulation (EU) 2017/1369.

[17] Commission Regulation (EU) XXXX/XXX *[enter the number of the Regulation]* of *[enter the date]* laying down ecodesign requirements for room air conditioners, room heat pumps and comfort fans to Directive 2009/125/EC of the European Parliament and of the Council (*[enter the references to the OJ]*).

19.3 Electric room heaters

Table 33. Product information sheet for electric room heaters

Supplier's name or trademark:			
Supplier's address[a]:			
Model identifier:			
Type of product:	select: - basic electric room heater - storage electric room heater - underfloor electric room heater		
Product parameters			
Seasonal room heating efficiency (η_{rh}) (%)	x	Energy efficiency class	[A/B/C/D/E/F/G]
Rated heating capacity (kW)	x	seasonal energy consumption for heating (Q_{HE}) (kWh/a)	x
Indoor sound power (dB(A))	x	Indoor sound power class	[A/B/C/D]
Control correction factor	x,x		
Power consumption standby W	x,x		
Product specific parameters:			
xxx	x,x	yyy	x,x
Minimum duration of the guarantee offered by the supplier[a]: x (years)			
Additional information: - controls allowed - product weight - product dimensions **Information to use when filtering EPREL on product features ?**			
The weblink to the supplier's website, where the information in point 3 of Annex II of Commission Regulation (EU) XXXX/XXX[18] *[insert Regulation number of the accompanying Ecodesign Regulation on room air conditioners, room heaters and comfort fans]* is found.			

[a] changes to these items shall not be considered relevant for the purposes of point 4 of Article 4 of Regulation (EU) 2017/1369.

[18] Commission Regulation (EU) XXXX/XXX *[enter the number of the Regulation]* of *[enter the date]* laying down ecodesign requirements for room air conditioners, room heat pumps and comfort fans to Directive 2009/125/EC of the European Parliament and of the Council (*[enter the references to the OJ]*).

19.4 Room heat pumps (heating only)

Table 34. Product information sheet for room heat pumps

Supplier's name or trademark:							
Supplier's address[a]:							
Model identifier:							
Type of room heat pump:			select: - fixed - portable double duct/split - portable single duct				
Product parameters for heating							
	Season (if applicable)				Season (if applicable)		
	Warmer	Avg	Colder		Warmer	Avg	Colder
Seasonal room heating efficiency (η_{rh}) (%)	x %	x %	x %	Energy efficiency class for room heating	[A/B/C/D/E/F/G]		
				seasonal energy consumption for heating (Q_{HE}) (kWh/a)	x kWh/a	x kWh/a	x kWh/a
Rated heating capacity (kW)			x kW				
Indoor sound power (dB(A))			x	Indoor sound power class			[A/B/C/D]
Outdoor sound power (dB(A)), if applicable			x	Outdoor sound power class, if applicable			[A/B/C/D]
Control correction factor			x,x				
Power consumption standby W			x,x				
GWP of refrigerant used (kg CO2 eq./100 y)			x	for single duct RHPs: Equilibrium temperature for heating			x °C
Product specific parameters (only rows that are relevant may be shown)							
*for **fixed** heat pump and **other portable** heat pump*							
	Season* (warmer/colder if applicable)				Season* (warmer/colder if applicable)		
	Warmer	Avg	Colder		Warmer	Avg	Colder
Heating capacity at -7 °C outdoor	x,x kW	x,x kW	x,x kW	COP at -7 °C outdoor	x	x	x
Heating capacity at +2 °C outdoor	x,x kW	x,x kW	x,x kW	COP at +2 °C outdoor	x	x	x
Heating capacity at +7 °C outdoor	x,x kW	x,x kW	x,x kW	COP at +7 °C outdoor	x	x	x
Heating capacity at +12 °C outdoor	x,x kW	x,x kW	x,x kW	COP at +12 °C outdoor	x	x	x
Heating capacity at Tj = Tol	x,x kW	x,x kW	x,x kW	COP at Tj = Tol	x	x	x
Heating capacity at Tj = Tbiv	x,x kW	x,x kW	x,x kW	COP at Tj = Tbiv	x	x	x
if declared for 'Colder' season: Heating capacity at -15 °C outdoor	(n.a.)	(n.a.)	x,x kW	if declared for 'Colder' season: COP at -15 °C outdoor	(n.a.)	(n.a.)	x
Temperature heat pump off Tol	x,x °C						
Temperature back-up 'on' Tbiv	x,x °C						
Max. capacity electric back-up (if applicable)	x,x kW						

*for **single duct** heat pump*			
Max. heating capacity (20 °C indoor/outdoor)	x,x kW	COP at max. heating capacity	x,x
if variable capacity: Min. heating capacity (20 °C indoor/outdoor)	x,x kW	COP at min. heating capacity	x,x
Equilibrium temperature heating	x,x °C		
Exhaust air flow rate	x m^3/h		
Minimum duration of the guarantee offered by the supplier[a]:			
Additional information: - product weight - product dimensions **Information to use when filtering EPREL on product features ?**			
The weblink to the supplier's website, where the information in point 3 of Annex II of Commission Regulation (EU) XXXX/XXX[19] *[insert Regulation number of the accompanying Ecodesign Regulation on room air conditioners, room heaters and comfort fans]* is found.			

[19] Commission Regulation (EU) XXXX/XXX *[enter the number of the Regulation]* of *[enter the date]* laying down ecodesign requirements for room air conditioners, room heat pumps and comfort fans to Directive 2009/125/EC of the European Parliament and of the Council (*[enter the references to the OJ]*).

19.5 Reversible air conditioners / heat pumps

Table 35. Product information sheet for reversible air conditioners/heat pumps

Supplier's name or trademark:							
Supplier's address[a]:							
Model identifier:							
Type of room heat pump:	select: - fixed - other portable (double duct/split) - portable single duct						
Product parameters for cooling							
Seasonal room cooling efficiency (η_{rc}) (%)	x %			Energy efficiency class for room cooling			[A/B/C/D/ E/F/G]
if fixed/other portable: Rated cooling capacity (kW) ($P_{20ºC,100\%}$) *if single duct:* Cooling capacity Pdc at +27 °C ($P_{27ºC,100\%}$)indoor/outdoor	x kW			seasonal energy consumption for cooling (Q_{HE}) (kWh/a)			x kWh/a
Indoor sound power (dB(A))	x dB(A)			Indoor sound power class			[A/B/C/D]
Outdoor sound power (dB(A))	x dB(A)			Outdoor sound power class			[A/B/C/D]
				for single duct RHP/RACs: Equilibrium temperature for heating			x °C
				Equilibrium temperature for cooling			x °C
Product parameters for heating							
	Season (if applicable)				Season (if applicable)		
	Warmer	Avg	Colder		Warmer	Avg	Colder
Seasonal room heating efficiency (η_{rh}) (%)	x %	x %	x %	Energy efficiency class for room heating	[A/B/C/D/ E/F/G]		
				seasonal energy consumption for heating (Q_{HE}) (kWh/a)	x kWh/a	x kWh/a	x kWh/a
Rated heating capacity (kW)	x kW						
Indoor sound power (dB(A))	x			Indoor sound power class			[A/B/C/D]
Outdoor sound power (dB(A))*	x			Outdoor sound power class*			[A/B/C/D]
* if applicable							
Control correction factor	x,x						
Power consumption standby W	x,x						
GWP of refrigerant used (kg CO2 eq./100 y)	x						
Product specific parameters (only rows that are relevant may be shown)							
*for reversible **fixed** room air conditioner / heat pump*							
	Season* (warmer/colder if applicable)				Season* (warmer/colder if applicable)		
	Warmer	Avg	Colder		Warmer	Avg	Colder
Heating capacity at -7 °C outdoor	x,x kW	x,x kW	x,x kW	COP at -7 °C outdoor	x	x	x
Heating capacity at +2 °C outdoor	x,x kW	x,x kW	x,x kW	COP at +2 °C outdoor	x	x	x
Heating capacity at +7 °C outdoor	x,x kW	x,x kW	x,x kW	COP at +7 °C outdoor	x	x	x

Heating capacity at +12 °C outdoor	x,x kW	x,x kW	x,x kW	COP at +12 °C outdoor	x	x	x
Heating capacity at Tj = Tol	x,x kW	x,x kW	x,x kW	COP at Tj = Tol	x	x	x
Heating capacity at Tj = Tbiv	x,x kW	x,x kW	x,x kW	COP at Tj = Tbiv	x	x	x
if declared for 'Colder' season: Heating capacity at -15 °C outdoor	(n.a.)	(n.a.)	x,x kW	if declared for 'Colder' season: COP at -15 °C outdoor	(n.a.)	(n.a.)	x
Temperature heat pump off Tol	x,x °C						
Temperature back-up 'on' Tbiv	x,x °C						
Max. capacity electric back-up (if applicable)	x,x kW						

Cooling capacity Pdc at 27/35 °C in/outdoor	x,x kW	EER at 27/35 °C in/outdoor	x
Cooling capacity Pdc at 27/30 °C in/outdoor	x,x kW	EER at 27/30 °C in/outdoor	x
Cooling capacity Pdc at 27/25 °C in/outdoor	x,x kW	EER at 27/25 °C in/outdoor	x
Cooling capacity Pdc at 27/20 °C in/outdoor	x,x kW	EER at 27/20 °C in/outdoor	x
Temperature heat pump off	x,x °C		
*for reversible **other portable** room air conditioner / heat pump*			
Heating capacity at -7 °C outdoor	x,x kW	COP at -7 °C outdoor	x
Heating capacity at +2 °C outdoor	x,x kW	COP at +2 °C outdoor	x
Max. Heating capacity at +7 °C outdoor	x,x kW	COP100% at +7 °C outdoor	x
33% of max. Heating capacity at +12 °C outdoor	x,x kW	COP33% at +12 °C outdoor	x
Heating capacity at -15 °C outdoor	x,x kW	COP at -15 °C outdoor	x
Temperature heat pump off (Tol)	x,x °C		
Max. capacity electric back-up (if applicable)	x,x kW		
Max. Cooling capacity Pdc at 27/35 °C in/outdoor	x,x kW	EER100% at 27/35 °C in/outdoor	x
Max. Cooling capacity Pdc at 27/27 °C in/outdoor	x,x kW	EER100% at 27/27 °C in/outdoor	x
33% of max cooling capacity Pdc at 27/27 °C in/outdoor	x,x kW	EER33% at 27/27 °C in/outdoor	x
Temperature heat pump off	x,x °C		
*for reversible **single duct** room air conditioner / heat pump*			
Max. heating capacity (20 °C indoor/outdoor)	x,x kW	COP at max. heating capacity	
if variable capacity: Min. heating capacity (20 °C indoor/outdoor)	x,x kW	COP at min. heating capacity	
Equilibrium temperature heating	x,x °C		
Outdoor air flow rate	x m^3/h		
Max. cooling capacity Pdc at 27/27 °C in/outdoor, incl. infiltration	x,x kW	EER at max.cooling capacity	x
if variable capacity: Part load cooling capacity Pdc at 27/27 °C in/outdoor	x,x kW	EER at part load cooling capacity	x
Equilibrium temperature (Teq) (°C)	x,x °C		

Outdoor air flow rate	x m^3/h		
Minimum duration of the guarantee offered by the supplier[a]:			
Additional information: - product weight - product dimensions **Information to use when filtering EPREL on product features ?**			
The weblink to the supplier's website, where the information in point 3 of Annex II of Commission Regulation (EU) XXXX/XXX[20] *[insert Regulation number of the accompanying Ecodesign Regulation on room air conditioners, room heaters and comfort fans]* is found.			

[a] changes to these items shall not be considered relevant for the purposes of point 4 of Article 4 of Regulation (EU) 2017/1369.

[20] Commission Regulation (EU) XXXX/XXX *[enter the number of the Regulation]* of *[enter the date]* laying down ecodesign requirements for room air conditioners, room heat pumps and comfort fans to Directive 2009/125/EC of the European Parliament and of the Council (*[enter the references to the OJ]*).

19.6 Room air conditioners (cooling only)

Table 36. Product information sheet for room air conditioners (cooling only)

Supplier's name or trademark:			
Supplier's address[a]:			
Model identifier:			
Type of room heat pump:	select: - fixed - portable double duct/split - portable single duct		
Product parameters for cooling			
Seasonal room cooling efficiency (η_{rc}) (%)	x %	Energy efficiency class for room cooling	[A/B/C/D/ E/F/G]
if fixed/other portable: Rated cooling capacity (kW) *if single duct:* Cooling capacity Pdc at +27 °C indoor/outdoor, including infiltration	x kW	seasonal energy consumption for cooling (Q_{HE}) (kWh/a)	x kWh/a
Indoor sound power (dB(A))	x dB(A)	Indoor sound power class	[A/B/C/D]
Outdoor sound power (dB(A))*	x dB(A)	Outdoor sound power class*	[A/B/C/D]
* if applicable			
Control correction factor	x,x		
Power consumption standby W	x,x		
GWP of refrigerant used (kg CO2 eq./100 y)	x	for single duct RHPs: Equilibrium temperature for cooling	x °C
Product specific parameters (only rows that are relevant may be shown)			
*for **fixed** room air conditioner*			
Cooling capacity Pdc at 27/35 °C in/outdoor	x,x kW	EER at 27/35 °C in/outdoor	x
Cooling capacity Pdc at 27/30 °C in/outdoor	x,x kW	EER at 27/30 °C in/outdoor	x
Cooling capacity Pdc at 27/25 °C in/outdoor	x,x kW	EER at 27/25 °C in/outdoor	x
Cooling capacity Pdc at 27/20 °C in/outdoor	x,x kW	EER at 27/20 °C in/outdoor	x
Temperature heat pump off	x,x °C		
*for **other portable** room air conditioner*			
Max. Cooling capacity Pdc at 27/35 °C in/outdoor	x,x kW	EER100% at 27/35 °C in/outdoor	x
Max. Cooling capacity Pdc at 27/27 °C in/outdoor	x,x kW	EER100% at 27/27 °C in/outdoor	x
33% of max cooling capacity Pdc at 27/27 °C in/outdoor	x,x kW	EER33% at 27/27 °C in/outdoor	x
Temperature heat pump off	x,x °C		
*for **single duct** room air conditioner*			
Max. cooling capacity Pdc at 27/27 °C in/outdoor, incl. infiltration	x,x kW	EER at max.cooling capacity	x
if variable capacity: Part load cooling capacity Pdc at 27/27 °C in/outdoor	x,x kW	EER at part load cooling capacity	x
Equilibrium temperature (Teq) (°C)	x,x °C		
Outdoor air flow rate	x m^3/h		

Minimum duration of the guarantee offered by the supplier[a]:
Additional information: - product weight - product dimensions **Information to use when filtering EPREL on product features?**
The weblink to the supplier's website, where the information in point 3 of Annex II of Commission Regulation (EU) XXXX/XXX[21] *[insert Regulation number of the accompanying Ecodesign Regulation on room air conditioners, room heaters and comfort fans]* is found.

[a] changes to these items shall not be considered relevant for the purposes of point 4 of Article 4 of Regulation (EU) 2017/1369.

[21] Commission Regulation (EU) XXXX/XXX *[enter the number of the Regulation]* of *[enter the date]* laying down ecodesign requirements for room air conditioners, room heat pumps and comfort fans to Directive 2009/125/EC of the European Parliament and of the Council (*[enter the references to the OJ]*).

19.7 Comfort fans

Table 37. Product information sheet for comfort fans

Supplier's name or trademark:			
Supplier's address[a]:			
Model identifier:			
Type of comfort fan:		[select form: table / tower / pedestal / ceiling] [select rotor: conventional / bladeless]	
Diameter of comfort fan		[cm]	
General product parameters:			
Service Value ((m³/min)/W)	x	Energy efficiency class	[A/B/C/D/E/F/G]
Annual energy consumption (kWh/a)	x		
Maximum fan flow rate (m³/h)	x	Maximum fan power input (W)	xx
Minimum fan flow rate (m³/h)	x	Minimum fan power input (W)	xx
Sound power (dB(A))	x	Sound power class	[A/B/C/D/E]
Control correction factor	x,x		
Power consumption standby W	x,x		
Minimum duration of the guarantee offered by the supplier[a]:			
Additional information: **Information to use when filtering EPREL on product features ?**			
The weblink to the supplier's website, where the information in point 3 of Annex II of Commission Regulation (EU) XXXX/XXX[22] *[insert Regulation number of the accompanying Ecodesign Regulation on room air conditioners, room heaters and comfort fans]* is found.			

[a] changes to these items shall not be considered relevant for the purposes of point 4 of Article 4 of Regulation (EU) 2017/1369.

[22] Commission Regulation (EU) XXXX/XXX *[enter the number of the Regulation]* of *[enter the date]* laying down ecodesign requirements for room air conditioners, room heat pumps and comfort fans to Directive 2009/125/EC of the European Parliament and of the Council (*[enter the references to the OJ]*).

20 ANNEX VI - Technical documentation

1) The technical documentation referred to in point 1(d) of Article 3 shall include the following elements:

   a) the information as set out in Annex V;

   b) the name and address of the supplier;

   c) a description of the space heater model sufficient for its unambiguous identification;

   d) a list of equivalent models, including model identifiers;

   e) where appropriate, the references of the harmonised standards applied;

   f) where appropriate, the other technical standards and specifications used;

   g) the identification and signature of the person empowered to bind the supplier;

   h) for room heat pump room heaters and/or room air conditioners where the information relating to a specific model comprising a combination of indoor and outdoor units has been obtained by calculation on the basis of design and/or extrapolation from other combinations, the details of such calculations and/or extrapolations, and of any tests undertaken to verify the accuracy of the calculations, including details of the mathematical model for calculating the performance of such combinations and details of the measurements taken to verify this model;

   i) any specific precautions that shall be taken when the model is assembled, installed or maintained;

   j) any specific precautions that shall be taken for reuse, recycling and/or recovery of materials from the model.

21 ANNEX VII - Information to be provided in visual advertisements, in technical promotional material or other promotional material, in distance selling except distance selling on the internet

1) In visual advertisements for room heaters, room air conditioners or comfort fans, for the purposes of ensuring conformity with the requirements laid down in point 1(e) Article 3 and point 1(c) of Article 4, the energy efficiency class and the range of energy efficiency classes available on the label shall be shown as set out in point 4 of this Annex.

2) In technical promotional material or other promotional material for room heaters, room air conditioners or comfort fans, for the purposes of ensuring conformity with the requirements laid down in point 1(f) Article 3 and point 1(d) of Article 4 the energy efficiency class and the range of energy efficiency classes available on the label shall be shown as set out in point 4 of this Annex.

3) Any paper based distance selling of for room heaters, room air conditioners or comfort fans must show the energy efficiency class and the range of energy efficiency classes available on the label as set out in point 4 of this Annex.

4) The energy efficiency class and the range of energy efficiency classes shall be shown, as indicated in Figure 1, with:

   a) an arrow containing the letter of the energy efficiency class, in 100% white, Calibri Bold and in a font size at least equivalent to that of the price, when the price is shown;

   b) the colour of the arrow matching the colour of the energy efficiency class;

   c) the range of available energy efficiency classes in 100 % black; and

   d) the size shall be such that the label is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a border of 0,5 pt in 100% black placed around the arrow and the letter of the energy efficiency class.

By way of derogation, if the visual advertisement, technical promotional material or other promotional material or paper based distance selling is printed in monochrome, the arrow can be in monochrome in that visual advertisement, technical promotional material, other promotional material or paper based distance selling.

Figure 1: Coloured/monochrome left/right arrow, with range of energy efficiency classes indicated

5) Telemarketing based distance selling must specifically inform the customer of the energy efficiency class of the product and of the range of energy efficiency classes available on the label, and that the consumer can access the full label and the product information sheet through a through a link to the product database website or by requesting a printed copy.

6) For all the situations mentioned in points 1 to 3 and 5, it must be possible for the customer to obtain, on request, a printed copy of the label and the product information sheet.

22 ANNEX VIII - Information to be provided in the case of distance selling through the Internet

1) The electronic label made available by suppliers in accordance with point 1(g) of Article 3 shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the label is clearly visible and legible and shall be proportionate to the size specified in point 4 of Annex III. The label may be displayed using a nested display, in which case the image used for accessing the label shall comply with the specifications laid down in point 3 of this Annex. If nested display is applied, the label shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the image.

2) The image used for accessing the label in the case of a nested display, as indicated in Figure 2, shall:

   a) be an arrow in the colour corresponding to the energy efficiency class of the product on the label;

   b) indicate the energy efficiency class of the product on the arrow in 100% white, Calibri Bold and in a font size equivalent to that of the price;

   c) have the range of available energy efficiency classes in 100 % black; and

   d) have one of the following two formats, and its size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a visible border in 100 % black placed around the arrow and the letter of the energy efficiency class:

Figure 2: Coloured left/right arrow example, with range of energy classes indicated

3) In the case of a nested display, the sequence of display of the label shall be as follows:

   a) the image referred to in point 2 of this Annex shall be shown on the display mechanism in proximity to the price of the product;

   b) the image shall link to the label as set out in Annex III;

   c) the label shall be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image;

   d) the label shall be displayed by pop up, new tab, new page or inset screen display;

   e) for magnification of the label on tactile screens, the device conventions for tactile magnification shall apply;

   f) the label shall cease to be displayed by means of a close option or other standard closing mechanism;

   g) the alternative text for the graphic, to be displayed on failure to display the label, shall be the energy efficiency class of the product in a font size equivalent to that of the price.

4) The electronic product information sheet made available by suppliers in accordance with point 1(b) of Article 3 shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the product information sheet is clearly visible and legible. The product information sheet may be displayed using a nested display **or by referring to the product database, in which case the link used for accessing the product information sheet shall clearly and legibly indicate 'Product information sheet'**. If a nested display is used, the product information sheet shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the link.

23 ANNEX IX - Verification procedure for market surveillance purposes

The verification tolerances set out in this Annex relate only to the verification of the declared parameters by Member State authorities and shall not be used by the supplier as an allowed tolerance to establish the values in the technical documentation. The values and classes on the label or in the product fiche shall not be more favourable for the supplier than the values reported in the technical documentation.

Where a model has been designed to be able to detect it is being tested (e.g. by recognizing the test conditions or test cycle), and to react specifically by automatically altering its performance during the test with the objective of reaching a more favourable level for any of the parameters specified in this Regulation or included in the technical documentation or included in any of the documentation provided, the model and all equivalent models shall be considered not compliant.

As part of verifying the compliance of a product model with the requirements laid down in this Regulation, the authorities of the Member States shall apply the following procedure:

1) The Member State authorities shall verify one single unit of the model.

2) The model shall be considered to comply with the applicable requirements if:

   a) the values given in the technical documentation pursuant to point 3 of Article 3 of Regulation (EU) 2017/1369 (**declared values**), and, where applicable, the values used to calculate these values, are not more favourable for the supplier than the corresponding values given in the test reports; and

   b) the values published on the label and in the product information sheet are not more favourable for the supplier than the declared values, and the indicated energy efficiency class is not more favourable for the supplier than the class determined by the declared values; and

   c) when the Member State authorities test the unit of the model, the difference between the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) and the declared values shall be within the respective verification tolerances as given in Table 17.

3) If the results referred to in points 2(a) and (b) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.

4) If the result referred to in point 2(c) is not achieved, the Member State authorities shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more equivalent models.

5) The model shall be considered to comply with the applicable requirements if for these three units, the arithmetical mean of the determined values complies with the respective tolerances given in Table 17.

6) If the result referred to in point 5 is not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.

7) The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after a decision has been taken on the non-compliance of the model according to points 3 and 6.

The Member State authorities shall only apply the verification tolerances set out in Table 17 and shall only use the procedure described this Annex. No other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 17: Verification tolerances for measured parameters

Parameter	Product	Verification tolerances[a]
seasonal efficiency for heating	Room heat pumps with Pratedc < 2 kW	The determined value shall not be more than 8 % higher than the declared value.
	Room heat pumps with Pratedc ≥ 2 kW and < 6 kW	The determined value shall not be more than 7 % higher than the declared value.
	Room heat pumps with Pratedc ≥ 6 kW	The determined value shall not be more than 6 % higher than the declared value.
	fuel fired room heaters	The determined value shall not be more than 8 % higher than the declared value.
	electric room heaters	The determined value shall not be more than 2 % higher than the declared value.
seasonal efficiency for cooling	Room air conditioners with Pratedc < 2 kW	The determined value shall not be more than 8 % higher than the declared value.
	Room air conditioners with Pratedc ≥ 2 kW and < 6 kW	The determined value shall not be more than 6 % higher than the declared value.
	Room air conditioners with Pratedc ≥ 6 kW	The determined value shall not be more than 4 % higher than the declared value.
Service value	Comfort fans	The determined value shall not be more than 10 % higher than the declared value.

[a] in the case of three additional units tested as prescribed in point 4, the determined value means the arithmetical mean of the values determined for these three additional units.

SUPPLEMENT - Life cycle costs of LSH and RACs

Of the many reasons of consumers to choose a certain type of space heater reduction of overall costs (of purchase and running) can be one of them.

The following tables and graphs show the life cycle costs (including purchase and amortised to one year operation as product lifetimes are different) of various LSH and RAC options. The values are based on base case values presented in the review studies for room air conditioners and (gas/oil/electric) local space heaters. For solid fuel LSH the values have been collected/identified in the context of this impact assessment. Other products (of very low purchase costs or higher than base case efficiency) have been added to show a possible spread in costs.

The table shows the calculation of energy costs, using three different energy rates ('high', 'low' and 'medium', the latter more representative to 2020 values) for electricity, gas and solid fuels respectively. Due to negligible relevance 'oil' has been omitted from this overview. The costs are also differentiated for allocation of RAC purchase costs as this product may be purchased primarily for cooling purposes (and heating is a 'free' feature), for heating mainly (100% allocation to 'heating') or somewhere in between. The table shows calculations for 100%, 50% and 0% allocation of RAC purchase costs to (annual) heating costs.

The comparison is based upon heating a room with a 3.6 kW peak heat demand so that base case data of the small reversible RAC can be used directly. This also means that multiple electric heaters of 1 kW would be needed.

The tables and graphs show that the cheapest option capable of providing the required amount of heat is the solid fuel LSH, mainly because of its relatively low fuel costs. Only if efficiency of that heater was lowered to approximately 50% the costs would increase to that of the second cheapest product, the reversible room air conditioner. Depending on the allocation applied and the energy tarif, the RAC costs are just 23% to 42% of that of an electric Joule heater of 50 Euro purchase price. The costs of the gas heaters are somewhere in between (approximately half of the joule heater costs). The amount of allocation to heating of RAC purchase costs and even the energy tarifs do not change the order that much, even if the absolute values are quite different.

Table 38. Life cycle costs of LSH and RAC

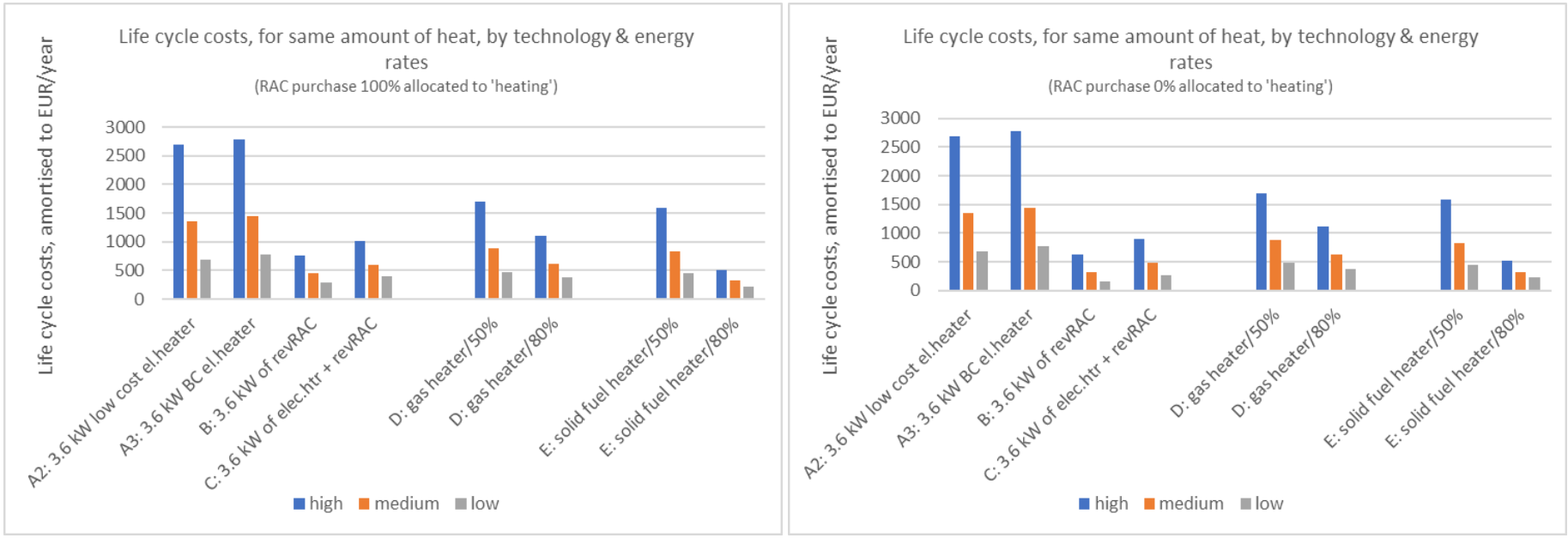
Type of heater	Peak. power	Heating hours (full load eq.)	Heat demand	Efficiency (final)	Energy cons.	Elec.tarif			Annual energy costs			Product life	Purchase costs			Allocation to heating		
	kW	h/a	kWh/a		kWh/a	high	medium	low	high	medium	low		EUR/kW	EUR	EUR/yr	% Cold	% Avg	% Warm
A2: 3.6 kW low cost el.heater	3.6	1400	5069	95%	5336	0.5	0.25	0.125	2668	1334	667	9	**50**	180	20	100%	100%	100%
A3: 3.6 kW BC el.heater	3.6	1400	5069	95%	5336	0.5	0.25	0.125	2668	1334	667	9	270	972	108	100%	100%	100%
B: 3.6 kW of revRAC	3.6	1400	5069	400%	1267	0.5	0.25	0.125	634	317	158	12	429	1543	129	100%	50%	0%
C: 3.6 kW of elec.htr + revRAC																		
- of which elec.heater (peak load 80-100%)	3.6	1240	4493	95%	4729	0.5	0.25	0.125	2365	1182	591	9	155	558	62	100%	100%	100%
- of which RHP (base load up to 80% of peak)	3.6	160	576	400%	144	0.5	0.25	0.125	72	36	18	12	429	1543	129	100%	50%	0%
Gas. tarif (EUR/kWh)																		
D: gas heater/50%	3.6	1400	5069	47%	10831	0.15	0.075	0.0375	1625	812	406	20		1425	71	100%	100%	100%
D: gas heater/80%	3.6	1400	5069	78%	6507	0.15	0.075	0.0375	976	488	244	20		2625	131	100%	100%	100%
Solid fuel tarif (EUR/kWh)																		
E: solid fuel heater/50%	3.6	1400	5069	27%	18773	0.06	0.03	0.015	1126	563	282	20		1425	71	100%	100%	100%
E: solid fuel heater/80%	3.6	1400	5069	72%	7040	0.06	0.03	0.015	422	211	106	20		2625	131	100%	100%	100%

Table 38. Life cycle costs of LSH and RAC / continued

	LCC (Cold: 100% allocation)			LCC (Average: 50% allocation)			LCC (Warm: 0% allocation)		
	high	medium	low	high	medium	low	high	medium	low
A2: 3.6 kW low cost el.heater	2688	1354	687	2688	1354	687	2688	1354	687
A3: 3.6 kW BC el.heater	2776	1442	775	2776	1442	775	2776	1442	775
B: 3.6 kW of revRAC	762	445	287	698	381	223	634	317	158
C: 3.6 kW of elec.htr + revRAC	1021	606	398	956	541	334	892	477	270
- elec.heater (peak load 80-100%)	320	191	126	320	191	126	320	191	126
- RHP (base load up to 80% of peak)	701	415	272	637	350	207	572	286	143
D: gas heater/50%	1696	884	477	1696	884	477	1696	884	477
D: gas heater/80%	1107	619	375	1107	619	375	1107	619	375
E: solid fuel heater/50%	1198	634	353	1198	634	353	1198	634	353
E: solid fuel heater/80%	554	342	237	554	342	237	554	342	237

Figure 6 Life cycle costs of LSH and RAC

Figure 7. Life cycle costs of room heaters (LSH + RAC) by energy tariff (high-medium-low) and allocation of purchase costs

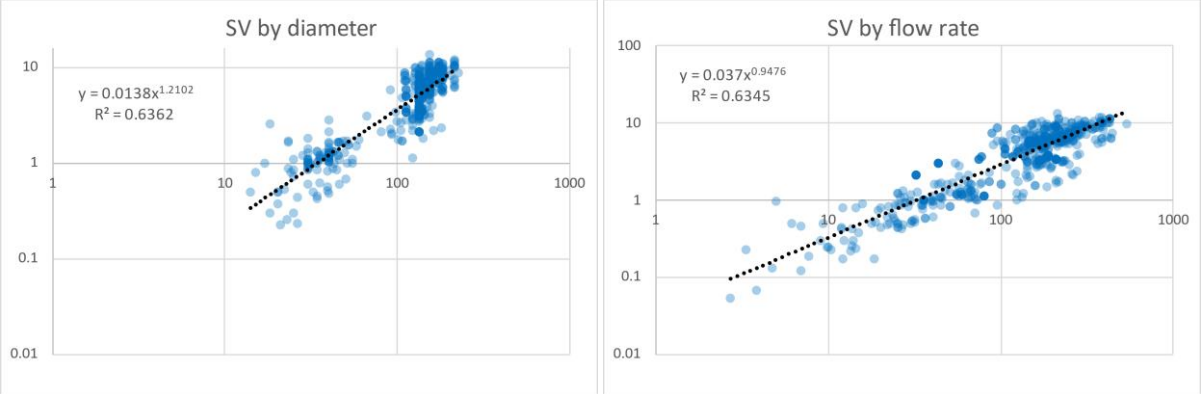


https://www.regulations.gov/search?filter=D%3DEERE-2014-BT-TP-0014&sortBy=postedDate&sortDirection=desc

SUPPLEMENT - Comfort Fans

This Working Document takes into account the general conclusions presented in the review study of air conditioners and (the addendum on) comfort fans, but adds an alternative labelling approach not presented in that review study, based on label classes defined by **fan air flow rate**, rather than fan diameter.

Figure 8. Dataset (n=623, incl. 418 ENERGY STAR ceiling fans) showing SV by diameter and fan air flow rate



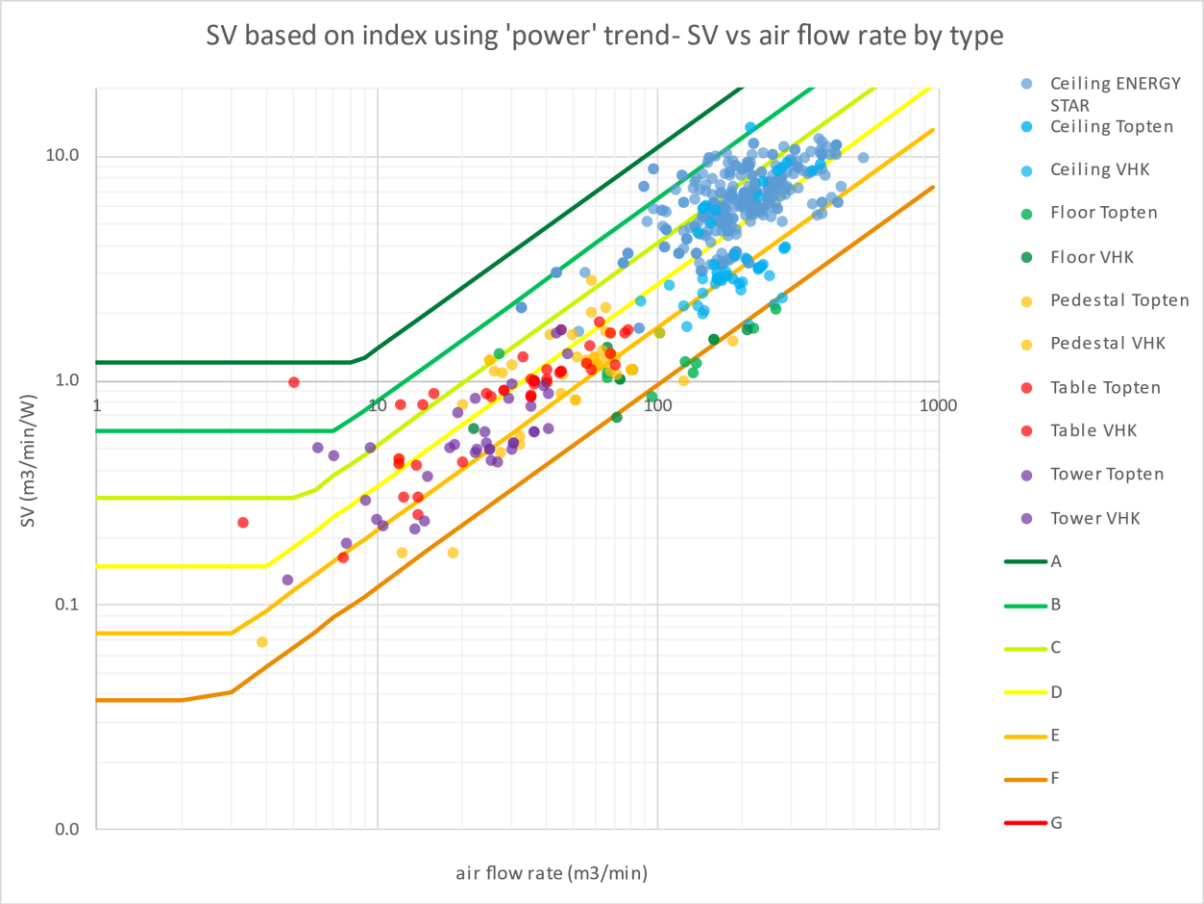
The figure above shows that the correlation between fan air flow rate and service value exists, similar to the correlation of fan diameter with service value. The rotor diameter and the speed at which the rotor rotates both have an influence on the required shaft power 'input' and the air flow 'output'. The benefit of an approach based on air flow rate is that this could avoid disambiguities related to establishing fan diameters of 'bladeless' fans, 'air multipliers', certain tower fans and comfort fans with multiple (axial) rotors.

In this Working Document one single labelling approach has been elaborated one for all fans combined regardless of type, as the analysis shows that sufficient coverage of fan types and models over the available energy efficiency classes can be obtained.

This section shows the distribution of products over labelling classes per approach, based on a dataset for all types of fans comprising 204 models (52 ceiling fans, 152 other fans), and 420 ceiling fans from the ENERGY STAR dataset (all data collected in the period 2021-2022).

The labelling class limits have been defined taking into account that class A should be empty at entry into force, and that a reasonable distribution of models over classes is achieved. The energy class limits are based on exponantial curves.

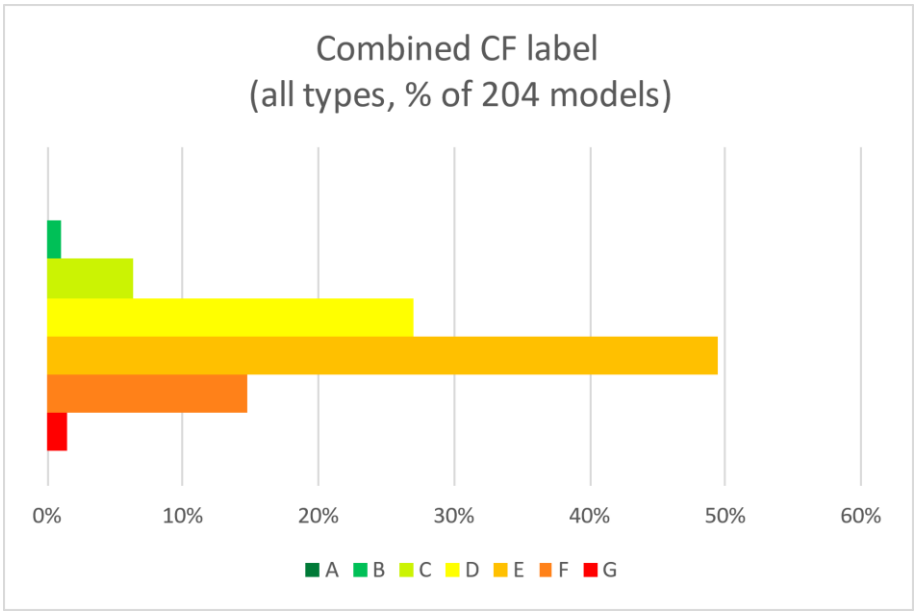
Figure 9. Scatterplot of service value of comfort fans by fan air flow rate, with energy classes indicated (logarithmic scale)



Note that the axes are logarithmic and the G curve (not shown) is at SV>0. The angles in curves indicate that the intersection of the horizontal limit value and the curve lies in between air flow rates used to draw curves.

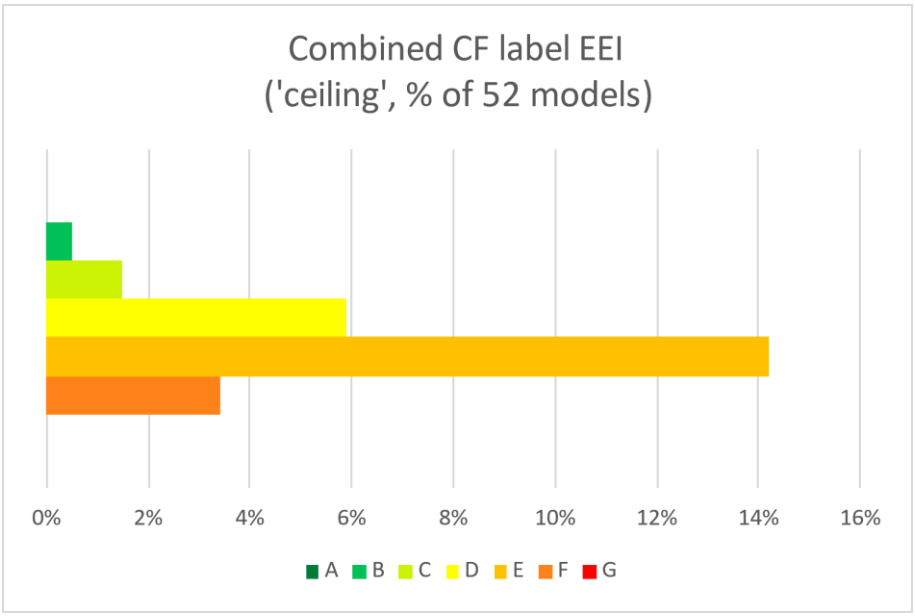
The figure shows the distribution of ceiling fans is dominated by relatively efficient ENERGY STAR ceiling fans, in particular in D, C and B classes.

Removing the ENERGY STAR ceiling fans results in the following distribution of fan types over energy efficiency classes ranging from B to G.



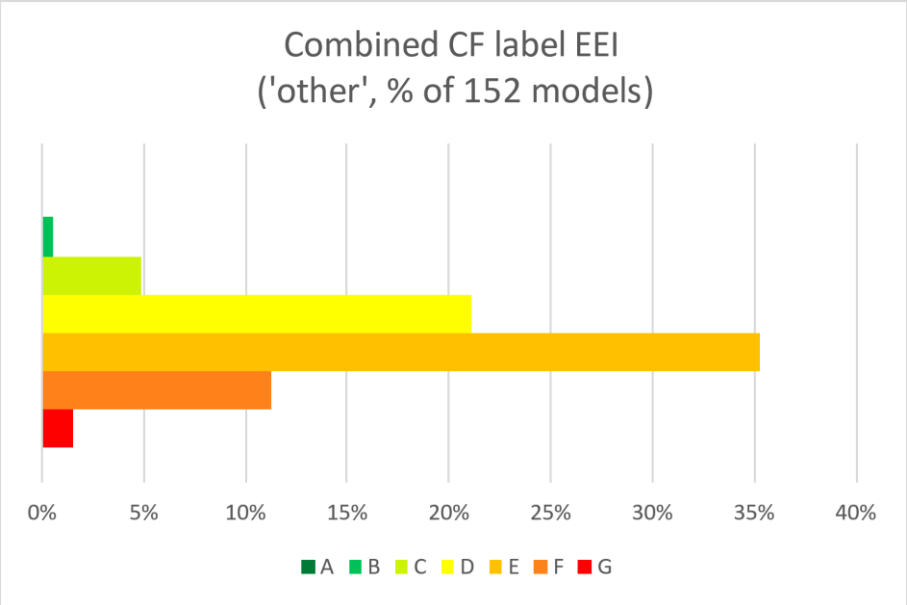
Zooming in on the distribution per comfort fan type shows that ceiling fans are rather uniformly distributed around the C-class (Note! this figure uses label limits that apply to 'other' fans as well).

Figure 10. Distribution of 'ceiling' fans over label classes



Zooming in on 'other' fans shows a fairly similar distribution.

Figure 11. Distribution of 'other' fans over label classes



The table below shows the count of models and respective shares per energy class.

Table 39. Distribution of comfort fan types over proposed labelling classes

	A	B	C	D	E	F	G
Type				**count**			
ceiling	0	1	3	12	29	7	0
table	0	1	3	20	19	0	0
pedestal	0	0	3	13	27	6	1
floor	0	0	1	1	5	12	2
tower	0	0	3	9	21	5	0
				share of total of type			
ceiling	0%	2%	6%	23%	56%	13%	0%
table	0%	2%	7%	47%	44%	0%	0%
pedestal	0%	0%	6%	26%	54%	12%	2%
floor	0%	0%	5%	5%	24%	57%	10%
tower	0%	0%	8%	24%	55%	13%	0%

SUPPLEMENT - Indicative savings

A first approximation of energy savings calculated for this proposal shows an overall annual electricity saving of 2 $TWh_{\_elec}$ in 2030, increasing to 9 and 14 $TWh_{\_elec}$ in 2040 and 2050 respectively.

These savings are achieved against a reference scenario that takes into account the basic rescaling of energy efficiency classes are required by Regulation (EU) 2017/1369.

Of these some 7 $TWh_{\_elec}$ annual savings for 2040 are realised by a shift in sales from electric Joule room heaters towards room heat pump (air-to-air) heaters, enabled by the merging of the two types of room heaters under a single scope. 1 $TWh_{\_elec}$ is saved in the category RAC (RAC savings could be higher if no sales shift of electric Joule towards RACs takes place). The savings for comfort fans are assessed at 1 $TWh_{\_elec}$.

The savings on electricity consumption vastly outweigh those on fuels as these are assessed at 1 $TWh_{\_fuel}$ saved in 2040.