PEP ecopassport® PROGRAM

PSR

SPECIFIC RULES FOR VENTILATION, AIR TREATMENT, FILTRATION AND MECHANICAL SMOKE EXHAUST EQUIPMENT

PSR-0008-ed3.0-EN-2023-10-19

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

Contents

List of the modifications of the present document

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Modified section Ed to ed 2	**Modification**
§ 3.1.2	Addition of the declared units 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 Category Rules (PCR) of Product Environmental Profiles (PEP) 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 ventilation, air treatment, filtration or mechanical smoke exhaust equipment. 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 ventilation, air treatment, filtration or mechanical smoke exhaust equipment market.

	www.pep-ecopassport.org
PSR reference	PSR-0008-ed3.0-EN-2023 xx xx
Critical review	The third-party Critical review was carried out by EVEA The declaration of conformity published on 30/06/2023 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-ed 4.1-EN-2017 10 17) and additional to the PCR, "PRODUCT CATEGORY RULES", (PCR-ed4-EN-2021 09 06) of the PEP ecopassport® eco-declaration program, this document sets out the specific rules for ventilation, air treatment, filtration or mechanical smoke exhaust equipment 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 ventilation, air treatment, filtration and mechanical smoke exhaust equipment with a common base for the development of their product life cycle assessments. The various ventilation, air treatment, filtration and mechanical smoke control/exhaust systems available are described below.

2.1. Definition of the product families concerned

The product families concerned are designated by the following terminology: ventilation, air treatment, filtration or mechanical smoke exhaust equipment

These include all devices that provide ventilation and/or air filtration and/or mechanical smoke extraction from within a home or a residential or commercial building.

Two families of ventilation and air treatment equipment are considered:

- **Active equipment (family 1)**: products that use electrical power to operate.

- **Passive equipment (family 2)**: products that do not use electrical power to operate.

Family 1: Active equipment	
Equipment	**Technical data**
Unidirectional residential ventilation unit	• Function: Ventilation • Type: unidirectional exhaust or unidirectional supply • Nominal airflow rate, electrical power input • Operating mode: constant airflow or constant airflow with peak airflow or demand control air flow
Bidirectional residential ventilation unit	• Function: Ventilation, filtration with optional pre-heating or pre-cooling • Type: bidirectional • Nominal airflow rate, electrical power input • Operating mode: constant airflow or constant airflow with peak airflow or demand control air flow
Residential or non-residential unidirectional ventilation unit or roof fan	• Application: collective or commercial • Function: Ventilation only, mechanical exhaust ventilation with or without a smoke extraction function, ventilation with or without (an) air treatment function(s): filtration, heating, cooling, humidification. • Type: unidirectional exhaust, unidirectional supply • Nominal airflow rate, electrical power input • Operating mode: constant airflow or constant airflow with peak airflow or demand control air flow
Residential or non-residential bidirectional ventilation unit or air handling unit	• Application: collective or commercial • Function: ventilation, filtration, and at least one additional function (heating, cooling, recovery, humidification, dehumidification, preheating, precooling) • Type: bidirectional • Exchanger: plate heat exchanger or wheel • Operating mode: constant airflow or constant airflow with peak airflow or demand control air flow
Powered air supply, air exhaust grilles or air diffusers	• Type: powered (power supply, batteries, etc.) • Function: air transfer • Connection cross-section
Smoke extraction unit or fan	• Type: unidirectional exhaust • Function: smoke exhaust only • Flow rate

Table 1 – Categories of active equipment covered by the PSR (family 1)

(1) Smoke extraction unit or fan will be tested annually according to regulations and in compliance with the safety regulations governing fire and panic hazards in ERP regulations specified by the modified decrees of 25 June 1980 and 22 June 1980. The energy consumed during the annual test is negligible in comparison to the other environmental impacts (for 250 Pa and 10,000 m^3/h, Pelec = 3 kW i.e. C = 3 * 1(h) = 3 kWh). These devices are therefore considered to be active equipment that does not consume energy during the use stage.

Family 2: Passive equipment	
Equipment	**Technical data**
Air supply, air exhaust grilles or air diffusers, fire dampers, terminal fire dampers, dampers and smoke control damper	• Type: circular or rectangular • Function: Air transfer • Material: metal or other (to be specified) • Connection cross-section
Air filters	• Type of filter • Quality of filtration • Function: air filtration • Dimensions, filtration area
Air inlets	• Type: fix, self-balanced or humidity control • Function: Air transfer • Maximum air flow at 20 Pa
Safety boxes for powered smoke fans (2)	• Type: non-powered • Current • Smoke exhaust only, smoke exhaust comfort, 1 or 2 speeds
Air ducts and components	• Type: rigid or semi-rigid or flexible, circular or rectangular, insulated or not • Function: air transfer • Length, thermal resistance if insulated • Diameter

Table 2 – Categories of active equipment covered by the PSR (family 2)

(2) The safety boxes are used to control a smoke extraction fan. When used with a fan, safety boxes are considered to be components of the ventilation system in which only the fan consumes electrical power. When safety boxes are sold on their own, they can only be used for smoke extraction if they are installed with a fan. This equipment is therefore considered to be passive equipment that does not consume energy during the use stage.

2.2. Consideration of the functions and technologies not included in this document

The specific rules for ventilation, air treatment, filtration or mechanical smoke exhaust equipment will take account of all technological advances, provided that such advances form part of a request to the P.E.P. association to include them in the specific rules for ventilation, air treatment, filtration or mechanical smoke exhaust equipment; the P.E.P. association will then decide whether the new technology can be included and whether the performance claims are justified.

In view of the specific features of each equipment categories described below, only the results for products sharing the same functional unit can be compared.

3. Reference Product life cycle assessment

3.1. Functional unit and reference flow description

These specific rules are additional to section 2.1 "Functional unit and reference flow description" of the current PCR (PCR-ed4-EN-2021 09 06).

3.1.1. Functional unit

3.1.1.1. Functional unit of active equipment (family 1)

3.1.1.1.1. Functional unit of ventilation units, fans, smoke extraction units or fans

The functional unit associated with active devices such as ventilation units, fans, smoke extraction units or fans as defined in Section 2.1 "Definition of the product families concerned" of the present specific rules is:

"Transfer 1 m^3 of air per hour for the ventilation and/or air treatment and/or smoke extraction and/or filtration of a building over the reference lifetime of X years. "

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

3.1.1.1.2. Functional unit of powered air supply or air exhaust grilles or air diffusers

The functional unit associated with active devices such as powered air supply or air exhaust grilles or air diffusers as defined in Section 2.1 "Definition of the product families concerned" of the present specific rules is:

"To transfer air for ventilation and/or air filtration and/or smoke extraction of a building, for a connection cross-section of 1 dm^2, over the typical product lifetime of X years".

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

3.1.1.2. Functional unit of passive equipment (family 2)

3.1.1.2.1. Functional unit of air supply or air exhaust grilles or air diffusers, fire dampers, terminal fire dampers, dampers and smoke control dampers

The functional unit associated with passive devices such as air supply or air exhaust grilles or air diffusers, fire dampers, terminal fire dampers, dampers and smoke control dampers as defined in Section 2.1 "Definition of the product families concerned" of the present specific rules, is:

"To transfer air for ventilation and/or air filtration and/or smoke extraction of a building, for a connection cross-section of 1 dm², over the typical product lifetime of X years".

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

3.1.1.2.2. Air filters functional unit

The functional unit associated with air filters, as defined in Section 2.1, "Definition of the product families concerned" of the present specific rules, is:

"Filter air in a building for a flow area (free area) of 1 dm² over the product lifetime of X years".

The reference lifetime is as specified in section 3.1.2 “Reference product and reference flow description” of these specific rules.

3.1.1.2.3. Air inlets functional unit

The functional unit associated with air inlets, as defined in Section 2.1, "Definition of the product families concerned" of the present specific rules, is:

"To transfer 1 m3 of air par hour for the ventilation of a building over the typical product lifetime of X years"

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

3.1.1.2.4. Functional unit of safety boxes

The functional unit associated with passive equipment such as safety boxes, as defined in Section 2.1, "Definition of the product families concerned" of the present specific rules, is:

"Control a smoke exhaust fan, current strength oh 1 A, over a reference lifetime of X years. "

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

3.1.1.2.5. Functional unit of air ducts and components

The functional unit associated with passive equipment such as air ducts and components, as defined in Section 2.1, "Definition of the product families concerned" of the present specific rules, is:

"Transfer air via 1 m of air duct, over the product lifetime of X 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.

Definitions and reference lifetimes related to product families concerned in this chapter are the same as the ones defined in the chapter 3.1.1 “Functional unit”.

Flow rate, electrical power input and connection cross section have to be adapted according to the reference product in the following definitions:

3.1.2.1. Declared unit for active devices (family 1)

3.1.2.1.1. Declared unit for ventilation units, exhaust fans and roof fans

The declared unit related to this family is :

"To transfer air for ventilation and/or air filtration and/or smoke extraction of a building with a XXX (considered system) with a XX nominal airflow rate m3/h over the typical product lifetime of X years".

3.1.2.1.2. Declared unit for powered *air supply or air exhaust grilles or air diffusers*

The declared unit related to this family is :

"To transfer air for ventilation and/or air filtration and/or smoke exhaust of a building, with a XX (considered system) with a XX nominal airflow rate m3/h for a connection cross-section of XX dm², over the typical product lifetime of X years".

3.1.2.2. Declared unit for passive devices (family 2)

3.1.2.2.1. Declared unit of air supply or air exhaust grilles or air diffusers, fire dampers, terminal fire dampers, dampers and smoke control dampers

The declared unit related to this family is:

"To transfer air for ventilation and/or air filtration and/or smoke exhaust of a building with a XXX (considered system) with a XX nominal airflow rate m3/h for a connection cross-section of XX dm², over the typical product lifetime of X years".

3.1.2.2.2. Declared unit for air filters

The declared unit related to this family is:

"To filter air in a building for a XX dm² flow area (free area) with a filter with dimensions of xx m² over the product lifetime of X years".

3.1.2.2.3. Declared unit for air inlet

The declared unit related to this family is:
"To transfer air for the ventilation of a building with an XX m3/h air inlet over the typical product lifetime of X years"

3.1.2.2.4. Declared unit for safety boxes

The declared unit related to this family is:
"To control a smoke exhaust fan with a current strength of XX A over the typical product lifetime of X years"

3.1.2.2.5. Declared unit for air ducts and components

The declared unit related to this family is:
"**To transfer air with a 1 m air conduct with a XX diameter over the product lifetime of X years".**

Note: the declared unit is identical to the functional unit

3.1.3. Reference product and reference flow description

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

- ventilation, air treatment, filtration and mechanical smoke extraction equipment with a specific reference lifetime and whose energy consumption in the use stage is expressed in kWh/(m^3/h) according to the use scenario described in section 3.5.4.2.1. and 3.5.4.3.2. "Energy consumption (module B6)" of these specific rules for active equipment (family 1) and for passive equipment (family 2), no energy consumption is required in the use stage.
- 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 study is carried out on the reference product, defined as the product that achieves the reference flow rate. If no product is capable of achieving the reference flow rate, the product that comes

closest will be used. For ventilation units and smoke extraction units, the flow rate considered is the nominal flow rate defined in table 10 in chapter 3.5.4.2.1.

The reference product is defined as follows:

Family 1: Active equipment		
Equipment	**Reference product**	**Reference lifetime**
Unidirectional or bidirectional ventilation units for dwelling	Reference airflow rate Q = 135/210 m^3/h • Heat recovery: efficiency to be specified in the PEP • Filtration: specify the filtration efficiency of the filter(s) in the PEP.	17 years
Unidirectional or bidirectional ventilation unit, collective or commercial	• Collective building: o Reference airflow rate: Q = 1800 m^3/h o Declared operating mode: ▪ Constant airflow ▪ Constant airflow + Manually activated peak airflow (ex: self-adjusted) ▪ Demand control ventilation (DVC) per room (ex: humidity control) • Non-residential building: o Reference airflow rate ▪ 10000 m3/h for PEPs with a product range covering up to 15000 m3/h or more ▪ 3400 m3/h in other cases o Declared operating mode ▪ Constant airflow ▪ Demand control ventilation (CO2 sensors or presence) • Heat recovery: efficiency to be specified in the PEP • Filtration: Specify the energy-efficiency classification and class of the filter in the PEP	
Smoke extraction unit or fan	• Q = 10000 m^3/h	
Powered air supply, air exhaust grilles or air diffusers	• Air inlets • Fixed air outlets • Diffuser, reference diameter = 125 or cross section of 0,012 m^2	

Table 3 – Characteristics of reference product for active equipment (family 1)

Family 2: Passive equipment		
Equipment	**Reference product**	**Reference lifetime**
Air supply, air exhaust grilles or air diffusers	• Connection cross-section 0.02 m^2 (or 160 mm diameter)	17 years
Fire dampers, terminal fire dampers, dampers, and smoke control damper	• Connection cross-section 0.02 m^2 (or 160 mm diameter)	30 years

Air filters	• High-efficiency filter • Dimensions 592 mm * 592 mm or equivalent cross section area	1 year
Air inlets	• Maximum air flow at 20 Pa of the reference product to be specified in the PEP	17 years
Safety boxes	• Mechanical Smoke exhaust fan only • 1 speed • 6 A	10 years
Air ducts and components	• Hydraulic diameter 160 mm • Specify the leakage class of the product according to EN 12237 – Ventilation for buildings. Ductwork. Strength and leakage of circular sheet metallic ducts	30 years

Table 4 – Characteristics of reference product for passive equipment (family 2)

The list of functions handled by the product(s) and the options proposed must be mentioned in the PEP.

If no product corresponds to the above definition, the product with the most similar characteristics in the product range will be used.

Any other definition of the reference product rule should be justified in the LCA report and in the PEP.

3.2. System boundaries

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

3.2.3. Installation stage

Conventionally, the installation of a ventilation unit, air handling unit, filtration or mechanical smoke extraction may involve:

- Modifications to the structure (e.g. masonry work, electrical connection, addition of cladding for better aesthetic integration of the product in the building). Any modification to the structure and/or addition of elements not anticipated by the manufacturer is excluded from the scope of the study. The 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 (condensate evacuation, taps, etc.) and the associated structure modifications.
- 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

In the case of a breakdown of module B, as defined in paragraph 2.2.6 "Use stage" of the current PCR (PEP-PCR-ed4-EN-2021 09 06), environmental impacts of the use stage must be split as follows for all the product families in the current specific rules.

B1: Use phase	Liquid waste (only for bidirectional ventilation units and ventilation units with plate heat exchanger or cooling coil)
B2: Maintenance	Maintenance operations
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	Electric energy consumption by applying the use scenario as defined in the current PSR (only for active devices)
B7 : Water consumption during use phase	Not applicable. Module equal to 0

Table 5. Breakdown of module B in sub-modules B1 to B7.

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

3.4. Specific allocation rule

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

3.5. Development of scenarios (default scenarios)

These specific rules are additional to 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

Ventilation, air treatment, filtration and mechanical smoke exhaust equipment is composed of components supplied by the manufacturer:

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

The rules defined in section 3.8.1. "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. Recycled content of raw material

Raw materials packaging, their components and their transports 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 3.5.3.1. of the current PSR.

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 disposal 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 material recovery (recycling, re-use or incineration as fuel for energy production), environmental impacts must be considered in the life cycle analysis for ventilation, air treatment, filtration or mechanical smoke exhaust equipment, as shown in section 2.5.6 "End of life treatment scenarios" from the current PCR (PEP-PCR-ed4-EN-2021 09 06).
Justification of the disposal processes shall then be accompanied by a report indicating the disposal systems and the recovery rate for each type of waste.

When the manufacturer does not provide evidence of the processes used to dispose of the waste generated during the manufacturing stage of the device in question, the disposal 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 (end 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 (end 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 (end 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 6. Default loss rate for each constituent material of the total product (end 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, 0.12 kg of incinerated waste (without waste-to-energy recovery) and 0.12 of landfill waste

- 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 (module A4)

The rules specified in section 2.5.3 "Transport scenarios" of the current PCR (PCR-ed4-EN-2021 09 06) apply.

3.5.3. Installation stage (module A5)

The installation phase includes any process, component, energy or consumption and/or emission required to install a device.
The installation conditions do not imply that particular consumables and/or products.

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 from the following website: https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPAC__custom_3801295/default/bar?lang=fr.
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%
Aluminium	60%	7%	0%	33%
Paper-Cardboard	91%	5%	0%	4%
Wood	7%	31%	0%	62%
Plastic	27%	43%	0%	30%

Table 7. 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 8. 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

3.5.4.1. Maintenance stage

Any other maintenance scenario other than those presented below must be justified and documented in the LCA report and must be mentioned in the PEP.

If parts are to be replaced during the service life of the product, in compliance with the manufacturer's specifications, the impact of their manufacture, distribution and installation will have to be taken into account during the maintenance stage. The replacement of parts due to malfunction will not be taken into account.

For lack of available information, ventilation, air treatment, filtration or mechanical smoke exhaust equipment requires maintenance based on the following considerations:

Family 1: Active equipment		
Equipment	**Type of intervention over the RLT**	**Frequency over the RLT**
Unidirectional ventilation unit for dwelling	-	-
Bidirectional ventilation unit for dwelling	Filters	Once a year
Unidirectional ventilation unit for collective or tertiary buildings	Complete fan motor, or component replacement (motor, bearings, etc.) Belt Filters	Once Three times Once a year
Unidirectional or bidirectional air handling unit, or bidirectional ventilation unit for collective or tertiary buildings	Complete blower motor, or component replacement (motor, bearings, etc.) Belt Filters	Once Three times Once a year
Powered air supply, air exhaust grilles, air diffusers	Battery	Twice a year
Powered smoke exhaust fan or roof fan	Motor Belt Maintenance	Once Five times Once a year

Table 9– Maintenance scenarios for active equipment (family 1)

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.

No maintenance operation is required for passive equipment on its reference lifetime.

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. These maintenance operations shall be the part of a life cycle assessment.

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 stage for ventilation units

3.5.4.2.1. Consideration of liquid waste (module B1)

The consideration of liquid waste condensate-type being pure water (except some dirts), there is no treatment modelling to take into account. There is no waste production to model.

3.5.4.2.2. Energy consumption (module B6)

The use stage of ventilation units or fans, after installation of the product involves:

- energy consumption,
- functions for optimising energy consumption.

For each product that consumes energy during use, a typical use scenario for calculating the environmental impacts related to such energy consumption has been defined. The use scenario shall be determined for each product category, as defined in section 3.1.3 “Reference product and reference flow description” of these specific rules.

The following formula is used to calculate the total energy consumption necessary during the reference lifetime of the device:

$$\boldsymbol{C = \left[\left(\frac{Pelec * t}{1000}\right) + (1 - F)\right] + \left(C_{battery}\right) * RLT}$$

Where:

- C = Total energy consumption over the reference lifetime of the product, expressed in kWh.
- $C_{battery}$ = energy consumption of the battery as defined in Section 3.5.4.2 of these specific rules.
- P_{elec} = Electrical power input by the fan(s) expressed in W
- t = average annual operating time in hours. By default, t is equal to 8760 (constant operation 24h a day 365 days a year). For France scope, the table below applies:

	Description of the typical use scenario[2]	**Average annual operating time[3]**
Single-family dwelling, ventilation unit	Continuous operation 24 hours a day, 365 days a year	**8,760 hours**
Air terminal device (without peak airflow)	Continuous operation 24 hours a day, 365 days a year with time delay,	**8,760 hours**

Air terminal device (with peak airflow)	Continuous operation 24 hours a day, 365 days a year
	• with time delay,
	  ○ 1 hour/day, in kitchen
	  ○ 2 h/day for other terminal devices
	• without time delay
	  ○ 2 hours/day, in kitchen
	  ○ and 4 h/day for other terminal devices
		8,760 hours

Commercial building	Occupation scenario from RT 2020	**2,600 hours**

Table 9 – Operating time values for the typical use scenarios

For devices that cannot achieve these operating times, the assumption applied must be justified and stated in the PEP.

[2] Scenarios obtained from rules for processing technical notices for humidity control CMV

[3] Operating times obtained from RT 2012 scenarios

- F: Energy-saving functions, to deduct from P_{elec}:
  - Holiday mode (manual control): 1% more energy savings. This mode shall be justified in the LCA report (see section 6.1 Justification of bonus values for energy-saving functions)

- RLT = reference lifetime of the product in years as defined in section 3.1.3 "Reference product and reference flow description" of these specific rules.

- For individual residential ventilation units, the nominal airflow rate Qvnom is the reference flow rate according to NF EN 13142 (ErP[4]).

- For collective residential or non-residential ventilation units, the nominal airflow rate Qvnom is determined on the envelope curve of the ventilation unit at the nominal pressure Pqvnom indicated in Table 10.

Equipment	
Unidirectional or bidirectional residential ventilation unit	• Qvnom = Qref ErP (ou NF EN 13142) • Pqvnom = Pref (ou NF EN 13142) • Pelec = AEC* x 1000 / 8760
Collective, unidirectional or bidirectional residential ventilation unit, fans	• Collective residential centralised with constant flow rate: o Pqvnom = 160 Pa o Qvnom = Qmax(160 Pa) o Pelec = Pel (Qvnom, Pqvnom) • Collective residential centralised with constant flow rate + boost flow rate manually activated o Pqvnom = 160 Pa o Qvnom = Qmax(160 Pa) O Pélec = Pel (0.55 x Qvnom, Pqvnom) • Collective residential (centralised) demand control ventilation per room o Pqvnom = 160 Pa o Qvnom = Qmax(160 Pa) o Pélec = Pel (0.33 x Qvnom, Pqvnom)
Commercial unidirectional or bidirectional residential ventilation unit, fans	• Non-residential constant flow rate application o Pqvnom = 250 Pa o Qvnom = Qmax(250 Pa) o Pélec = Pel (Qvnom, Pqvnom) • Non residential demand control ventilation (CO2 sensors or presence) o Pqvnom = 250 Pa o Qvnom = Qmax(250 Pa) o Pélec = Pel (= 0.7 x Qvnom, Pqvnom)

[4] Regulation EU 1253/2014

Smoke extraction units or fans used for smoke extraction only	o Pqvnom = 250 Pa o Qvnom = Qmax(250 Pa)
**AEC = Annual Energy Consumption	

Table 10. Determination of the nominal airflow rate and the electrical power

Note: For devices that cannot achieve these pressure values, the closest pressure achievable by the product will be used. The assumption applied must be justified and stated in the PEP.

A PEP can accept different application perimeters (individual / collective / commercial, etc.). The declaring party can then cover them in a single PEP and present the extrapolation coefficients to be applied for each possible application topology.

For this purpose, the device consumption of each of these applications shall be calculated according to the formula shown in this section, in accordance with the various scenarios and hypotheses.
The calculation will be based on the worst performer product.

In addition, the PEP shall specify the following information for each application covered:

- Type of building: individual, collective, tertiary
- Nominal air flow rate Qvnom
- Nominal pressure Pqvnom
- P_{elec} Electrical power

An extrapolation coefficient shall be used as soon as one of the above-mentioned items changes. If several items change, several extrapolation coefficients shall be used.

The applicable methodology is described in section 6.1 “Product extrapolation rules applicable to different perimeters” of these specific rules.

Example of calculation of the electrical consumption of a self-balanced bidirectional ventilation unit (family 1, active equipment), assuming the following specific characteristics:

- Annual electric consumption (AEC): 353 kWh
- Pelec electrical power = 40 W (generic data)
- Operating time t = 8760 hours (generic data)
- Energy-saving function F – Holiday mode = 1% (generic data)
- Air flow rate Qvnom = 176 m3/h (data approaching the target value of the reference product – 140 m3/h)
- Reference lifetime (RLT) = 17 years (generic data)

$C = [((P_{elec} * t) / 1000) * (1 – F) * RLT]$

C = [((40 W * 8760 h)/1000) * (1 – 1%) * 17 years]

C = (350,4 * 0,99 * 17)

C = 5897 kWh

3.5.4.2.3. Consideration of electrical coils

In unidirectional flow, the electrical power absorbed by the electrical coils must be taken into account with an operating time of 400 hours:

$$C_{coil\ SF} = \frac{Pelec_{coil} \times 400}{1000}$$

Pelec_coil is defined as the electrical power required to heat the air from 5° (inlet temperature) to 20° (outlet temperature).

In bidirectional flow with exchanger, the electrical power absorbed by the electrical coils must be taken into account with an operating time of 400 hours:

$$C_{\text{coil DF}} = \frac{\text{Pelec\_coil x } 400}{1000}$$

Pelec_coil is defined as the electrical power required to heat the air from 16° (inlet temperature) to 20° (outlet temperature).

The energy consumption related to the preheating coil is not taken into account because of the difficulty of defining a typical scenario.

3.5.4.3. Use stage for powered grilles and diffusers?

3.5.4.3.1. Consideration of batteries (module B2)

In case of batteries are required for the proper operation of the device during its reference lifetime, the manufacture, distribution and end of life of the replacement batteries must be counted in the use stage. The autonomy and lifetime of the batteries must be justified in the LCA report.

3.5.4.3.2. Energy consumption (module B6)

The total energy consumption of a powered inlet or outlet required during the reference lifetime of the device is determined according to the type of application. The following formulae are to be applied:

- For an individual or collective residential application, the energy consumption can be considered as negligible. A calculation note must be added to the report to justify this assumption.
- For a commercial building application, the calculation assumptions for the consumption are justified in the report and mentioned in the PEP.

$$C = \left(\frac{P_{\text{elec}} \times t}{1000}\right) \times \text{RLT}$$

Where:

- Pelec = Electrical power input expressed in W by the powered inlet or outlet
- RLT = reference lifetime of the product in years as defined in section 3.1.2 “Reference product and reference flow description” of these specific rules.
- t = annual average operating time in hours. By default, t equals to 1400h in heating mode and 350h in cooling mode. For heating and cooling operation, t equals to 1750h.

3.5.5. End of life stage

Within the European Union, some ventilation, air treatment, filtration or mechanical smoke exhaust equipment waste is classed as WEEE (Waste Electrical and Electronic Equipment).

The following equipment is considered as WEEE:

- Active family 1 equipment, as described in section 2.1 “Definition of the product families concerned” of these specific rules
- Some passive family 2 equipment, as described in section 2.1 “Definition of the product families concerned” of these specific rules: safety boxes, fire dampers, terminal fire dampers, dampers and smoke control dampers.

Passive equipment as described in section 2.1 “Definition of the product families concerned” of these specific rules (excluding safety boxes, fire dampers, terminal fire dampers, dampers and smoke control dampers) is not included in the WEEE.

After presenting the local requirements for managing end-of-life thermodynamic generators, the LCA report will explain the organisation 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 applicable end-of-life treatment and collection 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 this equipment, the default scenario from the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

By sector-based agreement, the collection transport and transfer of the end-of-life product from the use site until its last treatment site is accounting as a transport hypothesis of 100 km in lorry for France scope.

3.5.5.1. Special case of end-of-life of air 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

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

3.6. Rules for extrapolation to a homogeneous environmental family

These rules are additional to section 2.6 "Rule(s) for extrapolation to a homogeneous environmental family" of the PCR.

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.

3.6.1. Definition of a homogeneous environmental family

It is accepted that the PEP covers products different from the reference product. These other products may be named (commercial references) in the PEP and in the LCA report, if they belong to the same homogeneous environmental family as the reference product.

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 ventilation, air treatment, filtration and mechanical smoke exhaust equipment, environmental impact weighting factors are applied to all the reference products in the same product range, as specified in section 3.1.3 “Reference product and reference flow description” of these specific rules.

It’s mandatory to mention on the PEP, the framework of validity of the extrapolation rules application based on technical criteria, in order to check that the products belong to the same homogeneous environmental family as the typical product.

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 3.1.3 “Reference product and reference flow description” of these specific rules, the calculation is performed on the device with the most similar characteristics.

3.6.2. Extrapolation rules application

If the conditions to belong to a homogeneous environmental family as defined in the paragraph 3.6.1. are satisfied, the extrapolation rules to be applied for each stage of the life cycle are those given in the paragraphs from 3.6.3 to 3.6.8. These rules are applicable at the product level (or declared unit).

For devices providing an air transfer function at 1 m3/h (ventilation unit, air handling unit, exhaust fan or roof fan), the flow rate and electrical power to take into account in calculating the extrapolation coefficients at the functional unit level are those defined in table 10.

3.6.3. Extrapolation rule applied to manufacturing stage

For the manufacturing 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 (with packaging). The weight of the device corresponds to its global mass, expressed in kilograms (kg), as supplied to the customer, packaging included.

For devices providing an air transfer function at 1 m3/h (ventilation unit, air handling unit, exhaust fan or roof fan):

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

For air ducts and components:

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

For powered air supply or air exhaust grilles or air diffusers:

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	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right) \times \left(\frac{Connection\ cross\ section\ of\ the\ reference\ product\ (dm2)}{Connection\ cross\ section\ of\ the\ product\ considered\ (dm2)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right)$

For other devices:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered,\ \ with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range,\ \ with\ packaging\ (kg)}\right) \times \left(\frac{Amperage\ of\ the\ reference\ product\ (A)}{Amperage\ of\ the\ product\ considered\ (A)}\right)$
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 extrapolation rule shall be mentioned in the PEP and cover the whole product range under consideration.

3.6.4. Extrapolation rule applied during the distribution stage

For the distribution 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 (with packaging). The weight of the device corresponds to its global mass, expressed in kilograms (kg), as supplied to the customer, packaging included.

For devices providing an air transfer function at 1 m3/h (ventilation unit, air handling unit, exhaust fan or roof fan):
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right) \times \left(\frac{Nominal\ airflow\ rate\ of\ the\ reference\ product\ (m3/h)}{Nominal\ airflow\ rate\ of\ the\ product\ considered\ (m3/h)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right)$

For air ducts and components:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right) \times \left(\frac{Length\ of\ the\ reference\ product\ (m)}{Length\ of\ the\ product\ considered\ (m)}\right)$
Coefficient on the scale of the	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right)$

declared product (additional information)	

For air supply or air exhaust grilles or powered air diffusers:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right) \times \left(\frac{Connection\ cross\ section\ of\ the\ reference\ product\ (dm2)}{Connection\ cross\ section\ of\ the\ product\ considered\ (dm2)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right)$

For other devices:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg))}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right) \times \left(\frac{Amperage\ of\ the\ reference\ product\ (A)}{Amperage\ of\ the\ product\ considered\ (A)}\right)$
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 extrapolation rule shall be mentioned in the PEP and cover the whole product range under consideration.

3.6.5. 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 expressed in kilograms (kg).

For devices providing an air transfer function at 1 m3/h (ventilation unit, air handling unit, exhaust fan or roof fan):
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	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right)$

	$\times \left(\frac{Nominal\ airflow\ rate\ of\ the\ reference\ product\ (m3/h)}{Nominal\ airflow\ rate\ of\ the\ product\ considered\ (m3/h)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right)$

For air ducts and components delivered in packaging:
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	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right) \times \left(\frac{Length\ of\ the\ reference\ product\ (m)}{Length\ of\ the\ product\ considered\ (m)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right)$

For powered air supply or air exhaust grilles or air diffusers:
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	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ (kg)}\right) \times \left(\frac{Connection\ cross\ section\ of\ the\ reference\ product\ (dm2)}{Connection\ cross\ section\ of\ the\ product\ considered\ (dm2)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ (kg)}\right)$

For other devices:
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	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right) \times \left(\frac{Amperage\ of\ the\ reference\ product\ (A)}{Amperage\ of\ the\ product\ considered\ (A)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Mass\ of\ the\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ packaging\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right)$

The extrapolation rule shall be mentioned in the PEP and cover the whole product range under consideration.

3.6.6. Extrapolation rule applied during the use stage

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

- under each 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 3.6.6.6. for module B6.

3.6.6.1. Module B1

Not applicable.

3.6.6.2. 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	$\left(\frac{total\ mass\ of\ component(s)\ replaced\ for\ the\ product\ considered\ (kg)}{total\ mass\ of\ component(s)\ replaced\ for\ the\ reference\ product\ (kg)}\right) \times \left(\frac{Nominal\ airflow\ rate\ of\ the\ reference\ product\ (m3/h)}{Nominal\ airflow\ rate\ of\ the\ product\ considered\ (m3/h)}\right)$
Coefficient on the scale of the declared product (additional information)	$\frac{total\ mass\ of\ component(s)\ replaced\ for\ the\ product\ considered\ (kg)}{total\ mass\ of\ component(s) replaced\ for\ the\ reference\ product\ (kg)}$

For other devices, 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	$1 \times \left(\frac{Nominal\ airflow\ rate\ of\ the\ reference\ product\ (m3/h)}{Nominal\ airflow\ rate\ of\ the\ product\ considered\ (m3/h)}\right)$
Coefficient on the scale of the declared product (additional information)	1

3.6.6.3. Module B3

Not applicable.

3.6.6.4. Module B4

Not applicable.

3.6.6.5. Module B5

Not applicable.

3.6.6.6. Module B6

Environmental impacts generated at module B6 are directly correlated to total energy consumption. Therefore, an extrapolation rule only applies for ventilation unit active equipment (family 1)

In use stage, an active equipment can:
- Cover different references in the same field of application (e.g. a range of ventilation units for collective housing)
- Cover one or more references in several different areas (e.g. a single flow ventilation unit that can be used in both multi-family housing and commercial buildings - and with different flow rates).

The extrapolation rule to be applied is defined below according to whether one or more perimeters are covered.

Case 1: Extrapolation rule during the use stage applied to products within a given perimeter

The extrapolation rule to be used on the PEP results for any other product from the same range of devices is as follows:

Coefficient on the FU scale	$\left(\frac{Energy\ consumption\ of\ the\ product\ considered\ (kWh)}{Energy\ consumption\ of\ the\ reference\ product\ of\ the\ range\ (kWh)}\right) \times \left(\frac{Nominal\ airflow\ rate\ of\ the\ reference\ product\ (m3/h)}{Nominal\ airflow\ rate\ of\ the\ product\ considered\ (m3/h)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Energy\ consumption\ of\ the\ product\ considered\ (kWh)}{Energy\ consumption\ of\ the\ reference\ product\ of\ the\ range\ (kWh)}\right)$

For the calculation of energy consumption, the electrical power input is determined according to table 10. Examples of application are available in the appendix (paragraph 6.2 "Examples of application of extrapolation rules in the use stage").
The extrapolation rule must be mentioned in the PEP to cover the entire range of the product studied.

The extrapolation rule shall be mentioned in the PEP and cover the whole product range under consideration.

Case 2: Extrapolation rule during the use stage for applicable products within different perimeters

The extrapolation rule to be used on the PEP results for a different perimeter is as follows:

Coefficient on the FU scale	$\left(\frac{Energy\ consumption\ of\ the\ product\ considered\ (kWh)}{Energy\ consumption\ of\ the\ reference\ product\ of\ the\ range\ (kWh)}\right) \times \left(\frac{Transmitted\ nominal\ airflow\ rate\ of\ the\ reference\ product\ (m3/h)}{Transmitted\ nominal\ airflow\ rate\ of\ the\ product\ considered\ (m3/h)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Energy\ consumption\ of\ the\ product\ considered\ (kWh)}{Energy\ consumption\ of\ the\ reference\ product\ of\ the\ range\ (kWh)}\right)$

If applicable, the PEP will specify for each application / perimeter adopted and covered by this declaration:

- the different application typologies
- the assumptions applied to the consumption calculations (Pelec, t, RLT, flow rate Q)
- the consumption of the equipment
- the extrapolation coefficient to be applied, based on the formula: Device consumption covered by the PEP / Consumption of the reference device

The extrapolation rule has to be mentioned in the PEP in order to process the entire range of the product studied.

3.6.6.7. Module B7

Not applicable.

3.6.7. 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 expressed in kg.

For devices providing an air transfer function at 1 m3/h (ventilation unit, air handling unit, exhaust fan or roof fan):
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right) \times \left(\frac{Nominal\ airflow\ rate\ of\ the\ reference\ product\ (m3/h)}{Nominal\ airflow\ rate\ of\ the\ product\ considered\ (m3/h)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right)$

For air ducts and components:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right) \times \left(\frac{Length\ of\ the\ reference\ product\ (m)}{Length\ of\ the\ product\ considered\ (m)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (kg}\right)$

With total mass = total mass of the product excluding packaging

For powered air supply or air exhaust grilles or air diffusers:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right) \times \left(\frac{Connection\ cross\ section\ of\ the\ reference\ product\ (dm2)}{Connection\ cross\ section\ of\ the\ product\ considered\ (dm2)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right)$

With total mass = total mass of the product excluding packaging

For other devices:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right)$ x $\left(\frac{Amperage\ of\ the\ reference\ product\ (A)}{Amperage\ of\ the\ product\ considered\ (A)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (kg)}\right)$

With total mass = total mass of the product excluding packaging

The extrapolation rule shall be mentioned in the PEP and cover the whole product range under consideration.

3.6.8. Extrapolation rule

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").

Then, the extrapolation rule based on the mass of the product can also be applied to the module D.

For the benefits and loads beyond the system boundaries stage, the extrapolation rule to use for any other product of the range is calculated according to the mass of the product (with packaging).
The weight of the equipment, including packaging, corresponds to its overall mass, expressed in kg, as delivered to the customer.

For devices providing an air transfer function at 1 m3/h (ventilation unit, air handling unit, exhaust fan or roof fan):
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (including\ packaging)\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (including\ packaging)\ (kg)}\right) \times \left(\frac{Nominal\ airflow\ rate\ of\ the\ reference\ product\ (m3/h)}{Nominal\ airflow\ rate\ of\ the\ product\ considered\ (m3/h)}\right)$
Coefficient on the scale of the declared product (additional information)	$\frac{Total\ mass\ of\ the\ product\ considered\ (including\ packaging)\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (including\ packaging)\ (kg)}$

For air ducts and components delivered in packaging:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (including\ packaging)\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (including\ packaging)\ (kg)}\right) \times \left(\frac{Length\ of\ the\ reference\ product\ (m)}{Length\ of\ the\ product\ considered\ (m)}\right)$
Coefficient on the scale of the declared product	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ (including\ packaging)\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (including\ packaging)\ (kg)}\right)$

(additional information)	

For powered air supply or air exhaust grilles or air diffusers:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right) \times \left(\frac{Connection\ cross\ section\ of\ the\ reference\ product\ (dm2)}{Connection\ cross\ section\ of\ the\ product\ considered\ (dm2)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered, with\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range, with\ packaging\ (kg)}\right)$

For other devices:
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	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ \ inluding\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ including\ packaging\ (kg)}\right) \times \left(\frac{Amperage\ of\ the\ reference\ product\ (A)}{Amperage\ of\ the\ product\ considered\ (A)}\right)$
Coefficient on the scale of the declared product (additional information)	$\left(\frac{Total\ mass\ of\ the\ product\ considered\ including\ packaging\ (kg)}{Total\ mass\ of\ the\ reference\ product\ of\ the\ range\ (including\ packaging)(kg)}\right)$

The extrapolation rule shall be mentioned in the PEP and cover the whole product range under consideration.

3.7. Rules applying to joint environmental declarations

This PSR is complementary to PCR section 2.7 “Rules applying to joint environmental declarations” (PEP-PCR-ed4-EN-2021-09-06).
For joint environmental declarations, the study shall be conducted on a typical product, as defined is paragraph 3.1.3 “Reference product and reference flow description” of this PSR.

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.

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 PCR (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 organisation) is to be preferred and shall be justified in the LCA report, specifying:

1) primary data from 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 (with regard to the total quantity bought). For example, for ten suppliers providing 10% of the procurement, at least 5 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 of BOILERS: for lack of primary data, secondary data, i.e. data obtained from the life cycle assessment software database shall 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:
  - The loss rate is below the default values defined in the paragraph 3.5.1.3.: 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)
  - The loss rate is higher to the default values defined in the paragraph 3.5.1.3.: the loss rate has to be mentioned in the LCA report.

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 devices providing an air transfer function (ventilation unit, air handling unit, exhaust fan or roof fan):

Environmental impacts from the PEP (for 1 m^3/h) =
Environmental impacts of the reference product / Reference average air flow, Q (in m^3/h)

The reference average air flow is defined under the conditions given in Table 10 of Section 3.5.4.2 of the present rules.

For air ducts and components:

Environmental impacts from the PEP (for 1 m) =
Environmental impacts of the reference product / Duct length (m)

For powered air supply or air exhaust grilles or air diffusers, fire dampers, terminal fire dampers, dampers and smoke control damper:

Environmental impacts from the PEP (for 1 dm^2) =
Environmental impacts of the reference product / Connection cross section (m)

Note: the section of the reference product is 0,02 m^2 i.e. 2 dm^2.

For other types of equipment covered by these rules, the impacts given on the functional unit scale are those of the reference product:

Environmental impacts from the PEP =
Environmental impacts of reference product / Amperage (A)

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

The PEP must specify:

- The product sub-category and characteristics to be declared according to Section 3.1.3.
- The list of functions handled by the product(s) and the options proposed
- The use profile considered in the use stage according to Section 3.5.4
- Any scenario other than the default scenarios
- In case of a PEP applicable to a range of products or to a different perimeter, the extrapolation rules

4.2. Constituent materials

The rules specified in section 4.2 "Constituent materials" of the current PCR (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 (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 environmental impacts of the reference product expressed on the product scale (or declared unit) 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, to ensure clarity and transparency for the user:

- **For devices providing an air transfer function such as a ventilation unit**
  - For environmental impacts expressed per functional unit, the following wording must be included: "per m^3/h 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"
- **For air ducts and components:**
  - For environmental impacts expressed per functional unit, the following wording must be included: "per m 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"

- **For powered air supply or air exhaust grilles or air diffusers, fire dampers, terminal fire dampers, dampers and smoke control damper:**
  - For environmental impacts expressed per functional unit, the following wording must be included: “per dm² 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”
- **For other devices:**
  - For environmental impacts expressed per functional unit, the following wording must be included: “per ampere 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.

For devices providing an air transfer function:

The table of environmental impacts represents the environmental impact of the functional unit, i.e. air transfer of 1 m^3/h air for ventilation, and/or air treatment, and/or smoke evacuation, and/or filtering in a building.

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 average exhaust air flow.

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 m^3/h air transfer. The real impact of the life cycle of the product installed in a real situation must be calculated by the user of the PEP by multiplying the impact concerned by the average exhaust air flow from the use profile in m^3/h (value of Q defined in the use stage).

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. 1m^3/h air transfer. 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.

For powered air supply or air exhaust grilles or air diffusers, fire dampers, terminal fire dampers, dampers and smoke control damper, air filters:

The table of environmental impacts represents the environmental impact of the functional unit, i.e. 1 dm² of connection cross-section.

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 total installed length.

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 metre of equipment. 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 length of the installed product.

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. 1 dm^2 of connection cross-section*. 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.*

For other devices:

The table of environmental impacts represents the environmental impact of the functional unit, i.e. for an amperage of 1A.

The following details must be completed and included in the PEP, to ensure clarity and transparency for the user:
The environmental impacts represent the data on the scale of the functional unit, corresponding to the impact on the scale of the product (or declared product).

5. PEP Updates 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

AHU	Air handling unit
C	Final energy consumption
EPA	Efficient Particulate Air filter
HEPA	High Efficiency Particulate Air filter
kg	Kilogram
kWh	Kilowatt hour
LCA	Life cycle analysis
LCI	Life cycle inventory
m	Metre
mm	Millimetre
Pa	Pascal
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
ULPA	Ultra-Low Penetration Air
VMC	Controlled mechanical ventilation
WEEE	Waste Electrical and Electronic Equipment.
Wh	Watt hour

6.2. References

Chapter	Subject	Source
2.1 – Definition of the product families concerned	Filter definitions	EN 1822 - High-efficiency air filters (EPA, HEPA and ULPA) NF EN ISO 16890-1 May 2017 - Air filters for general ventilation - Part 1: Technical specifications, requirements and classification system based upon particulate matter efficiency (ePM) - Air filters for general ventilation - Part 1: Technical specifications, requirements and classification system based upon particulate matter (PM)
3.1 – Functional unit and reference flow description	Definition of leakage class of air ducts and components	EN 12237 - Ventilation for buildings - Ductwork - Strength and leakage of circular sheet metallic ducts
3.5.3.1. Waste generated during installation stage	Statistical data on the end-of-life treatment of packaging for France and Europe.	Eurostat website: https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPAC__custom_3801295/default/bar?lang=fr
3.5.4.2.1 – Energy consumption	Nominal Airflow Electrical power	EN 13142 – Ventilation for buildings – Components/products for residential ventilation - Required and optional performance characteristics UE 1253/2014 Regulation

6.3. Examples of application of the extrapolation rules

For all the extrapolation coefficient calculation examples below, product D is the reference product corresponding to a collective humidity control ventilation unit for multi-family dwelling (collective residential ventilation unit with demand control ventilation per room).

Example of typical data regarding 6 products belonging to the same homogeneous environmental family

Ventilation unit	A	B	C	D	E	F
Total mass of the product (excluding packaging) in kg	19,5	21	24	24	27	39,5
Mass of the packaging in kg	6,5	7	8	8	8	8,5
Total mass of the product (including packaging) in kg	26	28	32	32	35	48

Example 1: Identical perimeter - Extrapolation to the whole collective humidity control ventilation unit range in the use stage

Product D characteristics are those of the reference product (black frame)

Collective humidity control (reference)	A	B	C	D	E	F
Nominal airflow rate (max) of the ventilation unit at 160Pa	523	1000	1400	1800	2044	2263
Airflow at 0.33 x Qnom	173	330	462	594	675	975
Pelec at 0.33 x Qnom	32	77	71	105	129	138
t (hour)	8760	8760	8760	8760	8760	8760
F (holidays)	0%	0%	0%	0%	0%	0%
RLT (year)	17	17	17	17	17	17
Consumption C (kWh) during RLT	4765	11467	10573	15637	19211	20551

Example 2: Different perimeter - Extrapolation of the range in self-balanced mode in the use stage

Note: Self-balanced mode corresponds to « constant airflow rate + boost flow rate manually activated » in the meaning of this PSR.

Collective self-balanced	A	B	C	D	E	i r
Airflow rate max of the ventilation unit at 160Pa	523	1000	1400	1800	2044	2263
Pabs at Qmax	77	290	278	437	677	820
Airflow at 0.55 x Qnom	288	550	770	990	1124	1245
Pelec at 0.55 x Qnom	52	131	127	197	233	323
t (hour)	8760	8760	8760	8760	8760	8760
F (Holidays)	0%	0%	0%	0%	0%	0%
RLT (year)	17	17	17	17	17	17
Consumption C (kWh) during RLT	7744	19509	18913	29337	34698	48101

Example 3: Different perimeter - Extrapolation of the range in commercial mode in the use stage

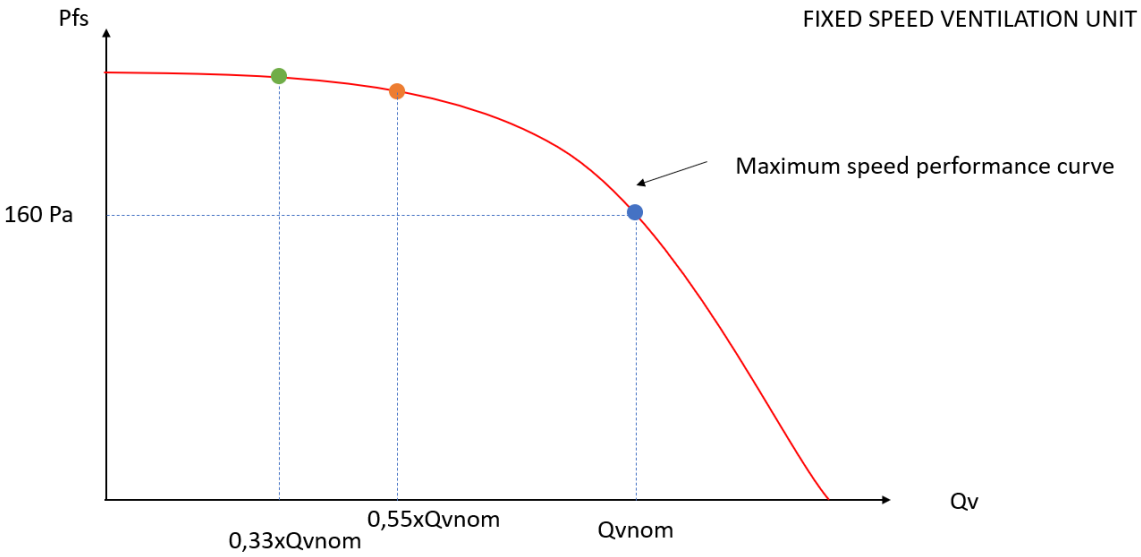
Commercial	A	B	C	D	E	F
Airflow rate max of the ventilation unit at 250Pa	500	725	1191	1400	1898	2550
Pelec (kW)	75	230	278	425	643	750
t (hour)	2600	2600	2601	2600	2600	2600
F (Holidays)	0%	0%	0%	0%	0%	0%
DVT (year)	17	17	17	17	17	17
Consumption C (kWh) during DVT	4906	10166	12292	18785	28420	33150

Example 4: Summary of the extrapolation coefficients to be provided

		Perimeter	A	B	C	D	E	F
Functional Unit scale	**A1-A3 : Manufacturing**	-	2,80	1,57	1,29	1	0,96	1,19
	A4 : Distribution	-	2,80	1,57	1,29	1	0,96	1,19
	A5 : Installation	-	2,80	1,57	1,29	1	0,88	0,85
	B1 : Use	-	-	-	-	-	-	-
	B2 : Maintenance	-	3.44	1.80	1.29	1	0.88	0.8
	B3 : Repair	-	-	-	-	-	-	-
	B4 : Replacement	-	-	-	-	-	-	-
	B5 : Rehabilitation	-	-	-	-	-	-	-
	B6 : Energy consumption	**Collective self-balanced**	1.70	2.25	1.56	1.88	1.95	2.45
		Collective humidity control	1.05	1.32	0.87	1.00	1.08	1.05
		Commercial (constant)	1.13	1.61	1.19	1.54	1.72	1.50
	B7 : Water consumption	-	-	-	-	-	-	-
	C1-C4 : End of life	-	2,80	1,57	1,29	1	0,99	1,31
	D : Benefits and loads beyond the system boundaries	-	2,80	1,57	1,29	1	0,96	1,19
Declared Product scale	**A1-A3 : Manufacturing**	-	0,81	0,88	1,00	1	1,09	1,50
	A4 : Distribution	-	0,81	0,88	1,00	1	1,09	1,50
	A5 : Installation	-	0,81	0,88	1,00	1	1,00	1,06
	B1 : Use	-	-	-	-	-	-	-
	B2 : Maintenance	-	0,50	0,90	1,00	1	1,00	1,50
	B3 : Repair	-	-	-	-	-	-	-
	B4 : Replacement	-	-	-	-	-	-	-
	B5 : Rehabilitation	-	-	-	-	-	-	-
	B6 : Energy consumption	**Collective self-balanced**	0.50	1.25	1.21	1.88	2.22	3.08
		Collective humidity control	0.30	0.73	0.68	1	1.23	1.31
		Commercial constant	0.31	0.65	0.79	1.20	1.82	2.12
	B7 : Water consumption	-	-	-	-	-	-	-
	C1-C4 : End of life	-	0,81	0,88	1,00	1	1,13	1,65

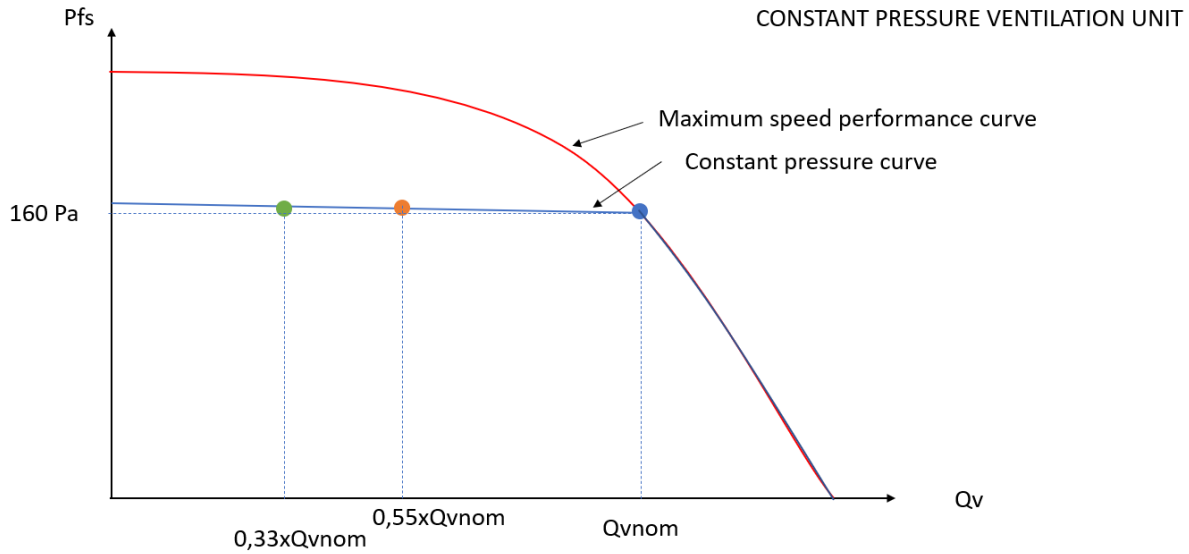
	D : Benefits and loads beyond the system boundaries	-	0,81	0,88	1,00	1	1,09	1,50

Examples of collective residential ventilation unit flow/pressure graphs: illustration of characteristics for the calculation of nominal airflow rate and energy consumption.



Working conditions for assessing Pélec:

- Constant airflow
- Constant airflow with peak airflow
- Demand control (e.g operation with humidity grilles)



Working conditions for assessing Pélec:

- Constant airflow
- Constant airflow with peak airflow
- Demand control (e.g operation with humidity grilles)

6.4. Declaration of conformity

Programme PEP Ecopassport®

Attestation de revue critique des règles additionnelles sectorielles pour les équipements de ventilation, de traitement d'air, de filtration ou de désenfumage mécanique

Document revu : REGLES SPECIFIQUES AUX EQUIPEMENTS DE VENTILATION, DE TRAITEMENT D'AIR, DE FILTRATION OU DE DESENFUMAGE MECANIQUE version 23/06/20123 (date de réception). (PSR-0008-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 équipements de ventilation, de traitement d'air, de filtration ou de désenfumage mécanique est conforme aux exigences de ces référentiels.

Tim Osmond
Vérificateur PEP Ecopassport® - EVEA