



PROGRAMME PEP ecopassport®

PSR

SPECIFIC RULES FOR STORAGE TANKS

PSR-0016-ed2-EN-2023 06 06

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

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List of the modifications of the present document

Online version 06/06/2023 :

Modified section Ed 1.0 to Ed 2.0	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 packagings
§ 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 (PEP) 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 storage tanks. 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 storage tank market and the interested parties.

	www.pep-ecopassport.org
PSR reference	PSR-0016-ed2-EN-2023 06 06
Critical review	The third-party Critical review was carried out by CODDE Department of LCIE Bureau Veritas. The declaration of conformity published on 26/04/2023 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" of the PEP ecopassport® eco-declaration program (PEP-PCR-ed4 -EN-2021 09 06), this document sets out the specific rules for the storage tanks 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 life time (RLT) taken into account for the products Life Cycle Assessment (LCA),
- the conventional use scenarios to be adopted during the product use phase.

The main purpose of those specific rules is to provide a shared basis to manufacturers when developing life cycle assessments for their products.

The various storage tanks technologies available are presented. Storage tanks are technical subsystems that can be used, for example, by systems dedicated to the exclusive production of hot water defined by the current PSR-0004.

2.1. Description of the product families concerned

The intended product family is referred as "STORAGE TANKS".

This family includes two products categories. It includes all the tanks for the storage of domestic hot water and all the tanks for the storage of cold or hot technical water. Individual or collective building applications are covered by this PSR:

- Individual building: tanks with a volume of 400 liters or less
- Collective building: tanks with a volume upper than 400 liters and less than 2000 liters.

Are excluded from the scope the storage tanks equipped with a booster system. These are covered by the PSR 0004 for the Individual and standalone domestic storage water heater from the PEP ecopassport® Program.

2.1.1. Domestic hot water storage tank

A domestic hot water storage tank is a container for storing domestic hot water; it can include one or more exchangers.

2.1.2. Technical water storage tank

A technical water storage tank is a container for storing hot or cold water for heating purposes and / or for producing domestic hot water or cooling premises, via one or more exchangers.

This category includes cold or hot technical water storage tanks, as well as glycolated water storage tanks.

2.1.3. Buffer tank

A buffer tank is a container for storing hot or cold water for the purposes of heating water and / or premises or cooling rooms, for which the container is not in contact with the atmosphere (without exchanger).

2.2. Taking into account of technological developments

The specific rules to storage tanks will take into account any technological advance, as long as it is the subject of a request for inclusion in the specific rules to storage tanks to the PEP Association, which will decide according to the presentation of the new technology and the justification of the claimed performances.

3. Product life cycle assessment

3.1. Functional unit and reference flow description

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

3.1.1. Functional unit

The functional unit is:

- For domestic hot water storage tanks:

« Ensure the storage of 1 liter of domestic water heated by another system, with a reference lifetime of XX years of the product »

With:

XX = 22 years for the domestic hot water storage tanks

- For technical water storage tanks or buffer tanks:

« Ensure the storage of 1 liter of water, with a reference lifetime of XX of the product »

With:

XX = 25 years for the technical water storage tanks of the buffer tanks

3.1.2. Declared unit

Declared unit can be used as complementary information in order to help future PEP users.

For France scope, declared unit must be applied if no functional unit can be defined.

Declared unit is defined as follows :

- For the domestic hot water storage tanks:
« **Ensure the storage of domestic hot water with a XX liters tank for a reference lifetime of XX years of the product** »

With XX = 22 years for domestic hot water storage tanks

- For the technical water storage tanks or the buffer tanks:
« **Ensure the storage of water with a XX liters technical water storage tank or a buffer tank for a reference lifetime of XX years of the product** »

With XX = 25 years for technical water storage tanks or buffer tanks

The capacity in liters (xx) has to be adjusted according to the reference product.

3.1.3. Reference product and reference flow description

The study is realized:

- On a storage tank,
- On a reference lifetime of 22 or 25 years depending on the products category studied,
- Then the impacts are reported to the functional unit according to the method described in paragraph 3.9.

The reference lifetime of domestic hot water storage tanks is 22 years. This duration corresponds to the reference lifetime of hot water production systems for collective housing applications (see current PSR-0004). Manufacturers involved in the development of this PSR consider that the durability of a tank is the same regardless of its application (individual or collective).

The reference lifetime of technical water storage tanks or buffer tanks is 25 years. Manufacturers involved in the development of this PSR believe that the duration of this equipment is at least 25 years. This time is greater than that of domestic hot water storage tanks due to the conditions of use and the quality of water more favorable to the durability of the equipment.

In the case of a declaration for a homogeneous product family, the environmental statement and the associated study will relate to a reference product with the following characteristics:

- For an individual building application, the study is carried out on a tank with a storage capacity of 200 liters or on the nearest volume product.
- For a collective building application, the study is carried out on a tank with a storage capacity of 1000 liters or on the nearest volume product.

An extrapolation rule to other products, in accordance with section 3.6, will apply and will be documented in the LCA report and the PEP form.

If the range of this product type does not contain a 200 liters storage capacity (for an individual application) or 1000 liters storage capacity (for a building application) devices, the analysis is applied to the device with the nearest power rating. This should be justified in the LCA report and mentioned in the PEP.

3.2. System boundaries

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

3.2.1. Manufacturing stage

All the components delivered with the product and allowing its proper functioning must be included in the scope of the study.

In the case of a storage tank, the elements to be included are:

- The storage tank,
- The insulation,
- The element(s) integrated into the device (probes, anode, etc.)

If applicable:

- The exchanger,
- The emergency system (resistance or emergency heat exchanger),
- The regulation system,
- The installation or fixing elements delivered with the product.

On the other hand, it does not take into account the heating system and the additional ones providing the heating of the water. These components are excluded from the scope of the study and have to be considered at the scale of the water heater. These elements may be the subject of a specific declaration.

All the elements included in the scope of the declaration must be documented in the LCA report and in the PEP form.

3.2.2. Distribution stage

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

3.2.3. Installation stage

Conventionally, the storage tank installation involves:

- The manufacturing and processing of the components of the equipment necessary for its installation but which would be integrated only at the time of its installation.
- The processes and energies that are implemented at the time of installation.
Energy flows related to the use of portable hand tools may be neglected.

- The treatment of packaging waste. In fact, the packaging waste generated during the installation stage is supposed to be eliminated by the installer once the equipment is installed.

Are not considered:

- Any modification of the frame and / or addition of elements not provided for by the manufacturer (eg masonry work, connection to the electrical network). The sanitary installation is also excluded from the scope of the study (examples: sink, faucet, cupboard ...).

The actual impact of these operations has to be calculated by the user of the declaration if he wishes according to the installation elements used during the construction phase.

3.2.4. Use stage

The use stage of a storage tank involves, once the element installed, no energy consumption. The energy consumption required for heating water has to be considered at the system level using the storage tank (see PSR-0004 "Individual and autonomous units for the exclusive production of domestic hot water"). Thus, the technical performance of the storage tank has to be taken into account at the scale of the system using the storage tank.

In addition, the energy consumption related to the emergency backup is neglected because of its exceptional trigger. Emergency backup is only triggered when the generator no longer operates while waiting for maintenance.

Technical water storage tanks do not require any maintenance operation.

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), the environmental impacts of the use stage must be split in the following way for all product families concerned by the current PSR.

B1 : Use Phase	Not applicable. Module equal to 0.
B2 : Maintenance	Renewal of the protective anode of the sacrificial tank (if present)
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	Not applicable. Module equal to 0.
B7 : Water consumption during use phase	Not applicable. Module equal to 0.

For information, module B breakdown is mandatory for France scope.

3.2.5. End of life stage

For this step, 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

The rules defined in the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

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 the paragraph 2.3. "Cut-off rules" of the current PCR (PEP- PCR-ed4-EN-2021 09 06) apply.

3.4. Specific allocation rules

These rules defined in the paragraph 2.4. "Rules for allocation between co-products" of the current PCR (PEP- PCR-ed4-EN-2021 09 06) apply.

3.5. Development of scenarios (default scenarios)

Accepted evidences in order to modify default scenarios

The current PSR has hypothesis and default scenarios. If the declarant wants to use specific data, these data must be justified in the LCA report. These data, given by industrials, don't have to be certified but based on evidence on the traceability chain. 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) can be justified with suppliers' data (datasheet or supplier statement) but can't be justified with common data (for example: professional associations, ADEME, industries)

If there is no specific justified recycled content, the default data given in paragraph 3.5.5.1. applies.

Raw materials loss rate (see paragraph 3.5.1.) can be justified with an internal document from the production plant (for example: annual report mentioning the quantity of material entering and leaving the process).

If there is no specific justified rate, the default data given in paragraph 3.5.5.3. apply.

End of life waste treatment (see paragraph 3.5.1. "manufacturing stage", paragraph 3.5.3. "installation stage" and paragraph 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 given in the current PSR for installation stage and end of life stage, table 7 of appendix D (PCR-ed4-EN 2021 09 06) applies.

3.5.1. Manufacturing stage

A storage tank consists of components supplied by the manufacturer:

- directly shaped by the manufacturer,
- or ready to be assembled.

The rules defined in section 3.8. "Primary and secondary data collection requirements" of these current specific rules apply.

3.5.1.1. Recycled content of raw material

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

3.5.1.2. Raw material packaging and their components

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 as follows:

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

Loss material are taken into account in this 5% average rate. Reused packaging on site are not taken into account.

Packaging end of life treatment is modeling as defined in paragraph 3.5.3.1. of the current PSR.

3.5.1.3. Waste from the manufacturing stage

The manufacturing of wastes and their treatment are included in the manufacturing phase.

Manufacturers can eliminate manufacturing wastes themselves, or under their responsibility. The LCA report precise how the manufacturer, or any person working on his behalf, fulfill those steps by distinguishing hazardous from non-hazardous manufacturing wastes, and by providing proof of those allegations.

When they are known, treatment processes (energy valorization, landfill, and incineration without valorization) must be presented and justified in the LCA report, and the related environmental impacts must be taken into account, as explained in the paragraph 2.5.6. of the current PCR (PEP-PCR-ed4-EN-2021 09 06). The treatment processes justification must be defined, in the LCA report, by explaining the treatment sector and the valorization ratio selected for each waste (for example: with an eco-organization annual report of the equipment end life treatment).

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

- 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)

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%	1g	1,05kg
Other processes	30%	1kg	1,3kg

Table 1: Default loss rate for each constituent material of the total product (finished product and associated packaging(s))

Example:

If 1 kg of a bare product (final mass of the part excluding 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.

As a sectorial convention, the waste collection transport is accounted with a 100km truck transport.

3.5.2. Distribution stage

The distribution stage must be analyzed in accordance with the section 2.2.4. "Distribution stage" of the current PCR (PEP-PCR-ed4-EN-2021 09 06).

3.5.3. Installation stage

3.5.3.1. Installation mode

By default, the product has to be installed on the ground. Any other installation mode has to be mentioned on the PEP and justified on the LCA report.

3.5.3.2. Waste from the installation stage

End of life packaging which production has been taken into account during manufacturing stage, is taken into account during installation stage.

Packaging wastes from a storage tank produced during the installation stage falls into the category of non-hazardous waste and are, in principle, removed by the installer once the storage tank is installed.

If there is no specific end of life evidence, treatment scenarios showed in the table below have to be applied by default. Tables below are representative of 2019. It's possible to use Eurostat more recent consolidated data if they are available from Eurostat website:

https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPAC__custom_3801295/default/bar?lang=fr.

The reference year or 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 2. 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 3. End of life packaging treatment default scenarios for Europe scope

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

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 of the storage tank are considered to be insignificant and will not be included in the life cycle assessment for packaging waste, if they represent less than 10% of the packaging total mass.

3.5.4. Use stage (B1-B7 modules)

The use stage of a storage tank implies, once the element installed, no direct consumption of energy.

3.5.4.1. Maintenance stage

Storage tanks require maintenance operations, involving:

Type of STORAGE TANK	Number of visits	Intervention mode	Nature of intervention on the reference lifetime
Domestic hot water storage tank	None	/	Renewal of the protective anode of the tank once during the reference life time of the product (unless the anode is active or if there is a permanent anticorrosion treatment). The person's travel associated with the anode renewal is accounted for in the PEP of the associated generator.
Technical water storage tank	None	/	/
Buffer tank	None	/	/

Table 4. Maintenance interventions number, mode et nature according to storage tanks type

The treatment of any other waste generated by the installation and maintenance steps, which is essential for the proper functioning of the storage tank, and not specified in the table above, must 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, these elements will be included in the study.

By default, transport equals to 100 km return trip for one person (assumed weight of 80kg) alone in his vehicle, with the specification of the ICV module "car passenger" used, unless, as precised above, for the anode renewal.

3.5.5. End-of-life stage

Storage tanks, when they reach the end of their life, can fall into the category of equipment covered by the WEEE Directive (Waste Electrical and Electronic Equipment).

After presenting the local requirements for managing of end-of-life storage tanks, the LCA report will explain the organization of known disposal and/or recovery channels, 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.

The use of ICV Ecosystem modules is valid for France and Europe.

For the valorisation processes, the study will cover all the sector stages until the intermediate storage before reuse.

For the equipment which is not concerned by the WEEE Directive and/or the absence of justification on their end-of-life treatment, the default scenario of the current PCR (PEP-PCR-ed4-EN-2021 09 06) must be used.

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.

3.5.6. Benefits and loads beyond the system boundaries stage

For this stage, the 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 (PEP-PCR-ed4-EN-2021 09 06).

The following sections detail the extrapolation rules applicable to each stage of the life cycle and the conditions of belonging to a homogeneous environmental family. To use these extrapolation rules, the manufacturer must justify in the LCA report that the range of products fulfills all the membership conditions.

The use of any other rule of extrapolation and/or definition of homogeneous environmental family should be justified in the LCA report.

3.6.1. Homogeneous environmental family definition

It is accepted that the PEP covers products other than those that constitute the reference product. These other products, different from the reference product, may be named (commercial references) in the PEP or in the LCA report, provided that they belong to the same homogeneous environmental family as the reference product. A homogeneous environmental family means a group of products satisfying the following characteristics:

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

3.6.2. Extrapolation rule during the manufacturing stage

As part of a product range that respects the characteristics of a homogeneous environmental family as defined in section 3.6.1, the environmental impacts generated during the manufacturing stage are mainly correlated to **the total mass of the storage tank including the accessories and the packaging.**

For the manufacturing stage, the extrapolation rule to develop from the reference product scale (or declared unit) - data collection for any other storage tank in the same range is:

Coefficient on the scale of the declared unit	$\left(\frac{\text{Total mass of the product considered} + \text{Mass of packaging of the product considered (kg)}}{\text{Total mass of reference product} + \text{Mass of packaging of reference product (kg)}} \right)$
Coefficient on the functional unit scale	$\left(\frac{\text{Total mass of the product considered} + \text{Mass of packaging of the considered product (kg)}}{\text{Total mass of the reference product} + \text{Mass of packaging of the reference product (kg)}} \right) \times \left(\frac{\text{Total water storage capacity of reference product (L)}}{\text{Total water storage capacity of the product considered (L)}} \right)$

With:

Total mass of the product = storage tank mass including accessories, in kg

Mass of packaging = mass of the packaging of the storage tank, in kg.

3.6.3. Extrapolation rule in the distribution stage

As part of a product range that respects the characteristics of a homogeneous environmental family as defined in section 3.6.1, the environmental impacts generated during the distribution stage are mainly correlated to **the total mass of the storage tank including the accessories and the packaging.**

For the distribution stage, the extrapolation rule to develop from the reference product scale (or declared unit) - data collection for any other storage tank in the same range is:

Coefficient on the scale of the declared unit	$\left(\frac{\text{Total mass of the product considered} + \text{Mass of packaging of the product considered (kg)}}{\text{Total mass of reference product} + \text{Mass of packaging of reference product (kg)}} \right)$
Coefficient on the functional unit scale	$\left(\frac{\text{Total mass of the product considered} + \text{Mass of packaging of the considered product (kg)}}{\text{Total mass of the reference product} + \text{Mass of packaging of the reference product (kg)}} \right) \times \left(\frac{\text{Total water storage capacity of reference product (L)}}{\text{Total water storage capacity of the product considered (L)}} \right)$

With:

Total mass of the product = storage tank mass including accessories, in kg

Mass of packaging = mass of the packaging of the storage tank, in kg.

3.6.4. Extrapolation rule in the installation stage

As part of a product range that respects the characteristics of a homogeneous environmental family as defined in section 3.6.1, the environmental impacts generated in the installation phase are mainly correlated to **the total mass of the packaging of the storage tank**.

For the installation stage, the extrapolation rule to develop from the reference product scale (or declared unit) - data collection for any other storage tank in the same range is:

Coefficient on the scale of the declared unit	$\left(\frac{\text{Mass of packaging of the product considered (kg)}}{\text{Mass of packaging of reference product (kg)}} \right)$
Coefficient on the Functional Unit scale	$\left(\frac{\text{Mass of packaging of the product considered (kg)}}{\text{Mass of packaging of the reference product (kg)}} \right) \times \left(\frac{\text{Total water storage capacity of reference product (L)}}{\text{Total water storage capacity of the product considered (L)}} \right)$

With:

Mass of packaging = mass of the packaging of the storage tank, in kg.

3.6.5. Extrapolation rule in 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.

3.6.5.1. Module B1

Not applicable.

3.6.5.2. Module B2

Environmental impacts generated at module B2 are due to the renewal of the protective anode of the tank. So, they are mainly correlated to the total mass of the anode storage tank.

The extrapolation rule to develop from the reference product scale (or declared unit) – data collection for any other storage tank in the same range is :

Coefficient on the scale of the declared unit	$\left(\frac{\text{Anode mass of the product considered (kg)}}{\text{Anode mass of reference product (kg)}} \right)$
Coefficient on the Functional Unit scale	$\left(\frac{\text{Anode mass of the product considered (kg)}}{\text{Anode mass of the reference product (kg)}} \right) \times \left(\frac{\text{Total water storage capacity of reference product (L)}}{\text{Total water storage capacity of the product considered (L)}} \right)$

If the studied environmental homogenous family doesn't have an anode or if the anode is not sacrificial, the extrapolation rule to develop from the reference product scale (or declared unit) – data collection for any other storage tank in the same range is:

Coefficient on the scale of the declared unit	1
Coefficient on the Functional Unit scale	$1 \times \left(\frac{\text{Total water storage capacity of reference product (L)}}{\text{Total water storage capacity of the product considered (L)}} \right)$

3.6.5.3. Module B3

Not applicable.

3.6.5.4. Module B4

Not applicable.

3.6.5.5. Module B5

Not applicable.

3.6.5.6. Module B6

Not applicable.

3.6.5.7. Module B7

Not applicable.

3.6.6. Extrapolation rule in the end-of-life stage

As part of a product range that respects the characteristics of a homogeneous environmental family as defined in section 3.6.1, the environmental impacts generated in the end-of-life stage are mainly correlated to **the total mass of the storage tank**.

For the end-of-life stage, the extrapolation rule to develop from the reference product scale (or declared unit) - data collection for any other storage tank in the same range is:

Coefficient on the scale of the declared unit	$\left(\frac{\text{Total mass of the product considered (kg)}}{\text{Total mass of the reference product (kg)}} \right)$
Coefficient on the Functional Unit scale	$\left(\frac{\text{Total mass of the product considered (kg)}}{\text{Total mass of the reference product (kg)}} \right) \times \left(\frac{\text{Total water storage capacity of reference product (L)}}{\text{Total water storage capacity of the product considered (L)}} \right)$

With:

Total mass of the product = storage tank mass including accessories, in kg

3.6.7. Extrapolation rule for benefits and loads beyond the system boundaries

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 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)).

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

For the benefits and loads beyond the system boundaries stage, the extrapolation rule to apply to the reference product in order to evaluate the impact for any other storage tank in the same range is:

Coefficient on the scale of the declared unit	$\left(\frac{\text{Total mass of the product considered} + \text{Mass of packaging of the product considered (kg)}}{\text{Total mass of reference product} + \text{Mass of packaging of reference product (kg)}} \right)$
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Coefficient on the functional unit scale	$\left(\frac{\text{Total mass of the product considered} + \text{Mass of packaging of the considered product (kg)}}{\text{Total mass of the reference product} + \text{Mass of packaging of the reference product (kg)}} \right) \times \left(\frac{\text{Total water storage capacity of reference product (L)}}{\text{Total water storage capacity of the product considered (L)}} \right)$
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With:

Total mass of the product = storage tank mass including accessories, in kg

Mass of packaging = mass of the packaging of the storage tank, in kg.

3.7. Rules applying to joint environmental declaration

These rules are complementary to the sections "Rules for the preparation of collective environmental declarations" of the PCR (PEP-PCR-ed4-EN-2021 09 06).

For a joint environmental declaration, the study must cover a "typical product ":

- **Individual building:** a storage tank with a volume of **200 liters** or, failing that, any other nearest volume.
- **Collective building:** a storage tank with a volume of **1000 liters**, or, failing that, any other nearest volume.

Moreover, it's mandatory to mention in the PEP the validity framework of the extrapolation rules application, based on technical criteria 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 (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 by volume (with respect

to the total quantity bought). For example, for ten suppliers each providing 10 % of the procurement volume, at least five suppliers shall be considered in order to obtain an overall view of the primary information provided. Any other distribution rule should be mentioned in the LCA report and in the PEP.

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

This information is not always available to manufacturers of storage tanks: for lack of primary data, secondary data, i.e. data obtained from the life cycle assessment software database shall be used. PCR explains how to select the LCI modules. If the transportation information is not available, the data defined in the section "Transport scenarios" of the current PCR (PEP-PCR-ed4-EN-2021 09 06) will be used.

The proportion of primary and secondary data used in the life cycle analysis of storage tanks must be indicated in the LCA report and may be included in the PEP, in the section describing the environmental impacts, in addition to the information required in the section 4.4. - Environmental Impacts - of the PCR (PEP-PCR-ed4-EN-2021 09 06). This proportion is determined regarding the product mass.

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 3.5.1.3. 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

3.8.2. Data quality evaluation

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

3.9. Calculation of environmental impact

3.9.1. Calculation of environmental impact on the product scale (declared unit)

The environmental impacts results generated by the life cycle of the reference product correspond to the environmental impacts on the scale of the declared unit.

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).

3.9.2. Calculation of environmental impact on the scale of the functional unit (FU)

To ensure consistency of the results of environmental impacts between the functional unit (to store 1 liter of water) and the reference product (200 or 1000 liters tank), the PEP shall show the environmental impacts of the manufacturing, distribution, installation, use (module B1 to B7), end-of-life and benefits and loads beyond the system boundaries stages as follows:

$$\text{Environmental impacts from the PEP (for 1 liter)} = \frac{\text{Environmental impacts of the reference product}}{\text{Storage capacity of the reference product}}$$

With:

Storage capacity of the reference product = total nominal volume of stored water including the volume of domestic water and the volume of the internal exchanger (s) in liters

4. Drafting of the Product Environmental Profile

4.1. General information

The specific rules specified in section "General information" of the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

In addition to the information required by the current PCR, the PEP must specify:

- The type of tank according to section 2.1
- The elements that make up the tank (to ensure, for example, whether a heat exchanger is included or not)
- The storage capacity of the tank expressed in liters
- Static losses S (in W) (defined in the regulation 814/2013)
- The type of reference installation considered and its installation mode (by default on the ground)
- Reference type (s) of use
- The following mention for the maintenance scenario associated to domestic hot water tanks : "The person's travel associated with the anode renewal is taken into account for in the PEP of the associated generator."

4.2. Constituent materials

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

4.3. Additional environmental information

The rules defined in the section 4.3. "Additional environmental information" of the current PCR (PEP-PCR-ed4-EN-2021 09 06) apply.

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 assessment.

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.
In the case of storage tanks, the impacts associated with maintenance operations have to be considered in module B2. The impacts of the other modules (B1, B3, B4, B5, B6 and B7) are zero.

In order to comply with the requirements of the current PCR (PEP-PCR-ed4-EN-2021 09 06), the results presented in the table of environmental impacts relate to the implementation of the functional unit, namely the implementation of storage capacity over a period equal to the reference lifetime.

To know the impact of the product on its life cycle, the PEP user must multiply the results obtained for the functional unit by the total capacity of the installed tank.

In addition, the following clarification should be completed and presented in the PEP, to ensure clarity and transparency for the user:

In order to develop the PEP, the impacts were related to a storage capacity of 1 liter of water. The impact of the life cycle stages of the installed product has to be calculated by the user of the declaration by multiplying the impact considered by the storage capacity of the product.

The results of this PEP form cannot be compared directly with the results of another PEP form. The results have to be weighted in the PEP form according to the yield and performance of the storage tank studied by the user.

In the case of a PEP covering a family of products, the extrapolation rules must be mentioned and the accuracy below must be entered in the PEP form:

The extrapolation coefficients are given for the environmental impact of the functional unit, namely the storage of 1 liter of water. For each stage of the life cycle, the environmental impacts of the product under consideration are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient. The "Total" column has to be calculated by adding the environmental impacts of each stage of the life cycle.

5. PEP update rule

Every PEP 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. Terms and definitions

LCA	Life Cycle Assessment
EC	European Community
IEC	International Electrotechnical Commission
ES	European standards
EEE	Electrical and Electronic Equipment
EU	European Union (Union Européenne)
LCI	Life Cycle Inventory
Kg	Kilogram
KWh	Kilo Watt hour
L	Liter
FS	French standard
PCR	Product category rules

PEP	Product environmental profile
PSR	Product specific rules
Qpr	Cooling Constant
°C	Degree Celsius

6.2. References

Chapter	Subject	Sources
Error! Reference source not found.	Definition of the product categories	Based on the eco-design regulation n° 814/2014 EU
3.5.3.1.	End of life packaging treatment default scenarios for France and Europe scopes	Eurostat website giving statistics about packaging end of life treatments : https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPAC_custom_38012_95/default/bar?lang=fr .
4.1.	General Information	Eco-design regulation n° 814/2013

Table 6. References mentioned in this PSR

6.3. Application examples of the extrapolation rules

For the example below, product A is the reference product corresponding to a domestic hot water storage tank.

The three products belong to the same homogeneous environmental family, and the reference lifetime for each product is 22 years.

	Product A (reference)	Product B	Product C
Product mass (kg)	125,00	200,00	300,00
Anode mass of the product considered (kg)	1,00	1,50	2,00
Packaging mass (kg)	6,25	10,00	15,00
Total storage water capacity (L)	400,00	500,00	700,00
Total storage water capacity (reference product) / Total storage water capacity (considered product)	1,00	0,80	0,57

Table 6. Products characteristics of the homogeneous environmental family

According to the following parameters, we can determine extrapolation coefficients for each product and each life cycle stage:

	Stages	Product A	Product B	Product C
Functional Unit scale	A1-A3 : Manufacturing	1,00	1,28	1,37
	A4 : Distribution	1,00	1,28	1,37
	A5 : Installation	1,00	1,28	1,37
	B1 : Use	-	-	-
	B2 : Maintenance	1,00	1,04	1,14
	B3 : Repair	-	-	-
	B4 : Replacement	-	-	-
	B5 : Rehabilitation	-	-	-
	B6 : Energy consumption	-	-	-
	B7 : Water consumption	-	-	-
	C1-C4 : End of life	1,00	1,28	1,37
	D : Benefits and loads beyond the system boundaries	1,00	1,28	1,37
Declared product scale	A1-A3 : Manufacturing	1,00	1,60	2,40
	A4 : Distribution	1,00	1,60	2,40
	A5 : Installation	1,00	1,60	2,40
	B1 : Use	-	-	-
	B2 : Maintenance	1	1,30	2,00
	B3 : Repair	-	-	-
	B4 : Replacement	-	-	-
	B5 : Rehabilitation	-	-	-
	B6 : Energy consumption	-	-	-
	B7 : Water consumption	-	-	-
	C1-C4 : End of life	1,00	1,60	2,40
	D : Benefits and loads beyond the system boundaries	1,00	1,60	2,40

6.4. Declaration of conformity


L C I E

**Attestation de revue critique des
« Règles spécifiques aux Ballons de stockage »**

Chargée de revue critique	Olivia DJIRIGUIAN
Document revu	PSR - Règles spécifiques aux Ballons de stockage
Etabli par	CSTB
Version et date	PSR-0016-ed2-FR-2023-04-26
Période de revue	Janvier 2023 – Avril 2023
Référentiels de revue	L'objectif de la revue critique est de vérifier la conformité du document avec les référentiels suivants : <ul style="list-style-type: none">- Le programme PEP ecopassport, : PCR-ed4-FR-2021 09 06- Les normes NF EN ISO 14020-2002 et NF EN ISO 14025-2010 ;- Les normes NF EN ISO 14040 et 14044-2006
Conclusion	<p>Le document revu ne comporte pas de non-conformité par rapports aux référentiels. Ainsi, le PSR relatifs aux ballons de stockage est conforme aux exigences des référentiels.</p> <p>Olivia DJIRIGUIAN</p>  Consultante ACV et éco-conception Le 06/06/2023



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