PEP ecopassport® PROGRAM

PSR

SPECIFIC RULES FOR GAS, FUEL OIL, or BIOMASS BOILERS

FOR HEATING ONLY OR HEATING AND DOMESTIC HOT WATER PRODUCTION

PSR-0012-ed1.0-EN-2018 02 09

According to PSR-modele-ed1-EN-2015 03 20

Contents

1. Introduction

This reference document complements and explains the Product Environmental Profile Drafting Rules defined by the PEP ecopassport® program (PEP-PCR ed.3-EN-2015 04 02), available at www.pep-ecopassport.org.

It defines the additional requirements applicable to GAS, FUEL OIL OR BIOMASS BOILERS FOR HEATING ONLY OR HEATING AND DOMESTIC HOT WATER PRODUCTION. Compliance with these requirements is necessary to:

- Qualify the environmental performance of these products on an objective and consistent basis.
- Publish PEPs compliant with the PEP ecopassport® program and international reference standards.[1]

This reference document was drawn up in compliance with the open, transparent rules of the PEP ecopassport® program with the support of stakeholders and professionals in the GAS, FUEL OIL and BIOMASS BOILERS market and the interested parties.

PEP ecopassport®	www.pep-ecopassport.org
PSR reference	PSR-0012-ed1.0-EN-2018 02 09
Critical review	The third-party Critical review was carried out by EVEA The declaration of conformity published on 16/01/2018 can be found in the Appendices.
Availability	The Critical review report is available on request from the P.E.P. Association contact@pep-ecopassport.org
Scope of validity	The critical review report and the declaration of conformity remain valid within 5 years or until the PEP Drafting Rules, or the normative reference texts to which they refer, are modified.

[1] ISO 14025, ISO 14040 and ISO 14044 standards

2. Scope

In accordance with the general instructions of the PEP ecopassport® program (PEP-General instructions-ed4.1-EN-2017 10 17) and additional to the PCR or Product Category Rules (PEP-PCR ed.3-E-EN-2015 04 02) of the PEP ecopassport® eco-declaration program, this document sets out the specific rules for GAS, FUEL OIL, OR BIOMASS BOILERS FOR HEATING ONLY OR HEATING AND DOMESTIC HOT WATER PRODUCTION and defines the product specifications to be adopted by manufacturers in the development of their PRODUCT ENVIRONMENTAL PROFILES (PEPs) particularly with regard to:

- the technology and its type of application,
- the conventional reference lifetime taken into account for the Life Cycle Assessment (LCA),
- the conventional use scenarios to be adopted during the product use phase.

The main purpose of these specific rules is to provide manufacturers of GAS, FUEL OIL OR BIOMASS BOILERS with a common basis for the development of their product life cycle assessments. The various available GAS, FUEL OIL OR BIOMASS BOILER products are thus presented.

2.1. Definition of the product families concerned

The product family concerned is designated by the following terminology: boiler. It includes all devices that generate heating or heating and domestic hot water.
This product family comprises the following devices:

- Gas boiler
- Fuel oil boiler
- Biomass boiler

The present rules concern only:

- Gas or fuel oil boilers with a rated power less than or equal to 400 kW covered by EU regulation No. 813/2013[2]
- Biomass boilers with a rated power less than or equal to 500 kW covered by EU regulation No. 813/1185

These devices can be used for heating or heating and domestic hot water production for a home or a residential or commercial building.

[2] See the sources used in Section 5.2 of the present document.

The present specific rules cover the following products:

Product sub-category	Characteristics to be declared
Boiler	• Energy: gas, fuel oil or biomass • Function: Heating only or heating and domestic hot water production (known as "mixed boiler") • Application: individual or collective • Technology: low-temperature or condensation • Type: Wall-mounted or standing on the floor • Rated power

Table 1 – Product families covered by the PSR

2.2. Special case of cogeneration boilers

The present rules do not apply to products that also produce electricity (cogeneration).

3. Product life cycle assessment

3.1. Functional unit and reference flow description

These specific rules are additional to section 2.1 "Functional unit and reference flow description" of the current PCR (PEP-PCR-ed3-EN- 2015 04 02).

3.1.1. Functional unit

The functional unit is determined on the basis of the main technical characteristics of the family of boiler products.

The function common to all the products in this sector-based appendix is the production of heating or heating and domestic hot water. The unit used to quantify product performance is the heating capacity.

This means that the following functional unit is associated with the devices:

- For a boiler providing heating only:

"To produce 1 kW of heating, according to the reference usage scenario and during the XX-year reference lifetime of the product."

- For a mixed boiler (heating and domestic hot water production):

"To produce 1 kW for heating and domestic hot water production, according to the reference usage scenario and during the XX-year reference lifetime of the product."

The description of the functional unit in the PEP specifies the reference lifetime of the equipment (XX years) according to the specifications in the section 3.1.2 dedicated to the product description and reference flows.

3.1.2. Reference product and reference flow description

For each of equipment categories defined, the analysis carried out includes the following reference flows:

- A boiler with a specific reference lifetime and whose energy consumption in use is expressed in kWh according to the usage scenario in sections 3.5.4.1 (gas or fuel oil boilers) or 3.5.5.1 (biomass boilers) of the present specific rules,
- its packaging
- any products or components required for installation.

The reference lifetime is 17 years for an individual boiler and 22 years for a collective boiler.

In the context of a PEP for a range of products, extrapolation rules will apply to all the reference products, as described in section 3.6 “Rules for extrapolation to a homogeneous environmental family”. In this case, the analysis will be carried out on the reference product, which is defined as follows:

- on an individual boiler providing heating or heating and domestic hot water production with a power rating of 25 kW (gas or fuel oil boilers), 20 kW (biomass boilers using wood pellets) or 30 kW (biomass boilers using logs)
- or on a collective boiler providing heating only with a power rating of 100 kW (gas, fuel oil, or biomass boilers),
- during reference lifetime,
- whose energy consumption in the usage stage is expressed in kWh of final energy according to the usage scenario described in sections 3.5.5.1 (gas or fuel oil boilers) or 3.5.5.1 (biomass boilers) of the present specific rules.

Calculation will be carried out in all cases on the worst performing product (any possible function or option). If no product corresponds to the above definition, the product with the most similar characteristics in the product range will be used.

3.2. System boundaries

These specific rules are additional to section 2 "System boundaries" of the current PCR (PEP-PCR-ed3-EN-2015 04 02).

3.2.1. Manufacturing stage

All components supplied with the product and contributing to its proper operation must be included in the scope of the study.

For biomass boilers, it seems that the boilers consist of various elements, whether built-in or not, and sold by the manufacturer or not (expansion tank, buffer tank, recycling kit, storage/transfer of the fuel, etc.) that vary according to the type of fuel (wood pellets or logs). The minimum elements required to perform the function must be incorporated into the study, whilst the others are defined as accessories to be taken

into account if sold with the boiler. The list of elements taken into consideration must appear clearly in the environmental declaration.
Note: for wood log boilers with manual feed requiring a buffer tank, this buffer tank must be taken into account.

3.2.2. Distribution stage

For this stage, the rules defined in the current PCR apply.

3.2.3. Installation stage

Conventionally, the installation of boilers can involve:

- Modifications to the structure (e.g. masonry work, connection to the electrical network, addition of cladding for better aesthetic integration of the product in the building).
  Any modification to the structure and/or addition of elements not anticipated by the manufacturer is excluded from the scope of the study. The real impact of these operations must be calculated by the user of the declaration if desired according to the installation elements used during the worksite phase.
- The sanitary installation (e.g. sink, taps, etc.) and the associated structure modifications.
  These parameters are excluded from the scope of the study and are subject to a specific declaration.
- For biomass boilers, connection of the product to the connection ducts (e.g. smoke evacuation, air intake).
  Connection ducts are excluded from the scope of the study and are subject to a specific declaration.
- The treatment of packaging waste is, however, included. The packaging waste produced during the installation phase should be disposed of by the installer once the equipment has been installed.

3.2.4. Use stage

Once the unit is installed, the gas, fuel oil, or biomass boiler use stage includes:

- Energy consumption via gas, fuel oil, or biomass (wood pellets or logs)
- Electrical energy consumption,
  In the context of gas and fuel oil boilers, this consumption is excluded from the scope of the study because it is considered negligible.
- Emissions in the air due to the combustion of gas, fuel oil, or wood.
- Ashes due to wood combustion (applicable for biomass boilers only).
- Liquid discharge due to the emission of condensates.
- Water consumption necessary to maintain pressure in the distribution circuit. This consumption is excluded from the scope of the study because it is considered negligible.
- Service operations for maintenance of the product
- For manually loaded pellet biomass boilers, the treatment of pellet packaging waste.

3.2.5. End-of-life stage

For this stage, the rules defined in the current PCR apply.

3.3. Cut-off criteria

The specific rules specified in section 2.3 "Cut-off criteria" of the current PCR (PEP-PCR-ed3-EN- 2015 04 02) apply.

3.4. Specific allocation rule

These specific rules are additional to section 2.4 "Rules for allocation between co-products" of the current PCR (PEP-PCR-ed3-EN- 2015 04 02).

Where primary data are shared with products other than those covered by these specific rules, the impact calculation is determined according to the mass of products manufactured.

3.5. Development of scenarios (default scenarios)

These specific rules are additional to section 2.5 on "Development of scenarios (default scenarios)" of the PCR (PEP-PCR-ed3-EN- 2015 04 02).

3.5.1. Manufacturing stage

A BOILER is composed of components supplied by the manufacturer:

- components directly made by the manufacturer
- or components ready to be fitted together.

The rules defined in section 3.8 "Requirements for collecting primary and secondary data" of these specific rules apply.

3.5.1.1. Waste generated during the manufacturing stage

Waste generation and treatment are included in the manufacturing stage.

Manufacturers can dispose of manufacturing waste themselves or arrange for it to be disposed of. The LCA report shall specify how the manufacturer, or any person working for him or on his behalf fulfils the requirements of these stages, by distinguishing between hazardous manufacturing waste and non-hazardous manufacturing waste and providing evidence of such claims.

When the treatment processes are known (waste-to-energy recovery, burying, incineration without recovery), they shall be presented and justified in the LCA report and the associated environmental impacts shall be taken into account.

For product recovery (recycling, re-use or incineration as fuel for energy production), environmental impacts must be considered in the life cycle analysis for BOILERS, as shown in section 2.5.6 “End of life treatment scenarios” from the current PCR.
The justification for the treatment processes must then be accompanied in the LCA report by the justification for the treatment systems and the recovery rate for each type of waste (e.g. via an annual report on the end-of-life processing of equipment by an eco-organisation).

When the manufacturer does not provide evidence of the processes used to treat the waste generated during the manufacturing stage of the product in question, the treatment process shall be calculated by default as follows:

- For nonhazardous waste: Mass of raw product x 0.20 = 50% of incinerated waste (without waste-to-energy recovery) and 50% of buried waste.
- For hazardous waste: Bare product mass x 0.20 = 100% incinerated waste (without waste-to-energy recovery).

When the worst performer value is used by default, no waste-to-energy recovery will be taken into account. The production (40% of waste) of this lost material must be taken into account.

By sector-based agreement, the transport stage for this waste shall be taken into account, assuming that it is trucked over a distance of 100 km.

3.5.2. Distribution stage

The distribution stage applicable to BOILERS must be analysed in accordance with the PCR section 2.5.3 "Transport scenarios" of the PCR.

3.5.3. Installation stage

The installation phase includes any process, component, energy or consumption and/or emission required to install a boiler.
For boilers, we consider that these elements are negligible.

3.5.3.1. Waste generated during the installation phase

The end of life of the packaging, whose production was taken into account during the manufacturing stage, is taken into account during the installation stage.
The packaging waste from produced during the installation stage is classed as non-hazardous waste and, in principle, shall be disposed of by the installer once the equipment has been installed.

Its processing is calculated as follows, by default[3]:

On the packaging mass	Cardboard, wood, corn starch, cellulose	Plastic and other products considered as non-hazardous waste
Percentage of packaging recycled at end of life	89%	21%
Percentage of packaging recovered for energy production at end of life	8%	32%
Percentage of packaging incinerated (50%) and buried (50%) without recovery at end of life	3%	47%

Table 2 – Default treatment of waste produced during the installation stage

Any other packaging material must be considered as buried.

By sector-based agreement, the transport stage for this waste shall be taken into account, assuming that it is trucked over a distance of 100 km.

Plastic film, straps, packing notes, labels or any other paper on or inside the package are considered to be insignificant and will not be included in the life cycle assessment for packaging waste if these items represent in total less than 50% of the total mass of the packaging.

3.5.4. Use stage for gas or fuel oil boilers

3.5.4.1. Energy consumption

For each product that consumes energy during use, a typical use scenario for calculating the environmental impacts related to such energy consumption has been defined. The method described below is applicable to boilers up to 400 kW power. The efficiencies are given on the HHV (Higher Heating Value).

- In "heating only" use:

The energy consumption C_{tot} in the use stage is calculated as follows:

$$Ctot\ (en\ kWh) = \frac{P * 800}{\frac{etas + F_{regulation}}{100} * 2066} * H_{HE} * \ RLT$$

Where:

- P =
  - For a boiler equipped with a device for adjustment to the heat requirements of the heating system, P_a: power output at the arithmetic average of the maximum and minimum power output according to EN 15502-1/A1 for gas boilers or according to EN 304 for fuel oil boilers expressed in kW

[3] Extract from the ADEME "Industrial, commercial and household packaging" report, 2008, and the "Recycling report 1999-2008: Materials and recycling itemised by sector", 2010, in particular pages 102 & 113.

    - For any other boiler, P_u: power output according to EN 15502-1/A1 for gas boilers or according to EN 304 for fuel oil boilers expressed in kW
- Etas =
    - For boilers with a power output below 70 kW, seasonal energy efficiency of the boiler for the heating mode according to regulation (EU) No. 813/2013.
    - For boilers with a power output above 70 kW, Etas is not a mandatory piece of information under the terms of regulation (EU) No. 813/2013. In that case, the calculation of the seasonal efficiency is supplied by the manufacturer and is performed based on efficiencies Eta1 and Eta4 under the same conditions as for boilers whose power output is below 70 kW. The values of Eta1 and Eta4 are stated in the PEP.
- $F_{regulation}$ = Regulation class defined in the commission communication document No. 2014/C 207/02, taking the boiler's built-in controls into account. By default, Class V is used, i.e. $F_{regulation} = 3$
- H_{HE} = number of hours of annual operation in equivalent active mode defined according to regulation (EU) No. 813/2013 (set at 2066 hours per year)
- RLT = reference lifetime as defined in Section 3.1.2

- <u>Use in heating and domestic hot water production:</u>

The energy consumption C_{tot} in the use stage is calculated as follows:

$$Ctot\ (en\ kWh) = \left(\frac{P * 800}{\frac{etas + F_{regulation}}{100} * 2066} * H_{HE} + 220 * Q_{fuel} \right) * RLT$$

Where:

- P =
    - For a boiler equipped with a device for adjustment to the heat requirements of the heating system, P_a: power output at the arithmetic average of the maximum and minimum power output according to EN 15502-1/A1 for gas boilers or according to EN 304 for fuel oil boilers expressed in kW
    - For any other boiler, P_u: power output according to EN 15502-1/A1 for gas boilers or according to EN 304 for fuel oil boilers expressed in kW
- Etas = seasonal energy efficiency of the boiler for heating mode according to regulation (EU) No. 813/2013.
- $F_{regulation}$ = Regulation class defined in the commission communication document No. 2014/C 207/02, taking the boiler's built-in controls into account. By default, Class V is used, i.e. $F_{regulation} = 3$
- H_{HE} = number of hours of annual operation in equivalent active mode defined according to regulation (EU) No. 813/2013 (set at 2066 hours per year)
- Q_{fuel} = daily fuel consumption for water heating, expressed in kWh according to regulation (EU) No. 811/2013
- RLT = reference lifetime as defined in Section 3.1.2

Note: the number of days of annual operation in domestic hot water production mode is set according to the regulation (EU) No. 811/2013 at 220 days per year.

The consumption of the circulating pump due to pressure losses in the boiler is neglected because it is in the region of 1 W (for 10 mbar of pressure losses and 1.2 m^3/h according to the method defined in EN 14511-3 in force). For collective boilers, the circulating pump is independent, not built-in.

If the use scenario used to carry out the life cycle analysis for the reference product is different from the one prescribed above for the product category, the use scenario chosen must be justified and documented in the report, and the use scenario used must be indicated in the PEP.

3.5.4.2. Consideration of atmospheric emissions

For gas or fuel oil boilers, the following atmospheric emissions must be considered:

- NOx (ILCD flow: Elementary flow / Emissions / Emissions to air / Emissions to air, unspecified / nitrogen oxides)
- CO_2 (ILCD flow: Elementary flow / Emissions / Emissions to air / Emissions to air, unspecified / carbon dioxide)
- CO (applicable to fuel oil boilers only) (ILCD flow: Elementary flow / Emissions / Emissions to air / Emissions to air, unspecified / carbon monoxide)

CnHm emissions are neglected.

To estimate these emissions, we refer to (EU) regulation No. 813/2013 or the existing standards listed below to determine the pollutants to be considered and their evaluations (non-exhaustive list):

Gas boiler	EN 15502-1 A1, EN 303-3, EN 303-7 and EN 676
Fuel oil boiler	EN 303-1/A1, EN 303-2, EN 304, EN 267, EN 15034, EN 15035

3.5.4.3. Consideration of liquid waste

Condensation boilers discharge condensates to be considered according to the following method:

- Gas: 55 g/kWh
- Fuel oil: 43 g/kWh

Composition of condensates:

- Gas: with an average pH of 4.5: water: 99.997%, acids: 0.003%
- Fuel oil: with an average pH of 3: water: 99.9 %, acids: 0.1%

We consider that the boiler does not condense when producing domestic hot water.
The ELCD inventory data concerning the treatment of domestic waste water (waste water treatment; domestic waste water according to the Directive 91/271/EEC concerning urban waste water treatment; at waste water treatment plant; EU-27) is recommended for the modelling of end-of-life treatments of liquid discharge.

3.5.4.4. Taking water consumption into account

The water consumption of boilers is negligible because it corresponding to the water top-up added to keep the distribution circuit at the correct operating pressure.

3.5.5. Use stage for biomass boilers

3.5.5.1. Energy consumption

The following formula is used to calculate the final energy consumption required for the operation of a biomass boiler over its reference lifetime:

$$C\ (kWh) = Celec + Cwood$$

Where:

C = Final energy consumption of the heating product, expressed in kWh, over the reference lifetime

C_{elec} = Electrical energy consumption of the heating product, expressed in kWh, over the reference lifetime

C_{wood} = Wood consumption (logs or pellets) of the heating product, expressed in kWh, over the reference lifetime

Electricity consumption:

For manual-feed solid fuel boilers able to operate at 50% of the rated heating capacity in continuous mode, and for automatic-feed solid fuel boilers:

$$Celec(kWh) = [(0{,}15 * el_{max} + 0{,}85 * el_{min}) * T + P_{SB} * (8760 - T)] * RLT$$

For manual-feed solid fuel boilers unable to operate at 50% or less of the rated heating capacity in continuous mode, and for solid fuel cogeneration boilers:

$$Celec(kWh) = [el_{max} * T + P_{SB} * (8760 - T)] * RLT$$

Where:

el_{max} = Auxiliary electrical power at rated heating capacity, expressed in kW

el_{min} = Auxiliary electrical power at partial-load heating power as defined by European Ecodesign Regulation No. 2015/1189, expressed in kW (Note: The heating power at partial load is equal to 30% of rated P for wood pellet boilers and 50% of rated P for log boilers).

P_{SB} = Auxiliary electrical power in standby mode

T = Number of hours of annual product operation in operating mode

For boilers providing heating only: T = 2066 h

For mixed boilers (heating and DHW): T = 2286 h

RLT = reference lifetime of the product expressed in years

Wood consumption:

For manual-feed solid fuel boilers able to operate at 50% of the rated heating capacity in continuous mode, and for automatic-feed solid fuel boilers:

$$Cwood\ (kg) = Cwood\ (kWh) * \frac{1}{PCI} = \frac{0{,}85 * P_p + 0{,}15 * P_n}{\frac{\eta_{son} - 3 + C_{regulation}}{100} - F_0} * T * RLT * \frac{1}{NCV}$$

For manual-feed solid fuel boilers unable to operate at 50% or less of the rated heating capacity in continuous mode:

$$Cwood\ (kg) = Cwood\ (kWh) * \frac{1}{PCI} = \frac{P_n}{\frac{\eta_{son} - 3 + C_{regulation}}{100} - F_0} * T * RLT * \frac{1}{NCV}$$

Where:

P_n = Rated heating capacity, expressed in kW

P_p = Heating power at partial load as defined by European Ecodesign regulation No. 2015/1189, expressed in kW

η_{son} = Seasonal energy efficiency in active mode of the heating product, relative to the wood consumption, calculated according to European Ecodesign regulation No. 2015/1189, expressed in %

$C_{regulation}$ = Regulation class defined in regulation No. 2015/1187. The following are used by default:

- For boilers with temperature control: Class III i.e. $C_{regulation} = 1.5$
- For boilers without temperature control: $C_{regulation} = 0$

Any other value shall be justified in the LCA report.

F_0 = Factor representing losses during shutdown

T = Number of hours of annual product operation in operating mode

For boilers providing heating only: T = 2066 h

For mixed boilers (heating and DHW): T = 2286 h

RLT = reference lifetime of the product expressed in years

NCV = Net calorific value of wood, expressed in kWh/kg

By sector-based agreement, the NCV values are:

$NCV_{log\ wood}$ = 3.76 kWh/kg (i.e. 13.53 MJ/kg, raw moisture content 25.64%)[4]

$NCV_{wood\ pellets}$ = 4.9 kWh/kg (i.e. 17.64 MJ/kg, raw moisture content 9.10%)[5]

The default value for heat losses during shutdown is given in draft standard PrEN15316-4.7 (manual-load boiler) and the EN1316-4.1 standard (automatic-load boiler) according to the boiler power and for an average temperature in the boiler of 70°C:

$$F_0 = 0{,}5 * \frac{Q_{p0}}{P_n} = 0{,}5 * \frac{c_5}{100} * (P_{n\ limit})^{c_6}$$

Where:

[4] Source EcoInvent. See the sources used in Section 5.2 of the present document

[5] Source EcoInvent and ADEME. See the sources used in Section 5.2 of the present document

Pn limit = Rated power in kW; limited to a maximum value of 400 kW.

C_5 and C_6 = Parameters given in the table below

Type of boiler	C_5 %	C_6 -
Atmospheric manual-load biomass boiler	8.5	-0.4
Manual-load fan-assisted biomass boiler	8.5	-0.4
Automatic-load biomass boiler	8	-0.28

Table 3 – Parameters for the calculation of losses during shutdown of biomass boilers

3.5.5.2. Taking wood production into account

To allow a fair comparison between the various environmental declarations created in the context of this PSR, the inventory data to be used for modelling wooden logs and wood pellets have been set.

The inventory data for the life cycle supplied in the EcoInvent[6] database (Version 3.3 2016) and available in Appendix 5.1 must be used.

For double-arch boilers, the boiler is considered to operate for 2/3 of the time with logs, and 1/3 of the time with wood pellets.

Any consideration of biomass fuel other than logs or wood pellets must be documented in the report.

Note for the "wooden log" data:

- The inventory is representative of wooden log production in the European market.
- Distribution transportation between the production site and the final customer is already included in the inventory data (i.e. a transportation distance of 10 km by truck, which is representative of a local market). Log wood generally comes from a local[7] supplier: self-consumption, purchased from a producer or dealer.
- The wood is considered to come from a sustainable source. This means that throughout the life cycle of the wood until its combustion, the treatment of biogenic carbon is considered to be neutral. Biogenic carbon sequestration does not therefore need to be modelled.
- The inventory is given for 1 kg of dry log wood with 25.64% moisture content (humid mass = 1.34478 kg; Water content = 0.34478 kg)
- The NCV of wood is 3.76 kWh/kg (i.e.13.53 MJ/kg) with 25.64% moisture content

Note for the "wood pellet" data:

- The inventory is representative of wood pellet production in the European market.
- Wood pellets are produced in factories using wood residue from sawmills and wood shavings as raw materials.

[6] Source EcoInvent. See the sources used in Section 5.2 of the present document

[7] Source ADEME. See the sources used in Section 5.2 of the present document

- Transportation and distribution between the production site and the final customer is not included in the inventory data. This procurement must be taken into account by a 100 km truck journey (ELCD module – Articulated lorry transport; Euro 0, 1, 2, 3, 4 mix; 40 t total weight, 27 t max payload; RER)[8].
- The wood is considered to come from a sustainable source. This means that throughout the life cycle of the wood until its combustion, the treatment of biogenic carbon is considered to be neutral. Biogenic carbon sequestration does not therefore need to be modelled.
- The inventory is given for 1 kg of wood pellets with 9.10% moisture content (humid mass = 1.1 kg; Water content = 0.1 kg).
- The NCV of wood is 4.9 kWh/kg (i.e.17.64 MJ/kg) with 9.10% moisture content

3.5.5.3. Consideration of atmospheric emissions

The use of biomass boilers involves the discharge of emissions into the air during the combustion of wood. According to the geographical representation to be covered by the declaration, the airborne emissions to be modelled and their mode of calculation must comply with current national regulatory requirements.
The airborne emissions to be modelled are at least:

- Carbon monoxide (CO) emissions (ILCD flow: Elementary flow / Emissions / Emissions to air / Emissions to air, unspecified / carbon monoxide)
- Nitrogen oxides (NOx) (ILDC flow: Elementary flow / Emissions / Emissions to air / Emissions to air, unspecified / nitrogen oxides)
- Volatile Organic Compounds (VOC) (ILCD flow: Elementary flow / Emissions / Emissions to air / Emissions to air, unspecified / volatile organic compound)
- And fine particles (PM/PME) (ILCD flow: Elementary flow / Emissions / Emissions to air / Emissions to air, unspecified / particles)

The use of European Standard EN 303-5 is recommended.

Note:

- The wood is considered to come from a sustainable source. This means that throughout the life cycle of the wood until its combustion, the treatment of biogenic carbon is considered to be neutral. Biogenic carbon emissions do not therefore need to be modelled.

3.5.5.4. Taking ash waste into account

The use of biomass boilers leads to the production of ash.

The quantity of ash generated is calculated as follows:

$$\boxed{Mass\ of\ ashes\ (kg) = \ Fuel\ mass * Ash\ coefficient}$$

[8] Source ADEME. See the sources used in Section 5.2 of the present document

	Type of fuel	Ash coeff.
Individual boiler	Wood pellets	0.5%
	Wood logs	1%
Collective boiler of rated power up to 70 kW, with an identical design to an individual boiler	Wood pellets	0.5%
	Wood logs	1%

Tableau 4 – Default scenario to estimate ash quantities

For collective boilers with a design that is not identical to that of an individual boiler, the quantity of ash generated must be justified in the supporting report.

The ashes resulting from combustion in the heating product are treated as domestic waste and used for soil improvement in private gardens, an assumption reflecting the current practices of private individuals who use wood for heating.
The end-of-life processing of ashes is modelled as follows:

	Type of fuel	Percentage of waste flow sent to landfill	Percentage of waste flow used in soil improvement
Individual boiler	Wood pellets	80%	20%
	Wood logs	20%	80%
Collective boiler	Wood pellets, wood logs	100%	0%

Table 5 – Default scenario for end-of-life treatment of ashes

For the spreading of ashes in private gardens, the leaching behaviour of the metals contained in the ashes was taken into account as follows[9]:

	Heavy metal content per kg of ash spread (mg/kg)			
	Ashes from log wood		Ashes from wood pellets	
	Discharge in soil	Discharge in water	Discharge in soil	Discharge in water
Cadmium	0.09	0.002	0.77	0.002
Chromium	14.40	1.40	14.40	1.40
Cobalt	2.23	/	12.30	/
Copper	140.87	0.13	140.87	0.13
Iron	4455.00	/	5030.00	/
Manganese	1213.00	/	4236.00	/
Mercury	/	0.005	/	0.005
Nickel	18.99	0.006	8.67	0.006
Lead	1.79	0.01	200.54	0.47
Zinc	91.80	0.02	223.00	0.14

Table 6 – Secondary data to take the spreading of ashes into account

[9] Source ADEME. See the sources used in Section 5.2 of the present document

3.5.5.5. Consideration of liquid waste

Because condensation biomass boilers are not a very widespread technology, the present rules do not specify any default scenario for the modelling of condensation discharge. For a condensation biomass boiler, the assumptions taken into account must be explained in detail and justified in the supporting report.

3.5.5.6. Taking water consumption into account

The default scenario defined in Section 3.5.4.2 for gas or fuel oil boilers applies.

3.5.6. Maintenance stage

The frequency of maintenance operations for boilers is defined by the French order dated 15 September 2009 arising from directive 2010/31/EC (EPBD directive)[10].. An average return trip distance of 100 km covered by an operator is taken into account.
If parts are to be replaced during the service life of the product, in compliance with the manufacturer's specifications, the impact of their manufacture, distribution and installation will have to be taken into account during the maintenance stage. The replacement of parts due to malfunction will not be taken into account.

In the absence of accessible data, boilers require maintenance involving the following elements:

Equipment	Maintenance	Replacement (part and frequency over the RLT)
Gas boiler up to 400 kW (any type)	Once a year	- Expansion tank (once) - Electrodes (once) - Anodes (3 times) - Plate exchanger (3 times) - Temperature probe (once) - Air filter (twice)
Fuel oil boiler up to 400 kW (any type)	Once a year	- Nozzle, seal (10 times) - Expansion tank (once) - Electrodes (once) - Anodes (3 times) - Plate exchanger (3 times) - Optical cell (once) - Temperature probe (once) - Air filter (twice) - Fuel filter (twice)

[10] See the sources used in Section 5.2 of the present document.

Equipment	Maintenance	Replacement (part and frequency over the RLT)
Biomass wood log boiler up to 500 kW (any type)	Once a year	- Ash removal door seal (once) - Loading door seal (twice) - Firestone other than central insert and door (once) - Central insert firestone (five times) - Ash removal door firestone (twice)
Biomass wood pellet boiler up to 500 kW (any type)	Once a year	- Door firestone (twice) - Right firestone (once) - Left firestone (once) - Upper + lower door seal (once) - Burner gun (once)

Table 7 – Maintenance scenario

When the system needs to be drained, the quantity of water necessary to return it to service is neglected (e.g. inspection, replacement of the expansion tank).

We consider that oil changes are carried out during a mandatory inspection, so that no additional transportation is counted.

In case an alternative scenario is used, it is necessary to document all the assumptions used in the LCA report.

The treatment of any other waste generated by the maintenance phase, essential for the BOILER to operate correctly, and not specified in the above-mentioned list, shall be taken into account and justified in the LCA report.

If a new product on the market requires maintenance or consumables not taken into account in this document, these items will be included in the analysis.

3.5.6.1. Waste generated during the maintenance stage

The manufacture of spare parts and new fluids as well as the end-of-life of the waste generated during the maintenance stage (end-of-life of fluids and spare parts) are taken into account in the use stage.

The material components, as specified in Table 7 of Section 3.5.6 "Maintenance stage" of the present document on the "type of intervention", must be considered as "waste generated during the maintenance stage" and their end-of-life must be considered here.

The end-of-life of these elements is then handled the same way as described in Section 3.5.7 "End-of-life stage" of the present document.

By sector-based agreement, the transport stage for this waste shall be taken into account, assuming that it is trucked over a distance of 100 km.

3.5.7. End-of-life stage

Within the European Union, waste from boilers is classed as WEEE (Waste from Electrical and Electronic Equipment).

The LCA report will explain the organisation of known disposal and/or recovery systems, the associated environmental impacts and how the manufacturer meets these requirements, if applicable. These items will determine the applicable end-of-life treatment (case 1, 2 or 3 explained below).

If the end-of-life treatment of equipment not included in the WEEE has not been justified, it will be treated as for case 4 below.

With regard to recovery processes, the analysis will focus on all the stages of the system, up to intermediate storage prior to reuse in accordance with the stock method.

For lack of specific justified information, the values specified below will be used:

On the mass of the **bare drained product**	1st case: recovery of at least 80% (of which 75% is recycling / reuse)[11]	Case 2: recovery of less than 80% (75% of which is to be recycled / reused)[11]	Case 3: No evidence of recovery[11]	Case 4: equipment not covered by the WEEE[11]
Percentage of product recycled at end of life	75 %	40 %	20 %	60%
Percentage of product recovered for energy production at end of life	5 %	0 %	20 %	20%
Percentage of product incinerated without recovery at end of life	10 %	30 %	30 %	10%
Percentage of product buried at end of life	10 %	30 %	30 %	10%

Table 8 – Default treatment of waste produced during the end-of-life stage

By sector-based agreement, the transportation to collect the end-of-life product and convey it from the location of use to its final treatment site is calculated according to an assumption that it is carried by truck over a distance of 100 km.

3.5.7.1. Special case of end-of-life filters

100% of these filters are incinerated without waste-to-energy recovery. 100% of filters containing classified particulates or pollutants are buried without waste-to-energy recovery.

[11] Extract from the ADEME "Recycling report 1999-2008", 2010.

3.6. Rules for extrapolation to a homogeneous environmental family

These rules are additional to section 2.6 "Rules for extrapolation to a homogeneous environmental family" of the PCR (PEP-PCR-ed3-EN-2015 04 02).

A homogeneous environmental family means devices from the same range satisfying the following characteristics:

- Identical function
- Same product standard
- Similar manufacturing technology: identical type of materials and identical manufacturing processes

To develop a valid PEP for a range of BOILERS, environmental impact weighting factors are applied to all the reference products in the same product range, as specified in section 3.1.2 “Reference product and reference flow description” of these specific rules.

The extrapolation rule or the tables indicating the extrapolation coefficients applicable to the various stages of the life cycle and to each product in the range covered must be stated in the PEP.

When the product range contains none of the reference products defined in section 3.1.2 “Reference product and reference flow description” of these specific rules, the calculation is performed on the product with the most similar characteristics.

The extrapolation rules defined below in Sections 3.6.1 to 3.6.6 were developed based on an analysis of gas boiler ranges. They may be adapted to cover other types of boiler described in the present document. They must be documented and justified in the LCA report.

3.6.1. Extrapolation rule applied during the manufacturing stage

The environmental impacts produced during the manufacturing stage are directly correlated to the total mass of the product (excluding packaging) and the electronic components.

For the manufacturing stage, the extrapolation coefficient to be applied to the PEP results for any other power from the same range is as follows:

Coefficient on the FU scale	$\left[\left(\frac{Total\ mass\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ the\ reference\ product\ (kg)} + \frac{Mass\ of\ electronic\ components\ in\ the\ product\ considered\ (kg)}{Mass\ of\ reference\ product\ electronic\ components\ (kg)}\right) \div 2\right] \times \left(\frac{Calorific\ value\ of\ the\ reference\ product\ (kW)}{Calorific\ value\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ the\ reference\ product\ (kg)} + \frac{Mass\ of\ electronic\ components\ in\ the\ product\ considered\ (kg)}{Mass\ of\ reference\ product\ electronic\ components\ (kg)}\right) \div 2$

Where:
Total mass = total product mass (excluding packaging, with electronics) in kg
Mass of electronics = mass of electronics present in the boiler in kg (board and electronic components of the boiler control unit(s)
Calorific value = rated heating capacity as defined in Section 3.10, in kW

Note: The extrapolation coefficient takes into account the power of the products in order to guarantee consistent environmental impact results between the functional unit, the reference product, and the product under consideration.

3.6.2. Extrapolation rule applied during the distribution stage

The environmental impacts produced during the distribution stage are directly correlated to the total mass of the product and its packaging.

For the distribution stage, the mass extrapolation coefficient to be applied to the PEP results for any other power from the same range is as follows:

Coefficient on the FU scale	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ +\ Mass\ of\ packaging\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ reference\ product\ +\ Mass\ of\ packaging\ of\ reference\ product\ (kg)}\right) \times \left(\frac{Calorific\ value\ of\ the\ reference\ product\ (kW)}{Calorific\ value\ of\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ +\ Mass\ of\ packaging\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ reference\ product\ +\ Mass\ of\ packaging\ of\ reference\ product\ (kg)}\right)$

Where:
Total mass = product mass (excluding packaging) in kg
Packaging mass = total mass of instruction manuals, plastic films, polystyrene, pallet, etc. in kg
Calorific value = rated heating capacity as defined in Section 3.10, in kW

3.6.3. Extrapolation rule applied during the installation stage

In the context of these boiler-specific rules, the installation stage includes only the end-of-life treatment of the packaging. The environmental impacts produced during the installation stage are directly correlated to the total mass of the product and its packaging.

For the installation stage, the mass extrapolation coefficient to be applied to the PEP results for any other power from the same range is as follows:

Coefficient on the FU scale	$\left(\frac{Packaging\ mass\ of\ the\ product\ considered\ (kg)}{Packaging\ mass\ of\ the\ reference\ product\ (kg)}\right) \times \left(\frac{Calorific\ value\ of\ the\ reference\ product\ (kW)}{Calorific\ value\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Packaging\ mass\ of\ the\ product\ considered\ (kg)}{Packaging\ mass\ of\ the\ reference\ product\ (kg)}\right)$

Where:
Packaging mass = total mass of instruction manuals, plastic films, polystyrene, pallet, etc. in kg
Calorific value = rated heating capacity as defined in Section 3.10, in kW

3.6.4. Extrapolation rule applied during the use stage (excluding maintenance)

The environmental impacts produced during the use stage, excluding maintenance, are directly correlated to the energy consumption.

For the use stage (excluding maintenance), the energy extrapolation coefficient to be applied to the PEP results for any other power from the same range is as follows:

Coefficient on the FU scale	$\left(\frac{Ctot\ of\ the\ product\ considered\ (kWh)}{Ctot\ of\ the\ reference\ product\ (kWh)}\right) \times \left(\frac{Calorific\ value\ of\ the\ reference\ product\ (kW))}{Calorific\ value\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Ctot\ of\ the\ product\ considered\ (kWh)}{Ctot\ of\ the\ reference\ product\ (kWh)}\right)$

Where:
Ctot (kWh) = Energy consumption of the boiler, in kWh in the use stage for its entire lifetime (see calculation method for Ctot (kWh), Section 3.4.5.1 of the Gas and Fuel Oil Boilers PSR).
Calorific value = rated heating capacity as defined in Section 3.10, in kW

These extrapolation coefficients apply equally to emissions and discharge produced during the use stage (atmospheric emissions, liquid discharge, water consumption, and ash discharge).

3.6.5. Extrapolation rule applied during the maintenance stage

The environmental impacts produced during the maintenance stage are due to the annual travel of one operator and the replacement of the maintenance parts. These parts are considered as identical within the homogeneous family.

For the maintenance stage, the environmental impacts of the reference product are considered as identical to any other power from the same range.

3.6.6. Extrapolation rule applied during the end-of-life stage

The environmental impacts produced during the end-of-life stage are directly correlated to the total mass of the product (excluding packaging).

For the end-of-life stage, the mass extrapolation coefficient to be applied to the PEP results for any other power from the same range is as follows:

Coefficient on the FU scale	$\left(\frac{Mass\ of\ the\ product\ considered, excluding\ packaging\ (kg)}{Mass\ of\ the\ reference\ product\ of\ the\ range, excluding\ packaging\ (kg)}\right) \times \left(\frac{Calorific\ value\ of\ the\ reference\ product\ (kW)}{Calorific\ value\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Mass\ of\ the\ product\ considered, excluding\ packaging\ (kg)}{Mass\ of\ the\ reference\ product\ of\ the\ range, excluding\ packaging\ (kg)}\right)$

Where:
Total mass = product mass (excluding packaging) in kg
Calorific value = rated heating capacity as defined in Section 3.10, in kW

3.7. Rules applying to joint environmental declarations

These rules are complementary to PCR section 2.7 "Rules applying to joint environmental declarations" (PEP-PCR-ed3-EN-2015 04 02).

For a joint environmental declaration, the analysis must cover a "typical product" compliant with the rules defined in Section 3.1.2 "Reference product and reference flow description" of these specific rules.

3.8. Requirements concerning the collection of primary and secondary data

These rules are additional to the sections 2.9 "Requirements for the collection of primary data" and 2.10 "Requirements for secondary data" of the PCR (PEP-PCR-ed3-EN- 2015 04 02).

As far as possible, the primary data (i.e. all the data associated with the manufacturing stage of the reference product and specific to an organisation) is to be preferred and shall be justified in the LCA report, specifying:

1) primary data in case of a single supplier,

2) in case of procurement from several suppliers, the primary data to be taken into account is the data provided by major suppliers representing at least 50% of the procurement by volume (with respect to the total quantity bought). For example, for ten suppliers each providing 10 % of the procurement volume, at least five suppliers shall be considered in order to obtain an overall view of the primary information provided. Any other distribution rule should be mentioned in the LCA report and in the PEP.

If primary data are shared with products other than those referred to in these specific rules, the calculation of impacts will be done in proportion to the mass of the products manufactured.

This information is not always available to manufacturers of BOILERS: for lack of primary data, secondary data, i.e. data obtained from the life cycle assessment software database shall be used. PCR explains how to select the LCI modules. If the transportation information is not available, the data defined in the section "Transport scenarios" of the current PCR will be used.

3.9. Data quality evaluation

The specific rules specified in section 2.11 "Data quality evaluation" in the current PCR (PEP-PCR-ed3-EN-2015 04 02) apply.

3.10. Calculation of environmental impact

To ensure consistency of the results of environmental impacts between the functional unit and the reference product, the PEP shall show the environmental impacts of the manufacturing, distribution, installation, use (including maintenance) and end-of-life stages as follows:

Environmental impacts from the PEP (for 1 kW) =
Environmental impacts of the reference product / Calorific value of the reference product

Where:

- For gas or fuel oil boilers:

Calorific value = rated heating capacity according to EN 15502-1/A1 for gas boilers or rated power output according to EN 303-1/A1 for fuel oil boilers expressed in kW

- For manual-feed biomass boilers able to operate at 50% of the rated heating capacity in continuous mode, and for automatic-feed solid fuel boilers:

Calorific value= $\boxed{0{,}85 * P_p + 0{,}15 * P_n}$

P_n = Rated heating capacity, expressed in kW

P_p = Heating power at partial load as defined by European Ecodesign regulation No. 2015/1189, expressed in kW

- For manual-feed biomass boilers unable to operate at 50% or less of the rated heating capacity in continuous mode:

Calorific value= P_n

P_n = Rated heating capacity, expressed in kW

4. Drafting of the Product Environmental Profile

4.1. General information

The specific rules specified in section 4.1 "General information" of the current PCR (PEP-PCR-ed3-EN- 2015 04 02) apply.

The PEP must specify:

- The product sub-category and characteristics to be declared according to Section 2.1.
- The use profile considered in the use stage according to Section 3.5.4
- The Etas value or, for boilers with power ratings above 70 kW, the values of Eta1 and Eta4 according Section 3.5.4.1
- The draw-off cycle used for boilers combining heating with domestic hot water production according to Section 3.5.4.1
- Any other end-of-life treatment scenario for the product used, according to section 3.5.6

4.2. Constituent materials

The rules specified in section 4.2 "Constituent materials" of the current PCR (PEP-PCR-ed3-EN- 2015 04 02) apply.

4.3. Additional environmental information

These specific rules are additional to section 4.3 "Additional environmental information" of the PCR (PEP-PCR-ed3-EN- 2015 04 02).

In the context of performing Life Cycle Analyses on the scale of a building, the environmental impacts of the equipment must be considered on the scale of the product and the impacts related to energy consumption in the use stage must be treated separately.

To facilitate the use of the PEP in conducting a building LCA, the PEP may include:

- The table of the environmental impacts of the reference product expressed on the product (or declared product) scale in addition to the table on the functional unit scale. The values must then be indicated in numerical values, expressed in the appropriate units to three significant figures (and, optionally, as a percentage) for each stage of the life cycle, and the total for each indicator of the complete life cycle analysis.

  The following details must be indicated in the PEP, to ensure clarity and transparency for the user:
  - For environmental impacts expressed per functional unit, the following wording is included: "per kW corresponding to the functional unit"
  - For environmental impacts expressed per declared product, the following wording is included: “per device corresponding to the reference product"
- The results of the environmental impacts in the use stage according to a breakdown of Module B (B1 to B7) in compliance with standards EN 15978 and EN 15804.

PEP ecopassport®	Manufacturing stage (Section 3.5.1)			Distribution stage (Section 3.5.2)	Installation stage (Section 3.5.3)	Use stage (Sections 3.5.4, 3.5.5 and 3.5.6)							End-of-life stage (Section 3.5.7)				Benefits
EN 15978 / 15804	Production stage			Construction stage		Use stage							End-of-life stage				Benefits
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Supply of raw materials	Transport	Manufacture	Transport	Installation process	Use	Maintenance	Repair	Replacement	Rehabilitation	Energy use during use of the building	Water use during use of the building	Demolition/Deconstruction	Transport	Waste treatment	Disposal	Benefits beyond the system boundaries

Lookup table showing breakdown of life cycle by stage or by module

- The extrapolation rules on the scale of the declared product.

4.4. Environmental impacts

The table of environmental impacts represents the environmental impact of the functional unit, i.e. the production of 1 kW of heating or 1 kW of heating and domestic hot water.

Thus, the total impact of the installed product in a real situation must be calculated by the user of the PEP according to the power of the equipment by multiplying the impact concerned by the total number of kW of heating or heating and domestic hot water required by the installation.

The following statement must be completed and included in the PEP, to ensure clarity and transparency for the user:
The PEP was drawn up by considering the supply of 1 kW of heating or 1 kW of heating and domestic hot water production. The impact of the stages of the life cycle of an installed product is calculated by the user of the PEP by multiplying the impact concerned by the total heating capacity or the heating and domestic hot water production capacity in kW.

When extrapolation rules are used, the following statement must be included:
The extrapolation coefficients are given for the environmental impact of the functional unit, i.e. the production of 1 kW of heating or 1 kW of heating and domestic hot water. For each stage of the life cycle, the environmental impacts of the product concerned are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient. The "Total" column should be calculated by adding the environmental impacts of each stage of the life cycle.

5. Appendices

5.1. Inventory data

Inventory data to be used to model the production of 1 kg of logs are those available in the EcoInvent version 3.3 database (2016):
Name: market for cleft timber, measured as dry mass
Reference product: cleft timber, measured as dry mass [kg]
Location: Europe excluding Switzerland
Allocation, cut-off by classification
Period: 01/01/2014 – 31/12/2016

Inventory data to be used to model the production of 1 kg of dry wood pellets are those available in the EcoInvent version 3.3 database (2016):
Name: wood pellet production
Reference product: wood pellet, measured as dry mass [kg]

Location: RER
Allocation, cut-off by classification
Period: 01/01/2011 – 31/12/2016

Both sets of life cycle inventory data are available on request form the PEP Association, which can be contacted at: contact@pep-ecopassport.org

5.2. Glossary

Calorific value	Rated heating capacity
CnHm	Hydrocarbons
CO	Carbon monoxide
CO_2	Carbon dioxide
C_{tot}	Total energy consumption of the reference product over its reference lifetime
EEE	Electrical and Electronic Equipment
eta_s	Seasonal heating energy efficiency
H_{HE}	Number of hours of annual operation in equivalent active mode for the heating mode
Kg	Kilogram
kWh	Kilowatt hour
LCA	Life cycle analysis
LCI	Life cycle inventory
NOx	Nitrogen oxides
P_a	Power output at the arithmetic mean of the maximum and minimum rated power output according to EN 15502-1/A1 for gas boilers or according to EN 303-1/A1 for fuel oil boilers expressed in kW
Pa	Pascal
PCR	Product category rules
PEP	Product environmental profile
Primary data	Actual data measured by the manufacturer or supplier
PSR	Product specific rules
P_u	Power output according to EN 15502-1/A1 for gas boilers or according to EN 303-1/A1 for fuel oil boilers expressed in kW
Q_{fuel}	Daily fuel consumption for water heating, expressed in kWh according to regulation (EU) No. 811/2013
RLT	Reference lifetime
Secondary data	Generic data from a database or according to sector-based agreement
Wh	Watt hour

5.3. References

Chapter	Subject	Source
2.1 – Definition of the families concerned	Regulation (EU) No. 813/2013	Commission Regulation (EU) No 813/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters
	Regulation (EU) No. 2015/1185	Commission Regulation (EU) 2015/1185 of 24 April 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for solid fuel local space heaters
3.5.4.1 – Energy Consumption	Eco Design Regulation 811/2013 EC	Regulation (EU) No 811/2013 of 18 February 2013 in application of Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of space heaters and combination heaters
3.5.4.1 - Energy Consumption	EN 14511-3	NF EN 14511-3 October 2013: Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling – Part 3: Test methods
3.5.4.1 - Energy Consumption	NF EN 15502-1/A1	NF EN 15502-1+A1 September 2015:Gas-fired heating boilers - Part 1: General requirements and tests
3.5.4.1 - Energy Consumption	NF EN 303-1/A1	NF EN 303-1/A1 January 2004: Heating boilers - Part 1: Heating boilers with forced draught burners - Terminology, general requirements, testing and marking

Chapter	Subject	Source
3.5.4.2 – Consideration of atmospheric emissions	EN 267, EN 303-1/A1, EN 303-2, EN 303-3, EN 303-7, EN 304, EN 676, EN 15034, EN 15035, EN 15502-1/ A1	NF EN 267+A1 November 2011:Automatic forced draught burners for liquid fuels - NF EN 303-1/A1 January 2004: Heating boilers - Part 1: Heating boilers with forced draught burners - Terminology, general requirements, testing and marking NF EN 303-2/A1 January 2004: Heating boilers - Part 2: Heating boilers with forced draught burners - Special requirements for boilers with atomizing oil burners - NF EN 303-3/A2 November 2004: Heating boilers. - Part 3: Gas-fired central heating boilers. Assembly comprising a boiler body and a forced draught burner - NF EN 303-7 December 2006: Heating boilers - Part 7: Gas-fired central heating boilers equipped with a forced draught burner of nominal heat output not exceeding 1000 kW – NF EN 304/A2 March 2005: Heating boilers - Test code for heating boilers for atomizing oil burners NF EN 676+A2 August 2008: Automatic forced air burners for gaseous fuels - NF EN 15034 September 2007: Heating boilers - Condensing oil fired heating boilers NF EN 15035 March 2007: Heating boilers - Special requirements for oil fired room sealed units up to 70 kW NF EN 15502-1+A1 September 2015:Gas-fired heating boilers - Part 1: General requirements and tests

Chapter	Subject	Source
3.5.5 Use stage for biomass boilers	European Ecodesign Regulation No. 2015/1187	COMMISSION DELEGATED REGULATION (EU) 2015/1187 of 27 April 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of solid fuel boilers and packages of a solid fuel boiler, supplementary heaters, temperature controls and solar devices
	European Ecodesign Regulation No. 2015/1189	COMMISSION REGULATION (EU) 2015/1189 of 28 April 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for solid fuel boilers
	PrEN 15316-4.7	NF EN 15316-4.7 November 2009: Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. - Part 4-7: Space heating and DHW generation systems, combustion systems (boilers, biomass)
	EN 15316-4.1	NF EN 15316-4.1 October 2010: Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies. - Part 4-1: Space heating and DHW generation systems, combustion systems (boilers)
	Ash management	Ash management scenario determined by the UNICLIMA Syndicate and all of its members
	Emissions in soils and water from soil improvement	"Environmental report on domestic heating with wood" ADEME – December 2005
	NCV and moisture content of log wood	EcoInvent database (Version 3.3 2016) "market for cleft timber, measured as dry mass, Europe without Switzerland, (Author: Emilia Moreno Ruiz inactive)"
	NCV and moisture content of wood pellets	Moisture content defined based on the EcoInvent database (Version 3.3 2016) "wood pellet production, RER, (Author: Christian Bauer active)"; NCV supplemented by the ADEME study "Environmental report on domestic heating with wood" – December 2005
	Modelling the production of log wood or wood pellets	EcoInvent database (Version 3.3 2016) "market for cleft timber, measured as dry mass, Europe without Switzerland, (Author: Emilia Moreno Ruiz inactive)" & "wood pellet production, RER, (Author: Christian Bauer active)"
	Log wood procurement	ADEME Practical Guide "Heating with wood" 2016
	Wood pellet procurement	ADEME Practical Guide "Heating with wood" Sept 2012 presenting the pellet market in France

Chapter	Subject	Source
3.5.5 Maintenance stage	Directive 2010/31/EC	
4.3 Additional environmental information	EN 15978	NF EN 15978 May 2012: Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method
	EN 15804	NF EN 15804 April 2014: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

5.4. Declaration of conformity

Programme PEP Ecopassport®

Attestation de revue critique des règles additionnelles sectorielles pour les chaudières gaz, fioul ou biomasse

Document revu : PSR0012 - REGLES SPECIFIQUES AUX CHAUDIERES GAZ, FIOUL ou BIOMASSE version 16/01/2018 (date de réception)
Etabli par : Uniclima : le syndicat des industries thermiques, aérauliques et frigorifiques

Uniclima, le syndicat des industries thermiques, aérauliques et frigorifiques, a demandé à EVEA, en tant que cabinet conseil spécialisé en Analyse du Cycle de Vie, la revue critique des règles additionnelles sectorielles pour les chaudières gaz, fioul ou biomasse.

Référentiels :
L'objectif de cette revue critique est de vérifier la conformité de ce document avec les référentiels suivants :

- Le PCR référence PEP-PCR ed.3-FR-2015 04 02, disponible sur www.pep-ecopassport.org établit par le programme PEP Ecopassport®,
- Les normes NF EN ISO 14020 - 2002 et NF EN ISO 14025 -2010,
- Les normes NF EN ISO 14040 et 14044 – 2006.

Conclusion :
Le document revu ne présente pas de non-conformité avec les référentiels précités. Par conséquent le PSR relatif aux chaudières est conforme aux exigences de ces référentiels.

Jean Baptiste Puyou
Président Directeur Général EVEA

Tim Osmond
Vérificateur PEP Ecopassport® EVEA

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