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EUROPEAN COMMISSION

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Draft

COMMISSION DECISION

of […]

establishing the criteria for the award of the EU Ecolabel for hydronic heaters

(Text with EEA relevance)

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THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel [1], and in particular Article 8(2) thereof,

After consulting the European Union Ecolabelling Board,

Whereas:

(1) Under Regulation (EC) No 66/2010, the EU Ecolabel may be awarded to products which have a reduced environmental impact during their entire life cycle.

(2) Regulation (EC) No 66/2010 provides that specific EU Ecolabel criteria are to be established according to product groups.

(3) The Commission has drawn up a preliminary report on the technical, environmental, economic and legal aspects of the product group ‘hydronic heaters’ typically used in the Union and made it publicly available for comment. The study on which this report is based (hereinafter 'the study') was devised together with stakeholders and interested parties from the Union and third countries.

(4) The results of the study, presented in the preliminary report, have shown that energy consumption in the use phase contributes most significantly to the overall environmental impact of hydronic heaters. Therefore, the use of energy-efficient and low greenhouse gas-emitting hydronic heaters should be promoted and, in addition, such heaters using more environmental friendly technologies and proven to be safe for consumers should be supported.

[1] OJ L 27, 30.1.2010, p. 1.

(5) It is appropriate to establish EU Ecolabel criteria for the product group 'hydronic heaters'.

(6) The criteria, as well as the related assessment and verification requirements, should be valid for four years from the date of adoption of this Decision.

(7) The measures provided for in this Decision are in accordance with the opinion of the Committee established by Article 16 of Regulation (EC) No 66/2010,

HAS ADOPTED THIS DECISION:

Article 1

1. The product group 'hydronic heaters' shall comprise products that are used to generate heat as part of a hydronic central heating system, where the heated water is distributed by means of circulators and heat emitters in order to reach and maintain the indoor temperature of an enclosed space such as a building, a dwelling, or a room, at a desired level. The heat generator generates heat by means of one or more of the following processes and technologies:

   (a) combustion of gaseous, liquid or solid fossil fuels;

   (b) combustion of gaseous, liquid or solid biomass;

   (c) use of the Joule effect in electric resistance heating elements;

   (d) capture of ambient heat from air, water or ground source, and/or waste heat;

   (e) capture of latent heat from the exhaust gas of combination heaters;

   (f) cogeneration (the simultaneous generation in one process of heat and electricity);

   (g) solar energy (auxiliary);

2. The maximum output power of the hydronic heaters shall be 400 kW.

3. Combination heaters are included in the scope of this product group, provided that their primary function is to provide ambient heat.

4. The following products are excluded from the scope of this product group:

   (a) heaters whose primary function is to provide hot drinking or sanitary water;

   (b) heaters for heating and distributing gaseous heat transfer media such as vapour or air;

   (c) cogeneration heaters with a maximum electrical capacity of 50 kW or above;

(d) space heaters that combine both indirect heating, using hydronic central heating system, and direct heating, by direct emission of heat into the room or space where the appliance is installed;

(e) circulators, where they are supplied separately from the heater.

Article 2

For the purpose of this Decision, the following definitions shall apply:

(1) 'space heater' means a device that provides heat to a water-based central heating system in order to reach and maintain at a desired level the indoor temperature of an enclosed space such as a building, a dwelling or a room; a heater is equipped with one or more heat generators;

(2) 'combination heater' means a hydronic space heater that is designed to also provide heat to deliver hot drinking or sanitary water at given temperature levels, quantities and flow rates during given intervals, and is connected to an external supply of drinking or sanitary water;

(3) 'hybrid heater' means a package offered to the end-user containing one or more space heaters and/or one or more combination heaters, all placed on the market separately and combining heat generators of different technologies;

(4) 'hydronic central heating system' means a system using water as a heat transfer medium to distribute centrally generated heat to heat emitters for the space heating of buildings, or parts thereof;

(5) 'heat generator' means the part of a heater that generates the heat;

(6) 'gas heater' means a space heater or combination heater equipped with one or more heat generators fuelled with gaseous fuels of fossil origin or from biomass;

(7) 'liquid fuel heater' means a space heater or combination heater equipped with one or more heat generators fuelled with liquid fuels of fossil origin or from biomass;

(8) 'solid fuel heater' means a a space heater or combination heater equipped with one or more heat generators fuelled with solid fuels of fossil origin or from biomass;

(9) 'boiler heater' means a space heater or combination heater equipped with one or more heat generators using the combustion of gaseous, liquid or solid fuels of fossil origin or from biomass;

(10) 'gas boiler heater' means a boiler heater equipped with one or more heat generators using the combustion of gaseous fuels of fossil origin or from biomass;

(11) 'liquid fuel boiler heater' means a boiler heater equipped with one or more heat generators using the combustion of liquid fuels of fossil origin or from biomass;

(12) 'solid fuel boiler heater' means a boiler heater equipped with one or more heat generators using the combustion of solid fuels of fossil origin or from biomass;

(13) ‘solid biomass boiler heater’ means a boiler heater equipped with one or more heat generators using the combustion of solid fuels from biomass;

(14) ‘electric boiler heater’ means a boiler heater equipped with one or more heat generators using the Joule effect in electric resistance heating elements only;

(15) ‘heat pump heater’ means a space heater or combination heater equipped with one or more heat generators using ambient heat from an air, water or ground source, and/or waste heat for heat generation;

(16) ‘fuel-driven heat pump heater’ means a heat pump heater equipped with one or more heat generators fueled with gas or liquid fuel of fossil origin or from biomass;

(17) ‘electrically-driven heat pump heater’ means a heat pump heater equipped with one or more heat generators using electricity as a fuel;

(18) ‘cogeneration heater’ means a space heater simultaneously generating heat and electricity in a single process;

(19) ‘temperature control’ means equipment that interfaces with the end-user regarding the values and timing of the desired indoor temperature, and communicates relevant data, such as actual indoor and/or outdoor temperature(s), to an interface of the heater such as a central processing unit, thus helping to regulate the indoor temperature(s);

(20) ‘seasonal space heating energy efficiency’ (η_s) means the ratio between the space heating demand for a designated heating season, supplied by a space heater, a combination heater or a hybrid heater, including temperature control, and the annual energy consumption required to meet this demand, expressed in percentage (%);

(21) ‘water heating energy efficiency’ (η_{wh}) means the ratio between the useful energy in the drinking or sanitary water provided by a combination heater or a hybrid heater containing one or more combination heaters and the energy required for its generation, expressed in percentage (%);

(22) ‘global warming potential’ means global warming potential as defined in Article 2(4) of Regulation (EC) No 842/2006 of the European Parliament and of the Council[2];

(23) ‘Nm³’ means normal cubic metre (at 101.325 kPa, 273.15 K).

Article 3

The criteria for awarding the EU Ecolabel for a product falling within the product group ‘hydronic heaters’ defined in Article 1 of this Decision, as well as the related assessment and verification requirements, are set out in the Annex to this Decision.

[2] OJ L 161, 14.6.2006, p. 1.

Article 4

The criteria for the product group 'hydronic heaters' and the related assessment and verification requirements set out in the Annex shall be valid until [specific date] [date to be calculated four years from the date of adoption of this Decision].

Article 5

For administrative purposes the code number assigned to the product group 'hydronic heaters' shall be 'x'. [please specify the code]

Article 6

This Decision is addressed to the Member States.

Done at Brussels,

For the Commission

Janez POTOČNIK
Member of the Commission

ANNEX

EU ECOLABEL CRITERIA AND ASSESSMENT REQUIREMENTS

Criteria for awarding the EU Ecolabel to hydronic heaters are set for each of the following aspects:

1. Minimum energy efficiency

(a) Minimum seasonal space heating energy efficiency

(b) Minimum water heating energy efficiency

2. Greenhouse gas emission limits

3. Refrigerant and secondary refrigerant

4. Nitrogen oxide (NO_x) emission limits

5. Carbon monoxide (CO) emission limits

6. Organic gaseous carbon (OGC) emission limits

7. Particulate matter (PM) emission limits

8. Noise emission limits

9. Hazardous substances and mixtures

10. Substances listed in accordance with Article 59(1) of Regulation (EC) 1907/2006 of the European Parliament and of the Council[1]

11. Plastic parts

12. Product design for sustainability

13. Installation instructions and user information

14. Information appearing on the EU Ecolabel

Table 1 presents the applicability of the different criteria to each heat generator technology. In the case of a hybrid heater, it shall comply with all the criteria applicable to each of the heat generator technologies it is made of.

The specific assessment and verification requirements are indicated within each criterion.

Where the applicant is required to provide declarations, documentation, analyses test reports, or other evidence to show compliance with the criteria, these may originate from the applicant or his supplier or both.

[1] OJ L 396, 30.12.2006, p. 1.

Where possible, the testing shall be performed by laboratories that meet the general requirements of European Standard EN ISO 17025 or equivalent.

Test methods for each criterion, unless specified otherwise, shall be those described in the relevant Standards as indicated in **Table 2** and **Table 3** (where applicable). Where appropriate, test methods other than those indicated for each criterion may be used if the competent body assessing the application accepts their equivalence.

Where appropriate, competent bodies may require supporting documentation and may carry out independent verifications.

Table 1. Applicability of the different criteria to each of the heat generator technologies

Criteria \ Heat generator technology	Gas boiler heaters	Liquid fuel boiler heaters	Solid fuel boiler heaters	Electric boiler heaters	Fuel-driven heat pump heaters	Electric-ally-driven heat pump heaters	Cogene-ration heaters
1(a) – Minimum seasonal space heating energy efficiency	x	x	x	x	x	x	x
1(b) – Minimum water heating energy efficiency (applicable to combination heaters only)	x	x		x	x	x	x
2 – Greenhouse gas emission limits	x	x	x	x	x	x	x
3 – Refrigerant and secondary refrigerant					x	x	
4 – Nitrogen oxide (NOx) emission limits	x	x	x		x		x
5 – Carbon monoxide (CO) emission limits	x	x	x		x		x
6 – Organic carbon (OGC) emission limits			x				
7 – Particulate matter (PM) emission limits		x	x				x
8 – Noise emission limits					x	x	x
9 – Hazardous substances and materials	x	x	x	x	x	x	x
10 – Substances listed in accordance with Article 59(1) of Regulation (EC) 1907/2006	x	x	x	x	x	x	x
11– Plastic parts	x	x	x	x	x	x	x
12– Product design for sustainability	x	x	x	x	x	x	x
13 – Installation instructions and user information	x	x	x	x	x	x	x
14 – Information appearing on the EU Ecolabel	x	x	x	x	x	x	x

Table 2. Relevant standards for test methods

Number	Title
Gas boiler heaters	
EN 676	Automatic Forced draught burners for gaseous fuels
EN 15502-1	Gas-fired heating boilers – Part 1: General requirements and tests
Liquid fuel boiler heaters	
EN 267	Automatic forced draught burners for liquid fuels
EN 303-1	Heating boilers - Part 1: Heating boilers with forced draught burners - Terminology, general requirements, testing and marking
EN 303-2	Heating boilers – Part 2: Heating boilers with forced draught burners – Special requirements for boilers with atomizing oil burners
EN 303-4	Heating boilers - Part 4: Heating boilers with forced draught burners - Special requirements for boilers with forced draught oil burners with outputs up to 70 kW and a maximum operating pressure of 3 bar - Terminology, special requirements, testing and marking
EN 304	Heating boilers – Test code for heating boilers for atomizing oil burners
Solid fuel boiler heaters	
EN 303-5	Heating boilers – Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW – Terminology, requirements, testing and marking
Electric boiler heaters	
EN 60335-2-35	Household and similar electrical appliances – Safety – Part 2-35: Particular requirements for instantaneous water heaters
Fuel-driven heat pump heaters	
EN 12309 series	Gas-fired absorption and adsorption air-conditioning and/or heat pump appliances with a net heat input not exceeding 70 kW
DIN 4702, Part 8	Central heating boiler; determination of the standard efficiency and the standard emissivity
Electrically-driven heat pump heaters	
EN 14511 series	Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling
EN 14825	Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling – Testing and rating at part load conditions and calculation of seasonal performance

Cogeneration heaters	
EN 50465	Gas appliances – Fuel cell gas heating appliances – Fuel cell gas heating appliance of nominal heat input inferior or equal to 70 kW ([4])
ISO 3046-1	Reciprocating internal combustion engines – Performance – Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods – Additional requirements for engines for general use

Table 3. Additional relevant standards for test methods of air emissions

Number	**Title**
Nitrogen oxide emissions	
EN 14792	Stationary source emissions – Determination of mass concentration of nitrogen oxides (NOx) – Reference method: Chemiluminescence
Carbon monoxide emissions	
EN 15058	Stationary source emissions – Determination of the mass concentration of carbon monoxide (CO) – Reference method: Non-dispersive infrared spectrometry
Organic gaseous carbon emissions	
EN 12619	Stationary source emissions – Determination of the mass concentration of total gaseous organic carbon at low concentrations in flue gases – Continuous flame ionisation detector method
Particulate matter emissions	
EN 13284-1	Stationary source emissions – Determination of low range mass concentration of dust – Part 1: Manual gravimetric method

[4] An updated version of the standard is expected to cover cogeneration as well (see Draft prEN 50465:2011 Gas appliances – Combined Heat and Power appliance of nominal heat input inferior or equal to 70 kW)

Criterion 1 – Minimum energy efficiency

Criterion 1(a) – Minimum seasonal space heating energy efficiency

The seasonal space heating energy efficiency η_s of the hydronic heater shall not fall below the limit values set out in **Table 4**.

Table 4. Minimum requirements for seasonal space heating energy efficiency by heat generator technology

Heat generator technology	**Minimum seasonal space heating energy efficiency**
All heaters except solid biomass boiler heaters	$\eta_s \geq 98$ %
Solid biomass boiler heaters	$\eta_s \geq 79$ %

(i) The seasonal space heating energy efficiency shall be calculated in accordance with the procedures set out in Annex III to Regulation (EU) No … implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters [Number of the Regulation and OJ reference in footnote to be inserted[5]] and in Annex VII to Regulation (EU) No … supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control, solar device and passive flue heat recovery device [Number of the Regulation and OJ reference in footnote to be inserted[6]], including, where applicable, the transitional methods set in Commission Communication No … [Number of the Commission Communication and OJ reference in footnote to be inserted[7]].

(ii) For solid fuel boiler heaters, η_s shall be calculated in accordance with the procedures referred to in point (i), taking into account the following additional requirements:

(a) the calculation of η_s shall be based on the gross calorific value of the wet fuel (as received) GCV_{ar}, which corrects for the moisture content in the fuel but includes in the energy content the latent heat energy stored in hydrogen that is oxidised to water in the combustion process. The principles laid down in Standard EN 303-5:1999 shall apply to estimate η_s, while GCV_{ar} instead of the net calorific value of the wet fuel (as received) NCV_{ar} shall be used for the calculation of η_s.

(b) for determining the calorific value of solid biomass, the principles laid down in Standard EN 14918:2009 shall apply.

(c) The gross calorific value of the wet fuel at constant volume $GCV_{ar,V}$ can be derived as follows:

[5] This refers to Ecodesign Lot 1.
[6] This refers to Energy Labelling Lot 1.
[7] This refers to the Commission Communication describing the transitional methods applicable to Ecodesign and Energy Labelling Lot 1, to be replaced by harmonised standard(s).

$GCV_{ar,V} = GCV_{dry,V} \times (100 - m) / 100$ [MJ/kg]

where:

m is the moisture content of the wet fuel (percentage by mass)

$GCV_{dry,V}$ is the gross calorific value of the dry fuel (moisture-free) at constant volume

(d) The gross calorific value of the dry fuel at constant volume $GCV_{dry,V}$ can be derived as follows:

$GCV_{dry,V} = NCV_{dry,P} + 0.2122 \times H_{dry} + 0.0008 \times (O_{dry} + N_{dry})$ [MJ/kg]

where:

$NCV_{dry,P}$ is the net calorific value of the dry fuel (including ash) at constant pressure

H_{dry} is the hydrogen content of the dry fuel (percentage by mass)

O_{dry} is the oxygen content of the dry fuel (percentage by mass)

N_{dry} is the nitrogen content of the dry fuel (percentage by mass)

(e) The net calorific value of the dry fuel at constant pressure $NCV_{dry,P}$ can be derived as follows:

$NCV_{dry,P} = NCV_{ar,P} \times 100 / (100 - m) + 2.443 \times m / (100 - m)$ [MJ/kg]

where:

$NCV_{ar,P}$ is the net calorific value of the wet fuel at constant pressure

(f) It shall be noted that with combining (c), (d) and (e), $GCV_{ar,V}$ can be derived from $NCV_{ar,P}$ as follows:

$GCV_{ar,V} = NCV_{ar,P} + [0.2122 \times H_{dry} + 0.0008 \times (O_{dry} + N_{dry})] \times (100 - m) / 100 + 0.02443 \times m$ [MJ/kg]

Assessment and verification:

The applicant shall declare that the product complies with this criterion and provide test results conducted in accordance with the testing procedure indicated in the EN standards (including transitional methods where applicable) applicable to the given type of product (see **Table 2**). Measurements and calculations of the seasonal space heating energy efficiency shall be made using the methodology of seasonal space heating energy efficiency of packages and in accordance with the procedures referred to in point (i). For solid fuel boiler heaters, the seasonal space heating energy efficiency shall be calculated in accordance with point (ii).

Criterion 1(b) – Minimum water heating energy efficiency

(i) The water heating energy efficiency η_{wh} of combination heaters or hybrid heaters containing one or more combination heaters shall not fall below 65 %. This criterion shall not apply to solid fuel boiler heaters.

(ii) The water heating energy efficiency shall be calculated in accordance with the procedures set out in Annex III to Regulation (EU) No …[Number of the Regulation to be inserted[8]] and in Annex VII to Regulation (EU) No … [Number of the Regulation to be inserted[9]].

Assessment and verification:

The applicant shall declare that the product complies with this criterion and provide test results conducted in accordance with the testing procedure indicated in the EN standards (including transitional methods where applicable) applicable to the given type of product (see **Table 2**). Measurements and calculations shall be made using the methodology of water heating energy efficiency of packages in accordance with the procedures referred to in point (ii).

Criterion 2 – Greenhouse gas (GHG) emission limits

The greenhouse gas (GHG) emissions of the hydronic heater, expressed in grams of CO_2-equivalent per kWh of heating output calculated using the Total Equivalent Warming Impact (TEWI) formulas set out in Table 6, shall not exceed the values set out in **Table 5**.

Table 5. GHG emission limits by heat generator technology

Heat generator technology	**GHG emission limits**
All heaters, except heat pump heaters	200 g CO_2-equivalent/kWh heating output
Heat pump heaters	150 g CO_2-equivalent/kWh heating output

The GHG emissions shall be calculated following the TEWI formulae as set out in **Table 6** (the formula depends on the heat generator technology). Each TEWI formula may consist of two parts, one depending solely on the heater efficiency (expressed in terms of the seasonal space heating energy efficiency, η_s) and the fuel carbon intensity (represented by the β parameter), and the second part (only applicable to heat pump heaters) depending on the greenhouse gas emissions due to refrigerant leakage. The GHG emissions from the refrigerant leakage depend on the global warming potential (GWP_{100}) of the refrigerant and the refrigerant leakage during the use phase (expressed as an annual leakage rate, ER, in

[8] This refers to Ecodesign Lot 1.
[9] This refers to Energy Labelling Lot 1.

percentage of the total mass of the refrigerant per year) and at end-of-life (expressed as a percentage of the total mass of the refrigerant, α).

Table 6. TEWI formulae by heat generator technology

Heat generator technology	**TEWI formula (g CO_2-equivalent/kWh heating output)**
Boiler heaters	$\frac{\beta_{\text{fuel}}}{\eta_s}$
Heat pump heaters	$\delta \times \frac{\beta_{\text{fuel}}}{\eta_s} + (1-\delta) \times \frac{\beta_{\text{elec}}}{2.5 \times \eta_s} + \frac{\text{GWP}_{100} \times \text{m} \times (\text{ER} \times \text{n} + \alpha)}{\text{P} \times \text{h} \times \text{n}}$
Cogeneration heaters	$\frac{\beta_{\text{fuel}}}{\eta_{thermal}} + \frac{\eta_{cogen} \times \beta_{\text{elec}}}{\eta_{thermal} \times 2.5}$
Hybrid heaters	$(1-s_{HP}) \times \frac{\beta_{\text{fuel(1)}}}{\eta_{s,B}} + s_{HP} \times \left(\delta \times \frac{\beta_{\text{fuel(2)}}}{\eta_{s,HP}} + (1-\delta) \times \frac{\beta_{\text{elec}}}{2.5 \times \eta_{s,HP}} \right) + \frac{\text{GWP}_{100} \times m \times (\text{ER} \times \text{n} + \alpha}{P \times \text{h} \times \text{n}}$

The main parameters in the TEWI formulae set out in Table 6 are described in **Table 7**.

Table 7. Main parameters for computing the TEWI formulae

Parameter	**Description of parameter**	**Units**	**Constant value or test to be performed in order to obtain the parameter**
β_{elec}	GHG emission intensity of electricity	[g CO_2-equivalent/kWh_{elec}]	384
β_{fuel}	GHG emission intensity of the fuel used by the heater	[g CO_2-equivent/kWh]	See Table 8
η_s	Seasonal space heating energy efficiency	[-]	To be tested and declared by the applicant (Criterion 1)
$\eta_{s,B}$	Seasonal space heating energy efficiency of the boiler heater part for average climate conditions	[-]	To be tested and declared by the applicant; this corresponds to the seasonal space heating energy efficiency of the package minus supplementary heat pump, as stated in the product fiche of packages

$\eta_{s,HP}$	Seasonal space heating energy efficiency of the heat pump heater part for average climate conditions	[-]	To be tested and declared by the applicant; this corresponds to the seasonal space heating energy efficiency of the supplementary heat pump, as stated in the product fiche of packages
$\eta_{thermal}$	Thermal efficiency	[-]	See Table 9
η_{cogen}	Cogeneration efficiency	[-]	See Table 9
δ	Proxy	[-]	= 0 if electrically-driven heat pump heater = 1 if fuel-driven heat pump heater
GWP_{100}	Global warming potential (effect over 100 years)	[g CO_2-equivalent/g refrigerant, over 100 year period]	According to Annex I to Regulation (EC) No 842/2006
m	Refrigerant mass	[g]	To be declared by the applicant
ER	Refrigerant loss per year	[%/yr]	A value of ER = 3.5 %/yr shall be used.
n	Lifetime	[yr]	A value of n = 15 shall be used.
α	Refrigerant loss at end of life (disposal loss)	[%]	A value of α = 35 % shall be used.
P	Design load	[kW]	To be declared by the applicant.
h	Full load operating hours	[h/yr]	2000
s_{HP}	Share of heat output from the heat pump heater part over the total heat output	[-]	$= (16 - T_{HP}) / 26$ where T_{HP} is the temperature (ºC) at which the (primary) heat pump efficiency equals the primary boiler efficiency. It is assumed that below this temperature the boiler fulfils the heat demand, while above this temperature the heat pump supplies the heat demand.

Table 8 describes how to evaluate parameter β_{fuel} in the TEWI formulae depending on the fuel used by the heater. In case the boiler is designed for a fuel not listed in the table, the closest match of fuel shall be selected, based on the origin (fossil or biomass) and form (gaseous, liquid or solid) of the fuel used.

Table 8. Parameter β_{fuel} (GHG emission intensity) to compute the TEWI formulae

Fuel used by the heater	**GHG emission intensity**	**Value (g CO_2-equivalent/kWh)**
Gaseous fossil fuels	$\beta_{fuel} = \beta_{gas}$	202
Liquid fossil fuels	$\beta_{fuel} = \beta_{oil}$	292
Solid fossil fuels	$\beta_{fuel} = \beta_{coal}$	392
Gaseous biomass	$\beta_{fuel} = \beta_{bio\text{-}gas}$	98
Liquid biomass	$\beta_{fuel} = \beta_{bio\text{-}oil}$	149
Wood logs	$\beta_{fuel} = \beta_{bio\text{-}log}$	19
Wood chips	$\beta_{fuel} = \beta_{bio\text{-}chip}$	16
Wood pellets	$\beta_{fuel} = \beta_{bio\text{-}pellet}$	39
Blends of fossil fuels and biomass	β_{fuel} = weighted average derived from the sum of the weight fractions of the individual fuels multiplied by their GHG emission parameter	Σ (Fuel X % × $\beta_{fuel\ X}$) + (Fuel Y % × $\beta_{fuel\ Y}$) + … (Fuel N % × $\beta_{fuel\ N}$)

Table 9 describes how to evaluate parameters $\eta_{thermal}$ and η_{cogen} in the TEWI formula for cogeneration heaters.

Table 9. Parameters $\eta_{thermal}$ and η_{cogen} to compute the TEWI formula for cogeneration heaters

Parameter	Expression	Remarks
$\eta_{thermal}$	$= \eta_{son} - \sum_{i=1}^{4} F(i)$	η_{son} means the seasonal space heating energy efficiency in active mode as defined in Regulation (EU) No … [Number of the Regulation] F(i) means corrections F(1), F(2), F(3) and F(4) as defined in Commission Communication 2012/C…/…[Number of the **Communication**]
η_{cogen}	= F(5)	F(5) means correction F(5) as defined in Commission Communication 2012/C…/…[**Number of the Communication**]

Assessment and verification:

A certificate signed by the manufacturer declaring compliance with this criterion shall be submitted to the awarding competent body, together with the relevant documentation. The applicant shall provide the calculated GHG emissions following the proposed TEWI formulae and detail all the parameters used to calculate the GHG emissions.

Criterion 3 – Refrigerant and secondary refrigerant

Refrigerant

The global warming potential over a 100 year period (GWP_{100}) of the refrigerant shall not exceed a value of 2000. GWP_{100} values shall be those set out in Annex I to Regulation (EC) No 842/2006.

Secondary refrigerant

If applicable, the design of the hydronic heater shall not be based on secondary refrigerant, brine or additives classified as environmentally hazardous or constituting a health hazard within the meaning of Regulation (EC) No 1272/2008([10]), and installation instructions shall clearly indicate that substances classified as environmentally hazardous or constituting a health hazard shall not be used as a secondary refrigerant.

Assessment and verification:

Refrigerant

The names of refrigerant(s) used in the product shall be submitted with the application, along with their GWP_{100} values as defined in Regulation (EC) No 842/2006. The GWP_{100} values of refrigerants shall be calculated in terms of the 100-year warming potential of one kilogram of a gas relative to one kilogram of CO_2. Sources of references for the GWP_{100} values should be those defined in Annex 1.1(7) to Regulation (EU) No 206/2012 [11].

For the secondary refrigerant(s) only

The name(s) of the secondary refrigerant(s) used shall be submitted with the application.

([10]) OJ L 353, 31.12.2008, p. 1.
[11] OJ L 72, 10.3.2012, p. 7

Criterion 4 – Nitrogen oxide (NO_x) emission limits

The nitrogen oxide (NO_x) content of the exhaust gas shall not exceed the limit values indicated in **Table 10** (not applicable to electrical heaters). NO_x emissions shall be measured as the sum of nitrogen monoxide and nitrogen dioxide. The unit of measurement shall be given in mg/kWh energy input or in mg/Nm³, as appropriate.

Table 10. NO_x emission limits by heat generator technology

Heat generator technology	**NO_x emission limit**
Gas heaters	Equipped with internal combustion: 170 mg/kWh energy input Equipped with external combustion: 45 mg/kWh energy input
Liquid fuel heaters	Equipped with internal combustion: 380 mg/kWh energy input Equipped with external combustion: 100 mg/kWh energy input
Solid fuel heaters	Using wood pellet and wood log fuels: 150 mg/Nm³ at 10 % O_2 Using wood chip and other solid fuels: 150 mg/Nm³ at 10 % O_2

Assessment and verification:

A certificate signed by the manufacturer declaring compliance with this criterion shall be submitted to the awarding competent body, together with the relevant documentation.

The NO_x emissions in the exhaust gas shall be determined as standard emission factors according to the relevant standards included in **Table 2** and **Table 3** (where applicable).

Criterion 5 – Carbon monoxide (CO) emission limits

The carbon monoxide (CO) content of the exhaust gas shall not exceed the limit values indicated in **Table 11** (not applicable to electrical heaters). The unit of measurement shall be given in mg/kWh energy input or in mg/Nm³, as appropriate.

Table 11. CO emission limits by heat generator technology

Heat generator technology	**CO emission limit**
Gas heaters	Equipped with internal combustion: 150 mg/Nm³ at 5 % O_2 Equipped with external combustion: 25 mg/kWh energy input
Liquid fuel heaters	Equipped with internal combustion: 200 mg/Nm³ at 5 % O_2

	Equipped with external combustion: 50 mg/kWh energy input
Solid fuel heaters	Automatically stoked: 90 mg/Nm³ at 10 % O_2 Hand stoked: 250 mg/Nm³ at 10 % O_2

Assessment and verification:

A certificate signed by the manufacturer declaring compliance with this criterion shall be submitted to the awarding competent body, together with the relevant documentation.

The CO emissions in the exhaust gas shall be determined as standard emission factors according to the relevant standards included in **Table 2** and **Table 3** (where applicable).

Criterion 6 – Organic gaseous carbon (OGC) emission limits

The organic gaseous carbon (OGC) of the exhaust gas also understood as organically bound carbon content shall not exceed the limit values indicated in **Table 12** (only applicable to solid fuel boiler heaters). The unit of measurement shall be given in mg/Nm³.

Table 12. OGC emission limits by heat generator technology

Heat generator technology	**OGC emission limit**
Solid fuel boiler heaters	7 mg/Nm³ at 10 % O_2

Assessment and verification:

A certificate signed by the manufacturer declaring compliance with this criterion shall be submitted to the awarding competent body, together with the relevant documentation.

The OGC emissions in the exhaust gas shall be determined as standard emission factors according to the relevant standards included in **Table 2** and **Table 3** (where applicable).

Criterion 7 – Particulate matter (PM) emission limits

The particle matter (PM) content of the exhaust gas shall not exceed the limit values indicated in **Table 13**. The unit of measurement shall be given in mg/Nm³.

Table 13. PM emission limits by heat generator technology

Heat generator technology	**PM emission limit**
Liquid fuel heaters	Equipped with internal combustion: 1 mg/Nm³ at 5 % O_2

	Equipped with external combustion: no limit
Solid fuel heaters	Using wood pellet and wood log fuels: 15 mg/Nm³ at 10 % O_2 Using wood chip and other solid fuels: 15 mg/Nm³ at 10 % O_2

Assessment and verification:

A certificate signed by the manufacturer declaring compliance with this criterion shall be submitted to the awarding competent body, together with the relevant documentation.

The PM emissions in the exhaust gas shall be determined as standard emission factors according to the relevant standards included in **Table 2** and **Table 3** (where applicable).

Criterion 8 – Noise emission limits

The noise emissions shall not exceed the limit values indicated in **Table 14**. The unit of measurement shall be given in dB(A) or dB(C), as appropriate.

Table 14. Noise emission limits by heat generator technology

Heat generator technology	**Measurement**	**Noise emission limit**
Heat pump heaters equipped with external combustion	A-weighted sound power level limit value ($L_{WAd, lim}$)	$17 + 36 \times \log(P_N + 10)$ dB(A)
Heat pump heaters equipped with internal combustion	A-weighted sound pressure level limit value ($L_{PAd, lim}$)	$30 + 20 \times \log (0.4 \times P_N + 15)$ dB(A)
	C-weighted sound pressure level limit value ($L_{PCd, lim}$)	$L_{PAd, lim} + 20$ dB(C)
Cogeneration heaters equipped with internal combustion	A-weighted sound pressure level limit value ($L_{PAd, lim}$)	$30 + 20 \times \log (P_E + 15)$ dB(A)
	C-weighted sound pressure level limit value ($L_{PCd, lim}$)	$L_{PAd, lim} + 20$ dB(C)

Note: P_N means the nominal (full load) or declared heat output; P_E means the electricity output.

Assessment and verification:

A certificate signed by the manufacturer declaring compliance with this criterion shall be submitted to the awarding competent body, together with the relevant documentation.

Testing shall be performed in accordance with EN 12102:2008 for heat pump heaters equipped with external combustion and EN ISO 3744:2009 or EN ISO 3746:2010 for heat pump and

cogeneration heaters equipped with internal combustion. The test report shall be submitted with the application.

Criterion 9 – Hazardous substances and mixtures

In accordance with Article 6(6) of Regulation (EC) No 66/2010, the product or any article of it shall not contain substances referred to in Article 57 of Regulation (EC) No 1907/2006 nor substances or mixtures meeting the criteria for classification in the hazard classes or categories listed in **Table 15** in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council[12] or with Directive 67/548/EEC [*the second column lists the risk phrases provided for in that Directive*].

Table 15. List of hazard statements and risk phrases:

Hazard statement [13]	Risk Phrase [14]
H300 Fatal if swallowed	R28
H301 Toxic if swallowed	R25
H304 May be fatal if swallowed and enters airways	R65
H310 Fatal in contact with skin	R27
H311 Toxic in contact with skin	R24
H330 Fatal if inhaled	R23/26
H331 Toxic if inhaled	R23
H340 May cause genetic defects	R46
H341 Suspected of causing genetic defects	R68
H350 May cause cancer	R45
H350i May cause cancer by inhalation	R49
H351 Suspected of causing cancer	R40
H360F May damage fertility	R60
H360D May damage the unborn child	R61
H360FD May damage fertility. May damage the unborn child	R60/61/60-61
H360Fd May damage fertility. Suspected of damaging the unborn child	R60/63
H360Df May damage the unborn child. Suspected of damaging fertility	R61/62
H361f Suspected of damaging fertility	R62
H361d Suspected of damaging the unborn child	R63

[12] OJ L 353, 31.12.2008, p. 1.
[13] As provided for in Regulation (EC) No 1272/2008.
[14] As provided for in Directive 67/548/EEC.

H361fd May damage fertility. May damage the unborn child	R62-63
H362 May cause harm to breast fed children	R64
H370 Causes damage to organs	R39/23/24/25/26/27/28
H371 May cause damage to organs	R68/20/21/22
H372 Causes damage to organs	R48/25/24/23
H373 May cause damage to organs	R48/20/21/22
H400 Very toxic to aquatic life	R50/50-53
H410 Very toxic to aquatic life with long-lasting effects	R50-53
H411 Toxic to aquatic life with long-lasting effects	R51-53
H412 Harmful to aquatic life with long-lasting effects	R52-53
H413 May cause long-lasting effects to aquatic life	R53
EUH059 Hazardous to the ozone layer	R59
EUH029 Contact with water liberates toxic gas	R29
EUH031 Contact with acids liberates toxic gas	R31
EUH032 Contact with acids liberates very toxic gas	R32
EUH070 Toxic by eye contact	R39-41

The use of substances or mixtures in the final product which upon processing change their properties in a way that the identified hazard no longer applies is exempted from the above requirement.

Concentration limits for substances or mixtures meeting the criterion for classification in the hazard classes or categories listed in table 15, and for substances meeting the criteria of Article 57(a), (b) or (c) of Regulation (EC) No 1907/2006, shall not exceed the generic or specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008. Where specific concentration limits are determined, they shall prevail against the generic ones.

Concentration limits for substances meeting the criteria of Article 57(d), (e) or (f) of Regulation (EC) No 1907/2006 shall not exceed 0.1 % weight by weight.

The substances or mixtures listed in **Table 16** are specifically exempted from the prohibition set out in Article 6(6) of Regulation (EC) No 66/2010.

Table 16. Derogations from the prohibition set out in Article 6(6) of Regulation (EC) No 66/2010

Derogated substances, parts or articles	Derogations
Articles with weight below 25 g	All hazard statements and risk phrases
Homogeneous parts of complex articles with weight below 25 g	All hazard statements and risk phrases
Nickel in stainless steel	H351/372 and R40/48/25/24/23

Assessment and verification:

For each article and/or homogeneous part of complex articles with weight over 25 g, the applicant shall provide a declaration of compliance with this criterion, together with the related documentation, such as declarations of compliance signed by the suppliers of substances and copies of relevant Safety Data Sheets in accordance with Annex II to Regulation (EC) No 1907/2006 for substances or mixtures. Concentration limits for substances and mixtures shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006.

Criterion 10 – Substances listed in accordance with Article 59(1) of Regulation (EC) 1907/2006

No derogation from the prohibition set out in Article 6(6) of Regulation (EC) No 66/2010 may be granted concerning substances identified as substances of very high concern and included in the list referred to in Article 59 of Regulation (EC) No 1907/2006, present in mixtures, in an article or in any homogenous part of a complex article in concentrations higher than 0.1 % w/w. Specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008 shall apply where the concentration is lower than 0,1 % w/w.

Assessment and verification:

The list of substances identified as substances of very high concern and included in the candidate list in accordance with Article 59 of Regulation (EC) No 1907/2006 can be found here:

http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

Reference to the list shall be made on the date of application.

The applicant shall provide a declaration of compliance with this criterion, together with the related documentation, such as declarations of compliance signed by the suppliers of substances and copies of relevant Safety Data Sheets in accordance with Annex II to Regulation (EC) No 1907/2006 for substances or mixtures. Concentration limits for substances and mixtures shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006.

Criterion 11 – Plastic parts

If any plasticiser substance in the manufacturing process is applied, it shall comply with the requirements on hazardous substances set out in Criteria 9 and 10.

Plastic parts of articles or homogeneous parts of complex articles with weight 25 g or more shall not have a chlorine content greater than 50 % by weight.

Plastic parts with weight 50 g or more shall be marked according to the requirements of European Standard EN ISO 11469 to ensure that they are recycled, recovered, or disposed of in the correct manner during the end-of-life phase.

Assessment and verification:

The applicant shall provide a declaration of compliance with this criterion, together with the related documentation, such as declarations of compliance signed by the suppliers of substances and copies of relevant Safety Data Sheets. The applicant shall provide information on the plasticisers used in the product. The applicant shall provide information on the maximum chlorine content of the plastic parts. A declaration of compliance signed by the plastic suppliers and copies of relevant Safety Data Sheets about materials and substances shall also be provided to the awarding competent body. The applicant shall provide information on the intentionally added substances used as flame retardants.

Criterion 12 – Product design for sustainability

The product shall be designed in such a way that its exchangeable components can be replaced easily by service personnel. Information about which elements can be replaced shall be clearly indicated in the information sheet attached to the product. The applicant shall further ensure that genuine or equivalent spare parts are available for at least ten years from the date of purchase.

Repair or replacement of the product shall be covered by the warranty terms for at least five years.

The applicant shall undertake to take the product back free of charge at end-of-life and shall ensure proper recycling or material recovery of the product, while non-recyclable product parts shall be disposed of in an environmentally acceptable manner. The product information shall provide the details of the take-back scheme in place.

Assessment and verification:

The applicant shall provide a declaration of compliance with this criterion, together with the relevant documentation, including a sample or samples of the product information sheet and warranty terms.

Criterion 13 – Installation instructions and user information

The product shall be accompanied by relevant installation instructions and user information, which shall give all the technical details needed for a proper installation and shall provide advice on the product's proper and environmentally friendly use as well as its maintenance. It shall bear the following information in print (on the packaging or on the documentation accompanying the product) or in electronic format:

(a) a statement informing that the product has been awarded the EU Ecolabel, together with a brief, specific explanation as to what this means in addition to the general information provided alongside the EU Ecolabel logo;

(b) general information on appropriate dimensions of heaters for different building characteristics/size;

(c) information on the energy consumption of the heater.

(d) proper installation instructions, including:

(i) instructions specifying that the heater shall be installed by fully trained fitters;

(ii) any specific precautions that shall be taken when the heater is assembled or installed;

(iii) instructions specifying that the control settings of the heater ("heating curve") shall be adjusted properly after installation;

(iv) if applicable, details on what air pollution emission values the flue gas shall have during the operating phase and how the heater should be adjusted to achieve it. In particular, the instructions shall state that:

– the heater shall be adjusted with the aid of measuring gauges for measuring CO, O_2 or CO_2, NO_x, temperature and soot to ensure that none of the threshold values provided for in criteria 2, 4, 5, 6 and 7 are exceeded;

– holes shall be made for measuring gauges in the same location as used in laboratory testing;

– measurement results shall be recorded in a special form or diagram, one copy of which is retained by the end user;

(v) for low flue gas temperature technology, instructions specifying that the system shall be equipped with corrosion-retarding technology;

(vi) for condensing boiler technology, instructions specifying that the chimney shall be protected against condensate with low pH;

(vii) information on who the fitter can approach for guidance on installation;

(e) operating instructions for service personnel;

(f) user information, including:

(i) references to competent installers and service personnel;

(ii) recommendations on the proper use and maintenance of the heater, including the correct fuels to be used and their appropriate storage for optimum combustion and the regular maintenance schedule to keep;

(iii) advice on how rational use can minimise the environmental impact of the heater, in particular information on proper product's use to minimise energy consumption;

(iv) if applicable, information on how the measurement results should be interpreted and how they can be improved.

(v) information about which spare parts can be replaced;

(g) recommendations on appropriate disposal at product's end-of-life.

Assessment and verification:

The applicant shall declare that the product complies with this criterion and provide the competent body with a sample or samples of the user information or a link to a manufacturer's website containing this information as part of the application.

Criterion 14 – Information appearing on the EU Ecolabel

The optional label with text box shall contain the following text:

- Increased energy efficiency
- Reduced greenhouse gas emissions
- Reduced air emissions

The guidelines for the use of the optional label with the text box can be found in the 'Guidelines for the use of the EU Ecolabel logo' on the website:

http://ec.europa.eu/environment/ecolabel/promo/pdf/logo%20guidelines.pdf

Assessment and verification:

The applicant shall provide a sample of the printed paper product showing the label, together with a declaration of compliance with this criterion.