PEP ecopassport® PROGRAM

PSR

SPECIFIC RULES FOR HOT WATER RADIATORS OR TOWEL RADIATORS

PSR-0011-ed1.0-EN-2018 02 09

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

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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 hot water radiators or towel radiators. 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 hot water radiators or towel radiators market and the interested parties.

PEP ecopassport®	www.pep-ecopassport.org
PSR reference	PSR-0011-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, "Product Category Rules", (PEP-PCR ed.3-EN-2015 04 02) of the PEP ecopassport® eco-declaration program, this document sets out the specific rules for hot water radiators or towel radiators 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 reference lifetime taken into account for the products' Life Cycle Assessment (LCA),
- the conventional use scenarios to be adopted during the product use stage.

The main purpose of these specific rules is to provide manufacturers of hot water radiators or towel radiators with a common basis for the development of their product life cycle assessments. The different available technologies are therefore presented:

- Static hot water radiators
- Fan-assisted hot water radiators
- Towel radiators
- Mixed or fan-assisted mixed radiators

These specific rules cover static and fan-assisted hot water radiators whose main heating element is characterised by the harmonised EN 442[2] standards and holders of the CE Marking under the provisions of regulation (EU) 305/2011[3]. Hot water trench convectors are also covered and characterised using the rules described in the EN 442 standard.

The rules concerning fan-assisted and/or mixed hot water radiators come from the EN 16430[4] standard.

These specific rules do not apply to other hot water central heating devices integrated in the structure, such as heated floors or ceilings, whose installation, use, and end-of-life stages and lifetimes are different.

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

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

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

2.1. Definition of the product families concerned

2.1.1. Passive devices (Family 1)

2.1.1.1. Static hot water radiator

Can be called a static hot water radiator according to the EN 442-1 standard:

"Hot water central heating radiator made of a given material (steel, aluminium, cast iron, etc.) and of different types, with an output capacity defined according to EN 442, for space heating via natural convection and radiation, and not equipped with a control system."

It comes in different types:

- horizontal steel panel radiators
- vertical steel panel radiators
- cast iron radiators
- aluminium radiators
- hot water convectors
- horizontal flat tube decorative radiators
- vertical flat tube decorative radiators
- horizontal round tube decorative radiators
- vertical round tube decorative radiators
- towel radiators
- multi-column radiators
- fin radiators or trench convectors.

2.1.1.1.1. Case of hot water towel radiators

Can be called a “hot water towel radiator”, a product comprising at least:

- A main heating element in the form of a central heating radiator whose energy comes from a hot water source,
- A bleed valve, drain plug, and plugs,
- Mounts.

A hot water towel radiator can also be equipped with:

- A standalone blower system with electric heating element in the air flow,
- A control system built into the device or remote in the surroundings, controlling the blower system at least.

And/or, for a mixed hot water towel radiator:

- An electrical back-up system incorporated into the heating element in the water flow, and/or affixed to the heating element,
- A control system built into the device or remote in the surroundings, controlling the back-up system at least.

2.1.2. Active devices (Family 2)

2.1.2.1. Fan-assisted hot water radiator(s)

Can be called a “fan-assisted hot water radiator”, a product comprising at least:

- A main heating element in the form of a central heating radiator whose energy comes from a hot water source as defined according to European standard EN442-2 equipped with a forced convection system as defined in European standard 442-2.
- A control system built into the device or remote in the surroundings, controlling the forced convection system at least.
- A manual disconnection device for the fan(s).
- A bleed valve, drain plug, and plugs,
- Mounts.

2.1.2.2. Mixed or fan-assisted mixed hot water radiator(s)

Can be called a “mixed hot water radiator”, a product on which the following components are factory-mounted and comprise at least:

- A main heating element in the form of a central heating radiator whose energy comes from a hot water source as defined according to European Standard EN 442-2,
- and/or an electrical back-up system built into the heating element in the water flow, and/or affixed to the heating element, and/or a standalone blower system with electrical heating element in the air flow.
- A control system built into the device or remote in the surroundings, controlling the back-up system at least.
- And/or a manual disconnection device for the blower,
- A bleed valve, drain plug, and plugs,
- Mounts.

Can be called a “fan-assisted mixed hot water radiator”, a product on which the following components are factory-mounted and comprise at least:

- A main heating element in the form of a central heating radiator whose energy comes from a hot water source as defined according to European standard EN442-2 equipped with a forced convection system as defined in European standard 442-2.
- and/or an electrical back-up system built into the heating element in the water flow, and/or affixed to the heating element, and/or in the air flow.
- A control system built into the device or remote in the surroundings, controlling the back-up system at least.
- A manual disconnection device for the fan(s).
- A bleed valve, drain plug, and plugs,
- Mounts.

3. Product life cycle assessment

3.1. Functional unit and reference flow description

These specific rules are additional to section "Functional unit and reference flow description" of the current PCR.

3.1.1. Functional unit

The functional unit associated with radiators, as defined in Section 2.1, "Definition of the product families concerned" is as follows:

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

The measurement of this power is defined as follows for:

- static or mixed hot water radiators, or hot water towel radiators, at ΔT 50 according to the EN 442 standard[5],
- fan-assisted hot water radiators or fan-assisted mixed radiators according to the EN 16430[6] standard at ΔT 30 at average speed.

For all the stages of the life cycle, the environmental impacts are calculated over a reference lifetime of:

- 50 years for static hot water radiators,
- 17 years for fan-assisted hot water radiators, or mixed and mixed fan-assisted radiators, or for hot water towel radiators.

The reference lifetime of the equipment (XX years) must be specified in the description of the functional unit as indicated above.

3.1.2. Reference product and reference flow description

These specific rules are additional to section “Functional unit and reference flow description” of the current PCR.

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

- A radiator or a hot water towel radiator with a specific reference lifetime and whose energy consumption in use is expressed in kWh according to the use scenario described in section 3.5.4.2 “Active equipment (family 2)” of these specific rules for active equipment, and for passive equipment (family 1), no energy consumption is required in the use stage.
- Its packaging,
- Any products or components required for installation and use.

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

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

The declared energy consumptions in the use stage in the reference flow must be estimated for the supply of 1 kW of heating and based on Section 3.5.4 “Use stage” of the present specific rules.

For a hot water radiator whose expression for energy consumption in use is specified in kWh of final energy according to a use scenario, the energy consumptions relating to the following active components are taken into account:

- fan(s) in the case of fan-assisted radiators,
- electrical back-up system whose power, compatible with the heating element, is the highest,
- blower back-up system whose power, compatible with the heating element, is the highest,
- consumption of electronic components in standby mode.

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:

- power output equivalent to 1000 W for each type if several types are covered by the PEP or, for a towel radiator, on a radiator of power output equivalent to 600 W.
- During the reference lifetime,
- For active devices, whose energy consumption in the usage stage is expressed in kWh of final energy according to the usage scenario described in section 3.5.4.2 “Active devices (Family 2)” of the present specific rules.

If the range of this product type does not contain any 1000 W or 600 W devices, the analysis is applied to the device with the nearest power rating. This should be justified in the LCA report and mentioned in the PEP.

3.2. System boundaries

These specific rules are additional to section "System boundaries" of the current PCR.

3.2.1. Manufacturing stage

The accessories for regulation (e.g. manual or thermostatic taps) and connection to the network such as balancing T-pieces are not included and are subject to a specific declaration unless supplied with the hot water radiator supplied by the manufacturer.

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 a radiator or towel radiator can involve:

- Modifications to the structure (e.g. masonry work, connection to the electrical network, addition of cladding for better aesthetic integration of the device 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.
- The water consumption related to the commissioning of devices is excluded from the scope of the analysis and must be taken into consideration on the scale of the building.
- 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 use stage includes:

- For active devices, an energy consumption
- 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.
- Any draining and unclogging of the heating circuit and devices are excluded from the scope of the analysis.

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 "Cut-off criteria" of the current PCR apply.

3.4. Specific allocation rule

These specific rules are additional to section "Rules for allocation between co-products" of the current PCR.

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 the section on “Development of scenarios (default scenarios)” of the current PCR.

3.5.1. Manufacturing stage

A RADIATOR or TOWEL RADIATOR consists of components that are:

- 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.
Where known, the treatment processes (reuse, recycling, energy recovery, landfill, incineration without recovery) must be presented and justified in the LCA report, and the associated environmental impacts must be taken into account as indicated in section 2.5.6 on "Product end-of-life treatment scenarios" of the PCR in force.

For product recovery (recycling, re-use or incineration as fuel for energy production), environmental impacts must be considered in the life cycle analysis for radiators or hot water towel radiators, as shown in section 2.5.6 “Product 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 device in question, the treatment process shall be calculated by default as follows:

- Mass of raw product x 0.30 = 50% of incinerated waste (without waste-to-energy recovery) and 50% of buried waste.

When the worst performer value is used by default, no waste-to-energy recovery will be taken into account. The production (30% 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 must be analysed in accordance with the PCR section 2.5.3 "Transport scenario" 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 radiator or towel radiator.

If a wall mount is already counted in the LCA in the manufacturing stage, this element should not be considered in the installation stage.

In the absence of a wall mount, the LCA report specifies all the elements required to install the radiators or hot water towel radiators. These elements must be described and inventoried in the LCA report in the installation stage.

3.5.3.1. Waste generated during the installation phase

The end of life of the packaging, whose production is 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[7]:

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%

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

3.5.4.1. Passive devices (Family 1)

The use stage of static hot water radiators or towel radiators involves no energy consumption after installation of the product.

3.5.4.2. Active devices (Family 2)

The use stage of fan-assisted hot water radiators, or mixed and mixed fan-assisted radiators, involves the following once the product is installed:

- An energy consumption,
- Consumption by electronic components in standby mode.

Energy consumption of fan-assisted hot water radiators, or mixed and mixed fan-assisted radiators, is expressed in kWh of final energy, as specified for the reference product study, described in section 3.1 “Functional unit and reference flow description” of these specific rules, using the component families identified below.

The calculation of energy consumption in the use stage is based on assumptions that are defined and justified in Section 4 “Appendices” of these specific rules.

[7] Extract from the ADEME "Recycling report 1999-2008: Materials and recycling listed by sector - general summary", 2010, in particular page 63.

3.5.4.3. Energy consumption of fan-assisted hot water radiators

The total electricity consumption of a fan-assisted hot water radiator during the reference lifetime is as follows:

$$C_{tot} \text{ (in kWh)} = [(C_{standby} + C_{fan})] * RLT$$

Where:

C_{tot} = total electricity consumption of a hot water radiator over its reference lifetime expressed in kWh

$C_{standby}$ = annual standby electricity consumption of a hot water radiator expressed in kWh/year

C_{fan} = annual electricity consumption in heating mode of a hot water radiator expressed in kWh/year

RLT = reference lifetime of the product expressed in years

3.5.4.3.1. Default consumption in standby mode

The energy consumption in standby mode of a fan-assisted hot water radiator corresponds to the consumption of the fan control device.

The minimum standby mode duration to be taken into account for the energy consumption calculation is defined in Section 4 “Appendices” of these specific rules.

By default, this consumption outside the heating period is:

$C_{standby}$ (kWh/yr) = (2 x (8760- 4368))/1000 = 8.78 kWh/yr

The power considered outside the heating period is 2 W.

3.5.4.3.2. Consumption by the ventilation system

The energy consumption in heating mode is determined according to:

- The power absorbed by the electrical components (expressed in watts) of the reference product, including the fan(s) at medium speed
- The number of hours of operation per year (i.e. 4368 hours)

C_{fan} (kWh/yr) = (P_e x 4368) / 1000

Where:

P_e = Electrical power absorbed by the fan(s) at medium speed, in watts

3.5.4.4. Energy consumption by the mixed hot water radiators and mixed hot water towel radiators

The total electricity consumption of a hot water radiator or mixed towel radiator during the reference lifetime is as follows:

$$C_{tot}\,(\text{in kWh}) = [(C_{standby} + C_{back\text{-}up})] * RLT$$

Where:

C_{tot} = total electricity consumption of a hot water radiator or towel radiator over its reference lifetime expressed in kWh

$C_{standby}$ = annual standby electricity consumption of a hot water radiator or towel radiator expressed in kWh/year

$C_{back\text{-}up}$ = annual electricity consumption of electrical back-up equipment, expressed in kWh

RLT = reference lifetime of the product expressed in years

3.5.4.4.1. Default consumption in standby mode

The energy consumption in standby mode of a mixed hot water radiator corresponds to the consumption of the back-up equipment control device.

The minimum standby mode duration to be taken into account for the energy consumption calculation is defined in Section 4 “Appendices” of these specific rules.

By default, this consumption is estimated at 2 W per day in periods when the electrical back-up equipment is not in use, i.e.:

$C_{standby}$ (kWh/yr) = (2 x (8760 - 180))/1000 = 17.16 kWh/yr

3.5.4.4.2. Consumption of the electrical back-up equipment

The heating consumption in operation is determined according to:

- The power absorbed by the electrical components, including the electrical backup system
- The number of hours of operation per year (i.e. 180 hours)

The electrical back-up equipment is used in mid-season only (outside heating periods and summertime), two hours per day.

$C_{back\text{-}up}$ (kWh/yr) = (P_e x 180) / 1000

Where:

P_e = power absorbed (in watts) of the electrical back-up system of the reference product

3.5.4.5. Energy consumption of static hot water radiators or hot water towel radiators equipped with a blower system

The total electricity consumption of a hot water radiator or towel radiator with blower system during the reference lifetime is as follows:

$$C_{tot}\,(\text{in kWh}) = [(C_{standby} + C_{blower})] * RLT$$

Where:

C_{tot} = total electricity consumption of a hot water radiator or towel radiator over its reference lifetime expressed in kWh

$C_{standby}$ = annual standby electricity consumption of a hot water radiator or towel radiator expressed in kWh/year

C_{blower} = annual electricity consumption of back-up equipment per blower system, expressed in kWh

RLT = reference lifetime of the product expressed in years

3.5.4.5.1. Default consumption in standby mode

The energy consumption in standby mode of a hot water radiator or towel radiator with blower system corresponds to the consumption of the blower system control device.

The minimum standby mode duration to be taken into account for the energy consumption calculation is defined in Section 4 “Appendices” of these specific rules.

By default, this consumption is estimated at 2 W per day in heating periods and in summer, i.e.:

$C_{standby}$ = (2 x (8760-180))/1000 = 17.16 kWh/yr

3.5.4.5.2. Consumption by the blower system

The heating consumption in operation is determined according to:

- The power absorbed by the blower system
- The number of hours of operation per year (i.e. 180 hours)

C_{blower} (kWh/yr) = (P_e x 180) / 1000

Where:

P_e = power absorbed (in watts) by the blower system of the reference product

3.5.4.6. Energy consumption of the fan-assisted mixed hot water radiators

The total electricity consumption of a fan-assisted mixed hot water radiator during the reference lifetime is as follows:

$$C_{tot}\,(\text{in kWh}) = [(C_{standby} + C_{fan} + C_{back\text{-}up})] * RLT$$

Where:

C_{tot} = total electricity consumption of a hot water radiator over its reference lifetime expressed in kWh

$C_{standby}$ = annual standby electricity consumption of a hot water radiator expressed in kWh/year
C_{fan} = annual electrical consumption of fan(s) in heating mode of a hot water radiator, expressed in kWh/year (see Section 3.5.4.1.2 of the present specific rules)
C_{backup} = annual electricity consumption of electrical back-up equipment, expressed in kWh/year (see Section 3.5.4.2.2 of these specific rules)
RLT = reference lifetime of the product expressed in years

In this case, the default standby energy consumption is estimated at 2 W per day:

$C_{standby}$ = (2 x (2232+2160-180)) / 1000 = 8.42 kWh/year

3.5.4.7. Energy consumption of mixed hot water radiators or mixed hot water towel radiators equipped with a blower system

The total electricity consumption of a mixed hot water radiator or mixed towel radiator equipped with blower system during the reference lifetime is as follows:

$$C_{tot} \text{ (in kWh)} = [(C_{standby} + C_{blower} + C_{backup})] * RLT$$

Where:
C_{tot} = total electricity consumption of a hot water radiator or towel radiator over its reference lifetime expressed in kWh
$C_{standby}$ = annual standby electricity consumption of a hot water radiator expressed in kWh/year
C_{blower} = annual electricity consumption of back-up equipment per blower system, expressed in kWh/year (see Section 3.5.4.3.2 of these specific rules)
C_{backup} = annual electricity consumption of electrical back-up equipment, expressed in kWh/year (see Section 3.5.4.2.2 of these specific rules)
RLT = reference lifetime of the product expressed in years

In this case, the default standby energy consumption is estimated at 2 W per day, i.e.:

$C_{standby}$ = (2 x (8760-180-180)) / 1000 = 16.8 kWh/year

3.5.5. Maintenance stage

Hot water radiators and do not require maintenance or servicing during the use stage.

If a new product on the market requires consumables or frequent maintenance, these items must be included in the analysis and justified in the report.

3.5.6. End-of-life stage

Within the European Union, waste generated by mixed and/or fan-assisted hot water radiators or towel radiators 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).

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

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)[8]	Case 8: recovery of less than 80% (75% of which is to be recycled / reused)[2]	Case 3: No evidence of recovery[8]
Percentage of product recycled at end of life	75 %	40 %	20 %
Percentage of product recovered for energy production at end of life	5 %	0 %	20 %
Percentage of product incinerated without recovery at end of life	10 %	30 %	30 %
Percentage of product buried without recovery at end of life	10 %	30 %	30 %

Case of hot water radiators or towel radiators not covered by the WEEE directive (Waste Electrical and Electronic Equipment):

When the manufacturer provides proof of the recovery of the hot water radiator of towel radiator, the product recyclability rate calculation must be attached to the LCA report.

When the manufacturer does not provide evidence of the processes used to treat the waste generated, the treatment is calculated by default as follows:

- Bare product mass x 0.01 = mass of incinerated waste (100%).

This default value corresponds to the EN 442 requirement concerning fire-resistance of radiators, which requires that paint does not exceed 1% of the total mass of the radiator. Because paint is not recyclable, it emerges from the recycling process as residue, which is considered to be incinerated without energy recovery.

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.

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

3.6. Rule(s) for extrapolation to a homogeneous environmental family

The rules specified in section 2.6 “Rules for extrapolation to a homogeneous environmental family” of the PCR in force apply.

These rules are additional to section 2.6 "Rules for extrapolation to a homogeneous environmental family" of the PCR.

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 hot water radiators or towel radiators, environmental impact weighting factors are applied to all the 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 devices defined in section 3.1.2 “Reference product and reference flow description” of these specific rules, the calculation is performed on the device with the most similar characteristics.

3.6.1. Extrapolation rule during the manufacturing stage

The environmental impacts produced during the manufacturing stage are directly correlated to the total mass of the product.
As the mass of so-called “EEE” components does not change in the same ratio as the other components of the product, it is accepted that they are excluded from the extrapolation coefficient calculation.

For the manufacturing 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	$\left(\frac{mass\ of\ product\ considered\ -\ total\ mass\ of\ EEE\ components\ (kg)}{total\ mass\ of\ the\ reference\ product\ of\ the\ range,excluding\ EEE\ components\ (kg)}\right) \times \left(\frac{Power\ of\ the\ reference\ product\ (kW)}{Power\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{mass\ of\ product\ considered\ -\ total\ mass\ of\ EEE\ components\ (kg)}{total\ mass\ of\ the\ reference\ product\ of\ the\ range,excluding\ EEE\ components\ (kg)}\right)$

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 in distribution stage

The environmental impacts produced during the distribution stage are directly correlated to the total mass of the product (including any EEE components and the 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	$\left(\frac{mass\ of\ the\ product\ considered\ (kg)}{total\ mass\ of\ the\ reference\ product\ (kg)}\right) \times \left(\frac{Power\ of\ the\ reference\ product\ (kW)}{Power\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{mass\ of\ the\ product\ considered\ (kg)}{total\ mass\ of\ the\ reference\ product\ (kg)}\right)$

3.6.3. Extrapolation rule in installation stage

The environmental impacts produced in the installation stage are directly correlated to the mass of the packaging of the product concerned or the reference product.

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

3.6.4. Extrapolation rule in use stage

This section applies to active devices only (Family 2).

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

For the calculation of the environmental impact linked to the use stage, the PEP must specify the total absorbed electrical power of the fan(s) and/or electrical back-up systems for each hot water radiator power covered by the PEP created for the product range.
For the use stage, the following extrapolation coefficient must be used for any power other than the reference product power:

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

3.6.5. Extrapolation rule applied during the maintenance stage

Hot water radiators and towel radiators do not require maintenance or servicing during the use stage.

However, if a new product brought to market requires servicing (operator intervention and consumables), an extrapolation rule must be stated in the PEP and justified in the LCA report.

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

3.7. Rules applying to joint environmental declarations

These rules are complementary to PCR section "Rules applying to joint environmental declarations".

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 "Requirements for the collection of primary data" and "Requirements for secondary data" of the PCR.

As far as possible, the primary data for each component of the hot water radiator under consideration (i.e. all the data associated with the manufacturing phase of the reference product, 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 real or standard 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 other products than those referred to these specific rules, the calculation of impacts will be done in proportion to the mass of the devices manufactured.

This information is not always available to manufacturers. If primary data are not available, secondary standard data, taken from the database for the life cycle analysis software application, should 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 the section "Data quality evaluation" in the current PCR 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 /Power of the reference product (kW)

The reference power is defined in Section 3.1 “Functional unit and description of the reference flow”.

4. Drafting of the Product Environmental Profile

4.1. General information

The specific rules specified in section "General information" of the current PCR apply.

The PEP must specify:

- The description and characteristics of the product(s) concerned, in accordance with Section 2.1.
- Any scenario or assumption other than those defined in the present specific rules.

4.2. Constituent materials

The rules specified in the section "Constituent materials" of the current PCR apply.

4.3. Additional environmental information

These specific rules are additional to section 4.3 "Additional environmental information" of the PCR.

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 file in conducting a building LCA, the PEP may include:

- The table of environmental impacts of the reference product expressed on the product scale (or declared product) 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 included in the PEP file, to ensure clarity and transparency for the user:
  - For environmental impacts expressed per functional unit, the following wording must be included: "per kW corresponding to the functional unit"
  - For environmental impacts expressed per declared product, the following wording must be 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			Distribution stage	Installation stage	Use stage							End-of-life stage				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 emission of 1 kW heating power.

Thus, the total impact of the installed product 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 the device.

The following details must be completed and included in the PEP, to ensure clarity and transparency for the user:
The PEP was drawn up on the basis of 1 kW of heating power being supplied. The impact of the stages of the life cycle of an installed product is calculated by the user of the declaration by multiplying the impact concerned by the total heating capacity.

When extrapolation rules are used, the following statement must be included:

Extrapolation coefficients are given for the environmental impact of the functional unit, i.e. the emission of 1 kW heating power. 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. Glossary

$C_{back\text{-}up}$	Annual electricity consumption of the electrical back-up equipment
C_{blower}	Annual electricity consumption of the blower back-up equipment
C_{fan}	Annual electricity consumption of fan(s) in heating mode of a hot water radiator
$C_{standby}$	Annual standby electricity consumption of a hot water radiator or towel radiator
C_{tot}	Total electricity consumption of a hot water radiator or towel radiator over its reference lifetime
EEE	Electrical and Electronic Equipment
EN	European Union
Kg	Kilogram
kWh	Kilowatt hour
LCA	Life cycle analysis
LCI	Life cycle inventory
PCR	Product category rules
PEP	Product environmental profile
Primary data	Actual data measured by the manufacturer or supplier
PSR	Product specific rules
RLT	Reference lifetime
Secondary data	Generic data from a database or according to sector-based agreement
Wh	Watt hour

5.2. References

Chapter	Subject	Source
2. Scope 3.1.1 Functional unit	EN 442	Radiators and convectors - Part 1: Technical specifications and requirements (2014)
2. Scope 3.1.1 Functional unit	EN 16430	Fan assisted radiators, convectors and trench convectors - Part 1: Technical specifications and requirements (2014)
2. Scope	Regulation 305/2011	REGULATION (EU) No. 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC
5.3 Assumption and definition of calculation parameters for the use stage	"Energy Related Product" Directive 2009/125/EC	DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (revision)

5.3. Assumption and definition of calculation parameters for the use stage

Operating time assumptions for the calculation of energy consumption in the use stage:

Year = 365 days = 8760 hours
Heating period from 15 October to 15 April = 182 days = 4368 hours
Mid-season period = 15 April to 20 June and from 22 September to 14 October = 90 days = 2160 hours
Summer period = 21 June to 21 September = 93 days = 2232 hours

Operating period of back-up system or blower system = 2 hours/day in mid-season period, i.e.: 90*2 = 180 hours

Standby consumption of electrical devices during use stage:

The standby consumption is taken as 2 W by default according to the "Energy Related Product" directive 2009/125/EC[9].

By default, the standby consumption is determined according to the following principles:

- For fan-assisted hot water radiators: 2 W * number of hours outside heating period
- For mixed radiators: 2 W * (number of heating hours + number of summer hours)
- For mixed and fan-assisted radiators: 2 W * (number of summer hours)

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

5.4. Declaration of conformity

Programme PEP Ecopassport®

Attestation de revue critique des règles additionnelles sectorielles pour radiateurs ou sèche serviette eau chaude

Document revu : PSR0011 - REGLES SPECIFIQUES AUX RADIATEURS OU SECHE SERVIETTE EAU CHAUDE 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 radiateurs ou sèche serviette eau chaude.

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 radiateurs ou sèche serviette eau chaude est conforme aux exigences de ces référentiels.

Jean Baptiste Puyou
Président Directeur Général EVEA

Tim Osmond
Vérificateur PEP Ecopassport® EVEA