PEP ecopassport® PROGRAM

PSR

Specific rules for
COMFORT TERMINAL UNITS (CTU)

PSR-0009-ed3.0-EN-2023 10 19

According to PSR-modele-ed2-EN-2021 11 18

Contents

List of the modifications of the present document

Online version 2023/10/19:

Modified section Ed 1 to ed 2	Modification
§ 2.1	Addition of the product sub-category “unit heater” in the “fan coil unit” category
§ 3.1.2	Addition of the declared unit’s definition
§ 3.5	Addition of rules for the justification of without default scenario values
§ 3.5.1	Addition of one paragraph about recycled content of raw materials, and one paragraph about components and raw material packaging
§ 3.5.2.	The breakdown of use phase in sub-paragraphs related to modules B1, B2, B3, B4, B5, B6 and B7
§ 3.6.5.	Addition of extrapolation rules for submodules B1 to B7 (if applicable)
§ 3.6.7.	Addition of an extrapolation rule for module D
§ 5	Addition of a chapter about PEP update rules
§ 6.3	Addition of application examples for the extrapolation rules

1. Introduction

This reference document complements and explains the Product Environmental Profile Drafting Rules defined by the PEP ecopassport® program (PCR-ed4-EN-2021 09 06), available at www.pep-ecopassport.org.

It defines the additional requirements applicable to terminal comfort units. 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 COMFORT TERMINAL UNIT market.

	www.pep-ecopassport.org
PSR reference	PSR-0009-ed3.0-EN-2023 10 19
Critical review	The third-party Critical review was carried out by EVEA. The declaration of conformity published on 23/06/2023 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-4.1-EN-2017 10 17) and additional to the PCR, "Product Category Rules", (PEP-PCR-ed4-EN-2021 09 06) of the PEP ecopassport® eco-declaration program, this document sets out the specific rules for COMFORT TERMINAL UNITS 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 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 COMFORT TERMINAL UNITS with a common base for the development of their product life cycle assessments. The different available technologies are therefore presented:

- Fan coil unit (including battery-powered, gas-fired or electric unit heaters)
- Chilled beam
- Dynamic heater.

The specific rules for COMFORT TERMINAL UNITS can be updated in order to take account of all technological advances not included in this document, provided that such advances form part of a request to the P.E.P. Association to include them in the specific rules for COMFORT TERMINAL UNITS; the P.E.P. Association will then decide whether the new technology can be included and whether the performance claims are justified.

2.1. Definition of the product families concerned

2.1.1. Fan coil unit

Can be called a FAN COIL:
"Device used for heating and cooling and to ensure good indoor air quality and a minimum mixing rate to achieve the comfort required, as specified in NF EN ISO 7730. "

It consists of:

- One or more exchangers
- One or more fans fitted with electric motor(s)
- A casing if necessary
- A condensate retrieval pan for use in cold mode
- An air filter
- A mounting bracket (if supplied)

And, for ducted fan coil units, a distribution plenum. If the distribution plenum is sold separately, a PEP must be associated according to the PSR for ventilation, air treatment, filtration and mechanical smoke exhaust equipment (PSR-008-ed2.0-EN-2018 02 09).

A distinction is made between several types of fan coils, according to the Ecoconception regulation 2016/2281:

- Ducted or not
- Integrated or not

2.1.2. Chilled beam

2.1.2.1. Active chilled beam

Can be called an active chilled beam:
"Device used to heat, cool and, if applicable, ventilate a building, as specified by EN 15116"

It consists of:

- An air distribution system (plenum, injector and mixed air flow path)
- An exchanger
- A perforated face plate through which air can be drawn
- A mounting bracket (if supplied)
- And, if applicable, a casing.

2.1.2.2. Passive chilled beam

Can be called a passive chilled beam:
"Device used for cooling and to provide the comfort required, as specified by EN 14518. "

It consists of:

- An exchanger
- A casing
- A mounting bracket (if supplied).

2.1.3. Dynamic heater

Can be called a dynamic heater:
"Device used to heat and / or cool a building and from which air is evacuated by forced convection through one or more air outlets. Most of its capacity is hydronic capacity generated from an exchange between ambient air and a fluid originating from a generator external to the device. "

It consists of:

- An emitter
- One or more hydraulic exchangers, providing most of the total capacity of the device
- One or more air outlets
- A room thermostat integrated in the device, controlling at least the secondary heating unit(s) and the forced convection device
- A forced convection cut out device

- A filtration system
- A mounting bracket (if supplied)
- And, possibly, one or more secondary heating units consisting of one or more electric heating elements

Only devices with a total capacity up to 2000 W are concerned.

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 (PEP-PCR-ed4-EN-2021 09 06).

3.1.1. Functional unit

3.1.1.1. Fan coil unit

The functional unit related to fan coil units is defined below according to whether they provide heating only, cooling only of heating and cooling:

"Emit 1 kW heating via a fan coil unit, by providing the ventilation, filtration, and heating functions for 22 years"

"Emit 1 kW of sensitive cooling via a fan coil unit, by providing the ventilation, filtration, and heating functions for 22 years"

"Emit 1 kW of sensitive cooling or heating via a fan coil unit, by providing the ventilation, filtration, heating and/or cooling functions for 22 years"

The nominal thermal capacity and the reference lifetime are those specified in section 3.1.3 “Reference product and reference flow description” of these specific rules.

3.1.1.2. Chilled beam

The functional unit of the chilled beam active or passive is designed to:

"Ventilate and/or heat and/or cool a building for 25 years via a 1 m long beam with a section of 0.6 x 0.12 m^2 as specified by EN 14518 standard for passive chilled beams, or EN 15116 for active chilled beams."

The reference lifetime is as specified in section 3.1.3 “Reference product and reference flow description” of these specific rules.

3.1.1.3. Dynamic heater

The functional unit of the dynamic heater is designed to:

"Provide a heating or cooling capacity of 1 kW as specified by the manufacturer over a period of 17 years."

The reference lifetime is as specified in section 3.1.3. “Reference product and reference flow description” of these specific rules.

3.1.2. Declared Unit

Declared unit can be used as complementary information in order to help future PEP users.
For France scope, the declared unit must be applied if no functional unit can be defined.

For each of the families following, the reference lifetime is the one specified in section 3.1.3 “Reference product and reference flow description” of these specific rules.

3.1.2.1. Fan coil unit

The declared unit related to fan coil units is the following one:
“Provide ventilation, filtration, heating and/or cooling via a fan coil unit of xx kW (capacity reference) for a reference lifetime of 22 years.”

The reference capacity (xx kW) has to be adapted according to the reference product. This is the reference capacity as defined in paragraph 3.5.4.2. of these specific rules.

3.1.2.2. Chilled beam

The declared unit related to active or passive chilled beam is the following one:
"Ventilate and/or heat and/or cool a building via a chilled beam with a 1 m length for a section w x h m^2 for a reference lifetime of 25 years.”

The nominal thermal capacity and the dimensions (L, w, h) have to be adapted according to the reference product.

3.1.2.3. Dynamic heater

The declared unit related to dynamic heater is the following one:

“Provide heating or cooling via a dynamic heater of xx kW (reference capacity) for a reference lifetime of 17 years.”

The capacity (xx kW) has to be adapted according to the reference product. It's the nominal thermal capacity defined in the section 3.5.4.2. of these specific rules.

3.1.3. Reference product and reference flow description

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

- The manufacturing of a comfort terminal unit with a specific reference lifetime and, where applicable, whose energy consumption in use is expressed in kWh according to the use scenario in Section 3.5.4 "Use stage" of these rules of the section 3.5.4. Use phase (modules B1-B7) of these specific rules,
- Its packaging
- Any products or components required for installation.

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:

Products	Reference product	Reference lifetime
Fan coil unit	• The product selected from the range, which is used as the reference product, is chosen by the declarant. The capacity of the chosen reference product has to be mentioned in the PEP and the LCA report.	22 years
Active or passive chilled beam	• Dimensions: 1.2 x 0.6 x 0.12 m, i.e. 0.0864 m3 • The capacity has to be mentioned in the PEP and the LCA report.	25 years
Dynamic heater	• Output capacity equivalent to 1000 W	17 years

Table 1. Reference product for all the concerned families.

If no product corresponds to the above definition, the product with the most similar characteristics in the product range will be used. This choice has to be mentioned in the PEP and justified in the LCA report.

3.2. System boundaries

These specific rules are additional to section 2.2. "System boundaries" of the current PCR (PEP-PCR-ed4-EN-2021 09 06).

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.

3.2.2. Distribution stage

For this stage, the rules defined in the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

3.2.3. Installation stage

Conventionally, the installation of a comfort terminal unit may involve modifications to the structure (e.g. masonry work, electrical connections, addition of cladding, etc., 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 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 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

Additional chilled beam components that consume energy, such as electronic controls, built-in light fixtures, back-up heating, etc. might not fall within the scope of the study because they are not always supplied by the manufacturer with the product. If these elements are supplied with the product, they have to be taken into account.

According to the breakdown of module B, as defined in section 2.2.6. of the current PCR (PEP-PCR-ed4-EN-2021 09 06), use stage environmental impacts must be split in the following way for all product families concerned by the PSR

B1 : Use or application phase of the installed product	Liquid waste (condensate)
B2 : Maintenance	Maintenance operations and waste end of life treatment
B3 : Repair	Not applicable. Module equal to 0.
B4 : Replacement	Not applicable. Module equal to 0.
B5 : Rehabilitation	Not applicable. Module equal to 0.
B6 : Energy consumption during use phase	Energy consumption (applicable to fan coil units and dynamic radiators), energy conversion (into heating and/or cooling and/or ventilation), standby consumption by electronic components, any functions used to optimize energy consumption,
B7 : Water consumption during use phase	Not applicable. Module equal to 0.

For information, the breakdown of module B is mandatory in France.

3.2.5. End-of-life stage

For this stage, the rules defined in the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

3.2.6. Benefits and loads beyond the system boundaries

For this stage, the rules defined in the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.
For information, module D declaration is mandatory for products placed on the French market and planned to be used on a building LCA.

3.3. Cut-off criteria

The rules specified in section 2.3 "Cut-off criteria" of the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

3.4. Specific allocation rules

These specific rules are additional to section 2.4. "Rules for allocation between co-products" of the current PCR (PEP-PCR-ed4-EN-2021 09 06).

3.5. Development of scenarios (default scenarios)

These specific rules are additional to the section 2.5. on "Development of scenarios (default scenarios)" of the current PCR (PEP-PCR-ed4-EN-2021 09 06).

Each modification concerning default scenarios defined below must be justified in the LCA report and mentioned in the PEP.

Accepted evidences in order to modify default scenarios
The current PSR has hypothesis and default scenarios. If the declarant wants to use specific data, this data must be justified in the LCA report. This data, given by industrials, doesn't have to be certified but based on evidence. This evidence is engaging the declarant, supplier, or third-party responsibility. This evidence will have to be available if claimed.

Recycled content of raw materials (see paragraph 3.5.1. "Manufacturing stage") can be justified with suppliers' data but can't be justified with common data (professional associations, ADEME, industries). If there is no justified and specific recycled content, the default data given in section 3.5.1.1. has to be taken.

Raw material loss rate (see paragraph 3.5.1. “Manufacturing stage”) can be justified with an internal document from the production plant. If there is no specific justified rate, the default data given in section 3.5.1.3. has to be taken.

End of life waste treatment (see paragraphs “3.5.1. Manufacturing stage”, “3.5.3. Installation stage”, “3.5.6. End of life stage") can be justified with an attestation of the waste treatment company. If there is no specific data or default data for installation stage et end-of-life stage, table 7 of appendix D (PEP-PCR-ed4-EN-2021 09 06) applies.

3.5.1. Manufacturing stage

A comfort terminal unit is composed of:

- 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. Recycled content of raw material

If there is no justified specific data on recycled content, 0% recycled content must be applied.

3.5.1.2. Raw materials packaging and components

Raw materials packaging, their components and their transport to manufacturing sites must be taken into account. Suppliers’ data must be used. If no justification is given, an average packaging rate of 5% of the reference equipment mass (equipment + packaging) as defined below, must be taken:

- Wood 50%
- Cardboard 40%
- Low-density polyethylene 10%

Loss materials of these packaging have to be taken into account with an average rate of 5%.
Reused packaging on site are not taken into consideration. Packaging end of life treatment is modelling as defined in the paragraph 3.5.3.2. of the current PSR. 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.

3.5.1.3. 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 products exploitation (recycling, re-use or incineration as fuel for energy production), environmental impacts must be considered in the life cycle analysis for comfort terminal units, as shown in section 2.5.6 “End of life treatment scenarios” from the current PCR (PEP-PCR-ed4-EN-2021 09 06).

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-organization).

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 non-hazardous waste generated by raw material and components:

The amount of waste is calculated by multiplying the material quantity of the total product (finished product and associated packaging) by 0,05 for plastic injection processes and elastomer, and 0,3 for other manufacture processes. Non-hazardous waste treatment is modelling as follows: 100% of incinerated waste (without waste-to-energy recovery)

- For hazardous waste generated by raw material and components:

The amount of waste is calculated by multiplying the material quantity of the total product (finished product and associated packaging) by 0,05 for plastic injection processes and elastomer, and 0,3 for other manufacture processes. Hazardous waste treatment is modelling as follows: 100% of incinerated waste (without waste-to-energy recovery).
If applicable, when the worst performer value is used by default, no waste-to-energy recovery will be taken into account. The production of this lost material must be taken into account.

The table below sums up default loss rate for each constituent material of the total product (finished product and associated packaging(s)):

Process	**Default loss rate**	**Material mass after manufacture**	**Material mass to take into account (including loss)**
Plastic injection and elastomer	5%	1kg	1,05kg
Other processes	30%	1kg	1,30kg

Table 2 : Default loss rate for each constituent material of the total product (finished product and associated packaging(s))

Examples:
If 1 kg of a bare product (final mass of the part including packaging) is composed of 0.8kg of steel and 0.2kg of electronic card:

- For non-hazardous waste:

Waste mass = steel mass x 0.3 = 0.8 kg x 0.3 = 0.24 kg of incinerated waste (without waste-to-energy recovery)

- For hazardous waste (0.2 kg of electronic card):

Waste mass = electronic card mass x 0.3 = 0.2 kg x 0.3 = 0.06 kg of incinerated waste (without waste-to-energy recovery)

Any other waste treatment during manufacture stage which is taken into account for calculation has to be justified on the LCA report and mentioned in the PEP.

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 comfort terminal units must be analyzed in accordance with the PCR (PEP-PCR-ed4-EN-2021 09 06) section 2.5.3 "transport scenarios".

3.5.3. Installation stage

Installation conditions mean any process, component, energy or consumption and/or emission required to install a comfort terminal unit. The installation conditions do not imply that particular consumables and/or products to be itemized shall be used, provided that an installation template wall bracket has already been included during the manufacturing stage.

In the absence of a wall-mount that serves as a mounting template, the supporting report specifies the elements required for the installation of the comfort terminal unit. These elements must be described and inventoried in the LCA report in the installation stage.

The treatment of packaging waste is included. The packaging waste produced during the installation phase should be disposed of by the installer once the equipment has been installed.

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.

If there is no specific end of life evidence, treatment scenarios showed in the table below are applied by default. Tables below are representative of year 2019. It’s possible to use Eurostat recent consolidated data on their website if they are available (see reference at section 6.2.). The reference year of the used data shall be mentioned in the PEP.

For France scope, the default values below shall be used:

	Recycling rate	Incineration with energy production	Incineration without energy production	Burial rate
Metal	83%	1%	0%	16%
Steel	88%	0%	0%	12%
Aluminum	60%	7%	0%	33%
Paper-Cardboard	91%	5%	0%	4%
Wood	7%	31%	0%	62%
Plastic	27%	43%	0%	30%

Table 3. End of life packaging treatment default scenarios for France scope

For Europe scope, the default values below shall be used :

	Recycling rate	Incineration with energy production	Incineration without energy production	Burial rate
Metal	77%	2%	0%	21%
Paper-Cardboard	82%	9%	0%	9%
Wood	31%	31%	0%	38%
Plastic	41%	37%	0%	22%

Table 4. End of life packaging treatment default scenarios for Europe scope

For other scopes, waste shall be treated according to waste treatment default scenario of the current PCR (PEP-PCR-ed4-EN-2021 09 06) in paragraph 2.5.6.

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 10% of the total mass of the packaging.

3.5.4. Use stage (module B1-B7)

The energy consumption of a comfort terminal unit shall be expressed in kWh of final energy, in compliance with the specifications of the reference product analysis, as defined in section 3.1.3. “Functional unit and reference flow” of these specific rules, according to the comfort terminal unit typologies described below.

The PEP shall specify the operating water systems used to determine the energy consumption of the comfort terminal unit according to current EN standards and/or the Eurovent certification program. The following sentence must be included in the PEP: "The capacity consumed depends on the conditions of use and operation of the building concerned. "

3.5.4.1. Maintenance stage

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. The replacement of parts due to malfunction will not be taken into account.

For lack of available information, comfort terminal units require maintenance based on the following considerations:

Equipment	Type of intervention over the RLT	Frequency over the RLT
Fan coil unit	Filters Motor-driven fan	Twice a year Once
Chilled beam	-	-
Dynamic heater	Filter	Once a year

Tableau 2. Nature et frequency of maintenance operations by type of equipment

By sector-based agreement, the transport associated with a maintenance operation has to be taken into account by considering a transport hypothesis shall be equal to a 100-km return trip in a van for one person (assumed weight of 80 kg) alone in his vehicle, by precising the « car passenger » ICV module.

The treatment of any other waste generated by the installation and maintenance stages, essential for the comfort terminal unit 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.

3.5.4.1.1. Waste generated during maintenance stage

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

The material components, as specified in Section 3.5.4.1. "Maintenance stage (module B2)" of the present document, 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 3.5.5 "End-of-life stage (module C1-C4)" 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.

3.5.4.2. Use phase for fan coil units

3.5.4.2.1. Liquid waste (module B1)

For fan coil units, a quantity of water, expressed in liters, discharged from fan coil units is taken into account by default.
The discharged water is often dirty water that, for lack of more precise information, can be only modelled by water alone.

By sector-based agreement, the formula used to calculate the number of liters of condensate discharged from each device is:
Q (litres) = (Total capacity in W – Sensitive capacity in W) * summer operating time / 680

The capacities used are those given in the Eurovent regulation 2016/2281. If applicable, this data shall be mentioned in the PEP.

3.5.4.2.2. Energy consumption (module B6)

Electricity consumption in the use stage during the reference lifetime can be expressed as follows:

$$C\ (kWh) = (C_{hot} + C_{Cold} + C_{standby}) * RLT$$
$$= [(t_{HOT} * (5\%\ PelecHS + 25\%\ PelecMS + 70\%\ PelecLS))$$
$$+ (t_{COLD} * (5\%\ PelecHS + 30\%\ PelecMS + 65\%\ PelecLS))$$
$$+ C_{standby}]$$
$$* RLT$$

Where:
C = electricity consumption of the fan coil unit expressed in kWh
C_{Hot} = annual electricity consumption in heating mode of the fan coil unit expressed in kWh/year
C_{Cold} = annual electricity consumption in cooling mode of the fan coil unit expressed in kWh/year
$C_{standby}$ = annual standby electricity consumption of a fan coil unit expressed in kWh/year
t_{HOT} = operating time in heating mode in winter in hours
t_{COLD} = operating time in cooling mode in summer in hours
Pelec = electrical capacity input at the different fan operating speeds as defined for the Eurovent high-speed "HS", medium speed "MS" and low speed "LS" certification in kW
RLT = reference lifetime of the device in years.

By default, the operating times[2] applied are:

- 1400 hrs in winter
- 600 hrs in summer.

[2] Times obtained from RT 2012 scenarios

By default, the annual standby consumption of the unit is equal to the electrical capacity input, 2 W by default, multiplied by the number of hours the fan coil unit or dynamic heater remains on standby, i.e.:

$$C_{standby} = 2 * (8760-1400-600) = 2 * 6760 = 13,52 \text{ kWh/year.}$$

For fan coil units, the PEP shall mention the Eurovent Certification energy class.

For ducted fan coil units, the following sentence must be included in the PEP: "Ducted fan coil units must be combined with an appropriately sized return air and air blower diffuser."

3.5.4.3. Use stage for chilled beam

Chilled beams do not use electrical capacity in operation. The following note must be added to the Use stage - energy consumption section of the PEP: "Active chilled beams shall be connected to an appropriately dimensioned air handling unit."

3.5.4.4. Dynamic heater

3.5.4.4.1. Liquid waste (module B1)

For dynamic heaters, a quantity of water, expressed in liters, is taken into account by default.
The discharged water is often dirty water that, for lack of more precise information, can be only modelled by water alone.

By sector-based agreement, the formula used to calculate the number of liters of condensate discharged from each device is:
Q (liters) = (Total capacity in W – Sensitive capacity in W) * summer operating time / 680

The capacities used are those given in the Eurovent regulation 2016/2281. If applicable, this data shall be mentioned in the PEP.

3.5.4.4.2. Energy consumption

The electricity consumption of a dynamic heater during the reference lifetime is calculated as follows:

$$C \text{ (kWh)} = (C_{hot} + C_{cold} + C_{standby}) * RLT = [t_{HOT} * Pelec + t_{COLD} * Pelec + C_{standby}] * RLT$$

Where:
C = electricity consumption of a device expressed in kWh
C_{Hot} = annual electricity consumption in heating mode of a dynamic heater expressed in kWh/year
C_{cold} = annual electricity consumption in cooling mode of a dynamic heater expressed in kWh/year
$C_{standby}$ = annual standby electricity consumption of a dynamic heater expressed in kWh/year
RLT = reference lifetime of the device in years
t_{HOT} = operating time in heating mode in winter in hours

t_{COLD} = operating time in cooling mode in summer in hours
Pelec = electrical power input according the ecoconception regulation 2016/2281

By default, the operating times[3] applied are:

- 1400 hrs in winter
- 600 hrs in summer.

The inclusion of energy-saving functions shall be justified in the LCA report, which shall also specify their certification by an independent laboratory associated with the product category mentioned in this PSR.

3.5.5. End-of-life stage

Within the European Union, waste from thermodynamic generators is classed as WEEE (Waste from Electrical and Electronic Equipment).
After presenting the local requirements for managing end-of-life thermodynamic generators, the LCA report will explain the organization of known disposal and/or recovery systems, the associated environmental impacts and how the manufacturer shall meet these requirements, if applicable. These items will determine the collection rate and end-of-life treatment rate.

ICV Ecosystem modules can be used solely in France and Europe.

For the devices which are not concerned by the WEEE Directive and/or if there is no justification on the end of life treatment for these equipment, the default scenario from the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

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.

3.5.5.1. 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.

3.5.6. Benefits and loads beyond the system boundaries (module B)

For this step, the rules defined in the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

[3] Times obtained from RT 2012 scenarios

3.6. Rule 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 current PCR (PEP-PCR-ed4-EN-2021 09 06).

The following paragraphs detail the conditions of belonging to a homogeneous environmental family and the extrapolation rules applicable to each stage of the life cycle.

To use these extrapolation rules, the manufacturer must justify in the LCA report that the range of products covered by the PEP fulfill all the conditions presented in paragraph 3.6.1. The use of any other extrapolation rule and/or definition of environmental homogeneous family shall be justified in the LCA report.

3.6.1. Definition of a homogeneous environmental family

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

3.6.2. Extrapolation rules applicable to fan coil units and dynamic heaters

3.6.2.1. Extrapolation rule applicable during the manufacturing stage

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

As the regulation mass 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 and end-of-life stages, the mass extrapolation coefficient to be applied to the PEP results for any other capacity from the same range is as follows:

Coefficient on the FU scale	$\left(\frac{mass\ of\ product\ considered\ (including\ packaging) - \ regulation\ mass\ (kg)}{total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (including\ packaging), - regulation\ mass\ (kg)}\right) \times \left(\frac{Capacity\ of\ the\ reference\ product\ (kW)}{Capacity\ of\ the\ product\ considered\ (kW)}\right)$

Coefficient on the scale of the declared product (additional information)	$\left(\frac{mass\ of\ product\ considered\ (including\ packaging) - regulation\ mass\ (kg)}{total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (including\ packaging), - regulation\ mass\ (kg)}\right)$

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

The capacity of the reference product is defined in Section 3.5.4.2. “Energy consumption (module B6)” of these specific rules.

3.6.2.2. 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 capacity from the same range is as follows:

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

3.6.2.3. 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 capacity from the same range is as follows:

Coefficient on the FU scale	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ (kg)}\right) \times \left(\frac{Capacity\ of\ the\ reference\ product\ (kW)}{Capacity\ of\ the\ product\ considered\ (kW)}\right)$

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

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

For use stage, extrapolation rules have to be applied under each sub-module (B1 to B7). The use stage is equal to the sum of the extrapolated indicators of the sub-modules B.

For the use stage, the extrapolation rules have to be applied either:

- under each sub-module (from B1 to B7). The use stage is equal to the sum of extrapolated indicators of sub-modules B.
- or to the whole phase, according to the extrapolation rule defined in section 3.6.2.4.6. for module B6.

3.6.2.4.1. Module B1

For fan coil units and dynamic heaters, extrapolation coefficients apply to liquid waste. The environmental impacts generated during module B1 are directly correlated to the total energy consumption.
The extrapolation coefficient to be used on PEP results for any other product in the same range is as follows:

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

- C = total energy consumption. The method for calculating C is described in Section 3.5.4.2.1. of these specific rules.
- Capacity = Total cold capacity – sensitive cold capacity. The method for calculating the capacity is described in the section 3.5.4.2.2. of these specific rules.

3.6.2.4.2. Module B2

The environmental impacts produced during the maintenance stage are due to the annual travel of one operator and the replacement of the maintenance parts.

For the maintenance stage, the extrapolation rule to use for any other product of the same range is calculated on the basis of the total mass of product(s) replaced. The extrapolation coefficient to be used on PEP results for any other product in the same range is as follows:

Coefficient on the FU scale	$\left(\frac{total\ mass\ of\ product(s)\ replaced\ for\ the\ product\ considered\ (kg)}{total\ mass\ of\ product(s)\ replaced\ for\ the\ reference\ product\ (kg)}\right) \times \left(\frac{Capacity\ of\ the\ reference\ product\ (kW)}{Capacity\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{total\ mass\ of\ product(s)\ replaced\ for\ the\ product\ considered\ (kg)}{total\ mass\ of\ product(s)\ replaced\ for\ the\ reference\ product\ (kg)}\right)$

3.6.2.4.3. Module B3

Not applicable.

3.6.2.4.4. Module B4

Not applicable.

3.6.2.4.5. Module B5

Not applicable.

3.6.2.4.6. Module B6

For units that consume electricity during use (fan coil units and dynamic heaters), the environmental impacts generated by module B6 are correlated to total energy consumption.

The extrapolation rule to apply to the reference product to evaluate the impact of any other thermodynamic generator in the same range is as follows:

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

The calculation of total energy consumption is described in paragraph 3.5.4 of these specific rules.

3.6.2.4.7. Module B7

Not applicable.

3.6.2.5. 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 capacity from the same range is as follows:

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

3.6.2.6. Extrapolation rule applied to the benefices and loads beyond the system boundaries (module D)

Following a documented sensitivity study, it has been proved that environmental impacts of these systems from phase A1 to phase C4 are proportional to their mass. An extrapolation process applying to all the Life Cycle Assessment phases (A1-C4) has been made and appears in the table below.
Factors that change module D are:

- Recycled content of raw materials quantities used for manufacturing phase
- Loss quantities and waste generated during the Life Cycle Assessment, and their treatment.

These factors are directly related to the mass of the product and should not vary within a homogeneous environmental family (paragraph 2.6. of the current PCR (PEP-PCR-ed4-EN-2021 09 06): “similar manufacturing technology: same type of materials and manufacturing processes”).

For the benefits and loads beyond the system boundaries stage, the mass extrapolation coefficient to be applied to the PEP results for any other capacity from the same range is as follows:

Coefficient on the FU scale	$\left(\frac{Total\ mass\ of\ the\ product\ considered, including\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ including\ packaging\ (kg)}\right) \times \left(\frac{Capacity\ of\ the\ reference\ product\ (kW)}{Capacity\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered, including\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, including\ packaging\ (kg)}\right.$

3.6.3. Extrapolation rules applicable to chilled beams

3.6.3.1. Extrapolation rule applied to the manufacturing and distribution stages

For these stages, the extrapolation rule to be used for any other product from the same range is calculated according to the total mass of the product (with packaging). The weight of the device corresponds to its global mass, expressed in kilograms (kg), as supplied to the customer, packaging included.

The mass extrapolation coefficient to be used on the PEP results for any other product in the same product range is as follows:

Coefficient on the FU scale	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right) \times \left(\frac{Volume\ of\ the\ reference\ product\ (m3)}{Volume\ of\ the\ product\ considered\ (m3)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right)$

The volume of the reference product is defined in Section 3.1 “Functional unit and description of the reference flow” of these specific rules.

3.6.3.2. Extrapolation rule applied during the installation stage

For the installation stage, the extrapolation rule to be used for any other product from the same range is calculated according to the mass of the product packaging in kg.

The mass extrapolation coefficient to be used on the PEP results for any other product in the same product range is as follows:

Coefficient on the FU scale	$\left(\frac{mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{mass\ of\ the\ packaging\ of\ the\ reference\ product\ (kg)}\right) \times \left(\frac{Volume\ of\ the\ reference\ product\ (m3)}{Volume\ of\ the\ product\ considered\ (m3)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{mass\ of\ the\ packaging\ of\ the\ reference\ product\ (kg)}\right)$

3.6.3.3. Extrapolation rules applied to the use stage

For use stage, extrapolation rules have to be applied under each sub-module (B1 to B7). The use stage is equal to the sum of the extrapolated indicators of the sub-modules B.

For the use stage, the extrapolation rules have to be applied either:

- under each sub-module (from B1 to B7). The use stage is equal to the sum of extrapolated indicators of sub-modules B.
- or to the whole phase, according to the extrapolation rule defined in section 3.6.2.4.6. for module B6.

3.6.3.3.1. Module B1

Not applicable.

3.6.3.3.2. Module B2

Environmental impacts generated during maintenance stage are due to the annual travel of the operator and the renewal of maintenance parts. These parts are considered as the same within the homogeneous family.

3.6.3.3.3. Module B3

Not applicable.

3.6.3.3.4. Module B4

Not applicable.

3.6.3.3.5. Module B5

Not applicable.

3.6.3.3.6. Module B6

Because chilled beams consume no energy during use, there is no need to apply an extrapolation rule.
Not applicable.

3.6.3.3.7. Module B7

Not applicable.

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

For the end-of-life stage, the extrapolation rule to be used for any other product from the same range is calculated according to the total mass of the product (excluding packaging). The weight of the device corresponds to its overall mass, expressed in kg.

The mass extrapolation coefficient to be used on the PEP results for any other product in the same product range is as follows:

Coefficient on the FU scale	$\left(\frac{total\ mass\ of\ the\ product\ considered, excluding\ packaging\ (kg)}{total\ mass\ of\ the\ reference\ product\ of\ the\ range, excluding\ packaging\ (kg)}\right) \times \left(\frac{Volume\ of\ the\ reference\ product\ (m3)}{Volume\ of\ the\ product\ considered\ (m3)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{total\ mass\ of\ the\ product\ considered, excluding\ packaging\ (kg)}{total\ mass\ of\ the\ reference\ product\ of\ the\ range, excluding\ packaging\ (kg)}\right)$

3.6.3.5. Extrapolation rules applied to the benefices and loads beyond the system boundaries (module D)

Following a documented sensitivity study, it has been proved that environmental impacts of these systems from phase A1 to phase C4 are proportional to their mass. An extrapolation process applying to all the Life Cycle Assessment phases (A1-C4) has been made and appears in the table below.
Factors that change module D are:

- Recycled content of raw materials quantities used for manufacturing phase
- Loss quantities and waste generated during the Life Cycle Assessment, and their treatment.

These factors are directly related to the mass of the product and should not vary within a homogeneous environmental family (paragraph 2.6. of the current PCR (PEP-PCR-ed4-EN-2021 09 06): “similar manufacturing technology: same type of materials and manufacturing processes”).

Environmental impacts generated during the benefits and loads beyond the system boundaries stage are mainly correlated to the total mass of the product including its packaging.

For the benefits and loads beyond the system boundaries stage, the mass extrapolation coefficient to be applied to the PEP results for any other capacity from the same range is as follows:

Coefficient on the FU scale	$\left(\frac{Total\ mass\ of\ the\ product\ considered, including\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ including\ packaging\ (kg)}\right) \times \left(\frac{Capacity\ of\ the\ reference\ product\ (kW)}{Capacity\ of\ the\ product\ considered\ (kW)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered, including\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, including\ packaging\ (kg)}\right)$

3.7. Rules applying to joint environmental declarations

These rules are complementary to the current PCR section 2.7 "Rules applying to joint environmental declarations" (PEP-PCR-ed4-EN-2021 09 06).

For a joint environmental declaration, the analysis must cover a "typical product" compliant with the rules defined in Section 3.1.3 "Reference product and reference flow description" of these specific rules.
Moreover, the application validity framework of rules of extrapolation based on technical criteria shall be mentioned in the PEP, so that it's possible to check that products belong to the same environmental family as the typical product.

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

3.8. Requirements concerning environmental data

3.8.1. Requirements concerning the collection of primary and secondary data

These rules are additional to the sections 2.9.1 "Requirements for the collection of primary data" and 2.9.2. "Requirements for secondary data" of the current PCR (PEP-PCR-ed4-EN-2021 09 06).

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 organization) 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 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. For lack of primary data, secondary data, i.e. data obtained from the life cycle analysis software database should be used. The current PCR (PEP-PCR-ed4-EN-2021 09 06) explains how to select the ICV modules. If the transportation information is not available, the data defined in the section 2.5.3. "Transport scenarios" of the current PCR (PEP-PCR-ed4-EN-2021 09 06) will be used.

The ICV module used to model the raw material or the component can include a default loss rate.

- If the default loss rate included in the ICV module can be changed: Default values defined in the paragraph 3.5.1.4. have to be applied.
- If the default loss rate included in the ICV can not be changed:

O The loss rate is below the default values defined in the paragraph 3.5.1.4. : this loss rate has to be mentioned in the LCA report and the modelling has to be adapted as much as possible in order to take into account the difference between generated waste (hazardous or non-hazardous)

O The loss rate is higher to the default values defined in the paragraph 3.5.1.4. : the loss rate has to be mentioned in the LCA.

3.8.2. Data quality evaluation

The specific rules specified in section 2.9.3. "Data quality evaluation" in the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

3.9. 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:

- For fan coil units and dynamic heaters:

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

The capacity of the reference product is defined in Section 3.1.3. “Functional unit and description of the reference flow”.

For reversible products, i.e. those operating in cold and hot mode, the capacity of the reference product to be considered is: $Pref = (t_{hot} * P_{hot} + t_{cold} * P_{cold})/ (t_{hot} + t_{cold})$

- For chilled beams:

Environmental impacts from the PEP (for a beam measuring 1.2 x 0.6 x 0.12 m, i.e. 0.0864 m^3)= [Environmental impacts of the reference product / Volume of the product considered (m3)] * Volume of the reference product (m3)

The size of the reference product is defined in Section 3.1.3. “Functional unit and description of the reference flow”.

For the biogenic carbon storage, two assessment methodologies 0/0 or -1/+1 are accepted until the environmental database update. The methodology used has to be mentioned in the PEP and the LCA report.

The environmental database version has to be mentioned in the PEP and the LCA report (included the Environmental Footprint version number).

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-ed4-EN-2021 09 06) apply.

The PEP must specify:

- The product sub-category and characteristics to be declared according to Section 2.1.
- For chilled beams, the following sentence shall be added in the PEP: "Active chilled beams shall be connected to an appropriately dimensioned air handling unit."
- Any other end-of-life treatment scenario for the product used, according to section 3.5.5.

4.2. Constituent materials

The rules specified in section 4.2 "Constituent materials" of the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

4.3. Additional environmental information

These specific rules are additional to section 4.3 "Additional environmental information" of the PCR (PEP-PCR-ed4-EN-2021 09 06).

4.4. Environmental impacts

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.

The table of environmental impacts represents the environmental impact on the functional unit scale.

For fan coil units and dynamic heaters:

The table of environmental impacts represents the environmental impact of the functional unit, i.e. 1 kW of cold or hot.

Thus, the total impact of the installed product must be calculated by the user of the PEP according to the capacity 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 under the assumption of 1 kW of heating capacity being supplied. The real impact of the stages of the life cycle of a product installed in an actual situation is to be calculated by the user of the PEP by multiplying the impact concerned by the total heating capacity** in kW.*
*to be specified according to the functions performed by the equipment: 1 kW of cooling, 1 kW of heating or cooling.
** to be specified according to the functions performed by the equipment: cooling, heating or cooling.

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 capacity. 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.*
*to be specified according to the functions performed by the equipment: 1 kW of cooling, 1 kW of heating or cooling.

For chilled beams:

The table of environmental impacts represents the environmental impact of the functional unit, i.e. a beam whose dimensions are 1.2 x 0.6 x 0.12 m, i.e. 0.0864 m3.

Thus, the total impact of the product installed in a real situation must be calculated by the user of the PEP by multiplying the impact concerned by the volume of the product.

The following details must be completed and included in the PEP, to ensure clarity and transparency for the user:
The PEP was drawn up by considering a beam of dimensions 1.2 x 0.6 x 0.12 m, i.e. 0.0864 m3. The real impact of the stages of the life cycle of a product installed in an actual situation is calculated by the user of the PEP by multiplying the impact concerned by the total volume of the installed product.

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. a beam whose dimensions are 1.2 x 0.6 x 0.12 m, i.e. 0.0864 m3. 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. PEP Update rules

Every EPD registered by PEP association shall be updated and subjected to a new registration if the concerned product increase of more than 5%:

- In mass
- In new sub-components
- In environmental indicators considered as significant
- Any other element considered as significant
- In used material

6. Appendices

6.1. Glossary

C	Final energy consumption
EEE	Electrical and Electronic Equipment
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
W	Watt

6.2. Sources used

PSR ref	**Description**	**Sources used**
§ 3 and 7	Functional unit Use stage	EUROVENT fan coil unit certification program 2011-10 RS-6C002 and 2011-10 RS-6C002A
§ 2	Scope	NF EN ISO 7730 March 2006: Ergonomics of the thermal environment - Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria
§ 2 and 3	Scope Functional unit	NF EN 15116 June 2008: Ventilation in buildings - Chilled beams - Testing and rating of active chilled beams
§ 2 and 3	Scope Functional unit	NF EN 14518 September 2005: Ventilation in buildings - Chilled beams - Testing and rating of passive chilled beams

§ 3.5.3.1.	End of life packaging treatment default scenarios for France and Europe scope	Information is available on this website: https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPAC__custom_3801295/default/bar?lang=fr
§ 3.5.4	Determination of capacity	Ecoconception regulation 2016/2281

6.3. Application example for extrapolation rules

For the example below, product A is the reference product corresponding to a fan-coil unit.

Below, constants characterising all the products in the homogeneous environmental family:

t_{HOT} = operating time in heating mode in winter in hours	1400
t_{COLD} = operating time in cooling mode in summer in hours	600
Cstandby (annual standby electricity consumption kWh/year)	13,52
RLT (years)	22

Table 6: constants characterising all the products in the homogeneous environmental family

Below, data regarding 3 products (A, B, C) belonging to the same homogeneous environmental family. Product A is the reference product.

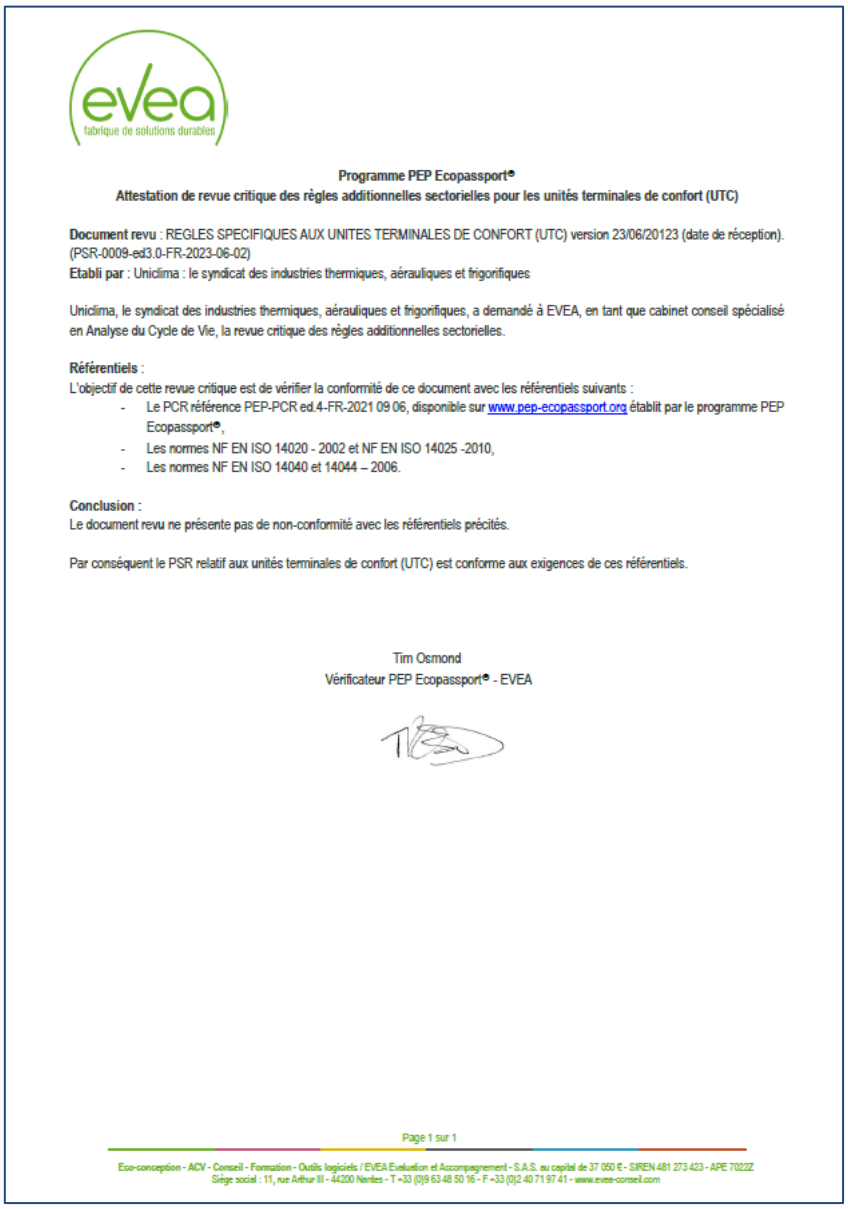
	Product A (reference)	Product B	Product C
Mass of the product (kg)	50,00	30,00	20,00
Mass of regulation (kg)	0,50	0,30	0,20
Mass of the packaging (kg)	2,00	1,50	1,00
Reference capacity (kW)	10,00	5,00	2,00
Reference product capacity/considered product capacity	1,00	2,00	5,00
Pelec HS (kW)	20,00	10,00	5,00
Pelec MS (kW)	10,00	5,00	2,00
Pelec LS (kW)	5,00	2,00	1,00
Total heating capacity (kW)	10,30	5,30	2,30
Total cooling capacity (kW)	9,30	4,30	1,30
Sensitive capacity (kW)	8,50	4,00	1,20
Total cooling capacity – sensitive capacity (kW)	0,80	0,30	0,10
Chot annual electricity consumption in heating mode of the fan coil unit expressed in kWh/year)	9800,00	4410,00	2030,00
Ccold (annual electricity consumption in cooling mode of the fan coil unit expressed in kWh/year)	4350,00	1980,00	900,00
Final energy consumption C (kWh)	311597,44	140877,44	64757,44

Then, we can determine extrapolation coefficient for each product and each stage of the life cycle :

	Steps	Product A	Product B	Product C
Functional unit scale	**A1-A3 : Manufacturing**	1,00	1,20	2,00
	A4 : Distribution	1,00	1,20	2,00
	A5 : Installation	1,00	1,50	2,50
	B1 : Use	1,00	1,21	1,66
	B2 : Maintenance	-	-	-
	B3 : Repair	-	-	-
	B4 : Replacement	-	-	-
	B5 : Rehabilitation	-	-	-
	B6 : Energy consumption	1,00	0,90	1,04
	B7 : Water consumption	-	-	-
	C1-C4 : End of life	1,00	1,19	1,98

	D : Benefits and loads beyond the system boundaries	1,00	1,20	2,00
Declared product scale	**A1-A3 : Manufacturing**	1,00	0,60	0,40
	A4 : Distribution	1,00	0,60	0,40
	A5 : Installation	1,00	0,75	0,50
	B1 : Use	1,00	0,45	0,21
	B2 : Maintenance	-	-	-
	B3 : Repair	-	-	-
	B4 : Replacement	-	-	-
	B5 : Rehabilitation	-	-	-
	B6 : Energy consumption	1,00	0,45	0,21
	B7 : Water consumption	-	-	-
	C1-C4 : End of life	1,00	0,59	0,40
	D : Benefits and loads beyond the system boundaries	1,00	0,60	0,67

6.4. Declaration of conformity



Programme PEP Ecopassport®
Attestation de revue critique des règles additionnelles sectorielles pour les unités terminales de confort (UTC)

Document revu : REGLES SPECIFIQUES AUX UNITES TERMINALES DE CONFORT (UTC) version 23/06/20123 (date de réception). (PSR-0009-ed3.0-FR-2023-06-02)
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.

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.4-FR-2021 09 06, 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 unités terminales de confort (UTC) est conforme aux exigences de ces référentiels.

Tim Osmond
Vérificateur PEP Ecopassport® - EVEA

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