# PCR Guidance-Texts for Building-Related Products and Services

## From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU)

## Part B: Requirements on the EPD for cement-based foams

www.ibu-epd.com

Institut Bauen und Umwelt e.V.

Architect Kristof van Hoof – Zandhoven (B)

## Imprint:

**Publisher:**

Institut Bauen und Umwelt e.V.

Hegelplatz 1
10117 Berlin

**First publication and periodic revisions**

| Version | Comments | Status |
|---|---|---|
| | Erstellung | 13.05.2020 |
| | | |
| | | |
| | | |
| | | |

**Tracking of versions of the PCR Template**

| Version | Comments | Status |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Tracking of versions PCR specific**

| Version | Comments | Status |
|---|---|---|
| **1.0** | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | |
|---|---|---|

# Scope

This document contains the **Requirements on an Environmental Product Declaration (EPD)** for the range of environmental product declarations published by the Institut Bauen und Umwelt e.V. (IBU) based on the /EN 15804/ standard. The document applies for:

Products made of cement-based and foamed materials, consisting of

- 
  - inorganic binders (cement)
  - Fillers
  - Auxiliaries and additives (e.g. fiber reinforcement, hydrophobing agent, air entraining agents, etc.).

The requirements on the EPD include:

- Requirements on the /EN 15804/ standard as a European core EPD,
- Complementary requirements on IBU EPD

The calculation rules for the life cycle assessment and requirements on the project report are specified in a separate document as Part A of the Product Category Rules.

The general principles for the EPD range of Institut Bauen und Umwelt e.V. (IBU) also apply.
**Insert text:** Requirements on the content are shown in blue colour under the respective titles. These coloured texts can be edited by clicking. In the appearing text editor, the requirements on the content are outlined above for further assistance. The relevant text can be entered below. After confirming the input, texts are incorporated into the document and displayed.

**Inserting images:** Using the text editor, "broad" and "small" pictures can be added. If you click on the respective button in the editor, you can select the image file and upload it. After uploading, the figure is shown in the text editor and can be changed in size by clicking and pulling the edges.

**Technical tables:** Click on the table, to open the table editor. Insert your values (= numbers) in the respective field in the column "Value". For each row, you can choose between 3 value types: value (= number), range (= consisting of two numbers separated with a hyphen) and a free text (e.g. “test passed after 3 days”). On the far left, you can hide rows that are not relevant by clicking on the check. Click the button “add new property” to generate a new row with free text space. It is not allowed to insert a picture instead of a table!

**Chapter 5, "Results of the LCA ':** click on the first table "system boundaries" and select all life stages you want to declare in the following dialogue. Then the following three tables are adjusted according to your entries. Now you can insert numerical values by clicking on the tables. The numerical values are to be indicated with three significant digits. To achieve an optimal representation, the "exponential view" can be selected for each impact indicator.

**Storing/saving** is done fully automatically.

**The first three pages** of the document will be deleted automatically after creation of the EPD.

**Labelled sample texts** are proposals to facilitate the creation of an EPD. If they are accepted into an EPD, they should be checked for their accuracy and if necessary adapted for the specific product.

## Requirements on content and format:

**The chapters of the EPDs** must be described in a compact form and in a factually and technically correct way. Judgmental, comparative, or promotional texts are not permitted unless specifically requested in the PCR or if necessary in the context of the EPD. Each document is carefully checked before publication.

**(The) extent of an EPD:** For technical reasons, an EPD may contain one data set only. This means that the tables for the LCA results are available only once per EPD. All four tables of the LCA results (Chapter 5) must be located entirely on one side.

**Quotations** should be indicated in italic (formatting), for example: *EN 15804*. The literature cited is to be shown completely in the references (Chapter 8).

## Product-group-specific LCA calculation rules from PCR part A

Unlike classic building materials such as concrete or mortar, foams made from inorganic bound materials are highly porous (porosity of approx. 99%). This high pore content means that gaseous CO2 and water vapour can diffuse through the material without any nominal resistance and react with the reactive components of the material. Unlike the classic building materials referred to above, most carbonation of cement-based foams already occurs during the curing/drying process. On leaving the plant (i.e. after the drying phase), carbonation is already underway which is why the associated absorption of CO2 is allocated to Module A3 (Manufacturing). Residual carbonation until the practical maximum is accounted for by the use phase (Module B1).

**Verification and module allocation in relation to carbonation:**
The manufacturer must provide the following verification/information:
- Average duration of drying/curing
- Series of measurements of ingredients which are reactive in terms of carbonation and which makes it possible to establish the anticipated carbonation rate during manufacturing
- Typical service life

With appropriate verification, CO2 absorption as a result of carbonation can be allocated proportionately to the manufacturing phase (Module A3) and the use phase (Module B1).

**Verification must be documented in the Background Report. The Background Report must include at least:**
1. **Assumed carbonation rate during the manufacturing phase, incl. verification**
2. **Assumed carbonation rate during the use phase, incl. the assumptions on which it is based**

**Calculating maximum CO2 absorption by cement:**
The formulae outlined in *DIN EN 16757, Sustainability of construction works – Environmental product declarations – Product category rules for concrete and concrete elements*, Annex BB is to be used as the calculation method for CO2 absorption by carbonation:

Utcc = w x C x (mCO2/mCaO) (BB.2 equation)

| | |
|---|---|
| Utcc | Maximum CO2 absorption on full carbonation [kg CO2 / kg product] |
| w | Percentage of reactive CaO in the binding agent used [%] |
| C | Binding agent content [kg binding agent / kg product] |
| mCO2 | Molecular mass CO2 (44 g/mol) |
| mCaO | Molecular mass CaO (56 g/mol) |

The maximum CO2 absorption is then multiplied by a factor of 0.95. This factor takes consideration of the fact that in practice CO2 absorption may be below the theoretically maximum CO2 absorption level. The practical maximum also depends on exposure, climatic conditions, specific installation situation and layer thickness etc.

**Calculating maximum CO2 absorption by hydrated lime:**
The maximum CO2 absorption when using hydrated lime is calculated stoichiometrically using the lime cycle:
Ca(OH)2 + CO2 à CaCO3 + H2O (“setting reaction”)
1 mol Ca(OH)2 (molecular mass 74 g/mol) binds 1 mol CO2 (molecular mass 44 g/mol).
The maximum CO2 absorption of hydrated lime is therefore 44/74 = 0.594 kg CO2/kg hydrated lime.
Total CO2 absorption is therefore

Utcl = 0.594 x Ccl

| | |
|---|---|
| Utcl | Maximum CO2 absorption on full carbonation of the hydrated lime [kg CO2 / kg product] |
| Ccl | Hydrated lime content in the product [%] |

# ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

| | |
|---|---|
| Owner of the Declaration | |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
| Publisher | Institut Bauen und Umwelt e.V. (IBU) |
| Declaration number | |
| Issue date | |
| Valid to | |

**Name of declared product**

## Name of manufacturer/association

Institut Bauen und Umwelt e.V.

**www.ibu-epd.com | https://epd-online.com**

## Large picture of the product

**Maximum file size 4 MB!**

Recommended picture size: width 1000 pixel, height 650 pixel

*Note: if the size of the image does not correspond to the dimensions given, the image shown may be distorted.*

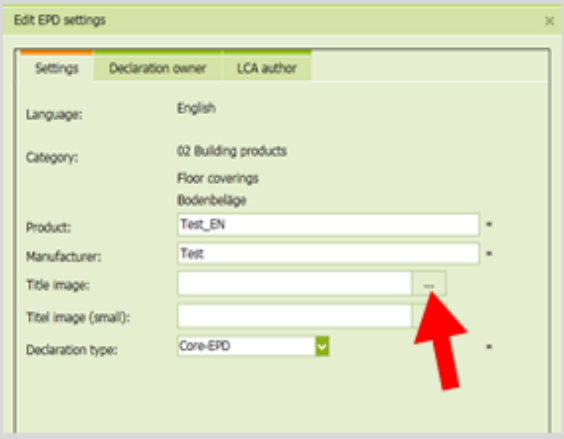
*Insert the picture: Click on the right side of your screen "Edit Properties" and enter the location of the image on your PC.*

**Small picture**

**max. 4 MB**

Small picture size:

w x h = 400 x 400 pixel

LOGO

# 1. General Information

## Name of the manufacturer

**Programme holder**
IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

**Declaration number**

**This declaration is based on the product category rules:**
Name of PCR, MM-JJJJ
(PCR checked and approved by the SVR)

**Issue date**

**Valid to**

[Unterschrift]

Dipl.-Ing.Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)

[Unterschrift]

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.))

## Name of the product

**Owner of the declaration**
Name of the manufacturer
Street
Postal Code/City

**Declared product / declared unit**
Name of declared product / declared unit

**Scope:**
The products, plants and their locations must be outlined, on which data the Life Cycle Assessment is based and for which the declaration applies.

For average EPDs, e.g. association EPDs, the plants/companies under review on whose data the LCA is based must be named; as an alternative, the representatively of the declaration can be depicted, e.g. for the association, by declaring the production volume covered by the LCA as a percentage of the entire volume of the declared product manufactured by all association members in the year of reference. It shall be clearly mentioned in this clause if the EPD represents an average EPD, e.g. as an association EPD.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of *EN 15804+A2*. In the following, the standard will be simplified as *EN 15804*.

**Verification**

| |
|---|
| The standard *EN 15804* serves as the core PCR |
| Independent verification of the declaration and data according to *ISO 14025:2011* |
| ☐ internally ☒ externally |

[Unterschrift]

Name of verifier
(Independent verifier)

# 2. Product

### 2.1 Product description/Product definition

The declared products must be described.

In addition to a general product description, the trade names of the products/product groups (including any product codes) must be mentioned to which the EPD applies.
If the declaration of trade names is not meaningfully possible (e.g. in the context of association EPDs), the product description must clearly demarcate the products product groups to which the EPD applies.
.Example:
The product is an inorganic insulating material comprising an inorganic binding agent and inorganic fillers. It is an easily processable material for lightweight, non-flammable and thermally-insulating as well as fully-recyclable products used in the construction industry.

The product has been specially developed for long-lasting, energy-efficient and thermally-insulating prefabricated and construction site applications.

At high, medium and low densities, the product is resistant to freezing/thawing cycles, displaying a low level of water absorption as the product features a high percentage of closed pores. The product displays a high degree of stability on cyclical admission of temperature and moisture.
The product is manufactured in a chemical foaming process. This can be carried out continuously or in batches.
Please select one of the following options and delete the header of the selected [alternative]:

**[Alternative 1a: Product according to the CPR based on a hEN]:**

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration *EN xyz:date, title* and the CE-marking. For the application and use the respective national provisions apply.

**[Alternative 1b: Products according to the CPR based on an ETA].**
For the placing of the product on the market in the European Union/European Free Trade Association /EU/EFTA) (with the exception of Switzerland) the Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration *ETA no. xyz:date, title* and the CE-marking.
For the application and use the respective national provisions apply.

**[Alternative 2a: Product not harmonised in accordance with the CPR but in accordance with other provisions for harmonisation of the EU]:**
For the placing on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the following legal provisions apply:

- *Directive no. xyz: date, title*
- *Regulation no. xyz: date, title*
- and the harmonised standards based on these provisions:
- *EN xyz:date, title*

The CE-marking takes into account the proof of conformity with the respective harmonized standards based on the legal provisions above.
For the application and use the respective national provisions apply.

**[Alternative 2b: Product harmonized as well in accordance with the CPR as with other provisions for harmonisation of the EU]:**
For the placing of the product on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the Regulation (EU) No. 305/2011/ (CPR) and the following other provisions for harmonisation apply:

- *Directive (EU) xyz:date, title*
- *Regulation (EU) no. xyz:date, title.*

The product needs a declaration of performance in accordance with the CPR taking into consideration /EN xyz: date/, title or /ETA no. xyz/:date, title respectively and the CE-marking.
The CE-marking for the product takes into account the Declaration of Performance in accordance with the CPR and the proof of conformity with the following harmonised standards or based on the other provisions for harmonisation:

- *EN xyz:date, title*
- *Source, date, title*

For the application and use the respective national provisions apply.

**[Alternative 3: Product for which no legal provisions for harmonisation of the EU exist]**
For the use and application of the product the respective national provisions at the place of use apply, in Germany for example the building codes of the federal states and the corresponding national specifications.

### 2.2 Application

The designated application must be specified for the products covered in the EPD.

### 2.3 Technical Data

The technical specifications of the products within the scope of the EPD shall be listed, including the reference to the test methods/test standards for each specification.
For products with CE marking, the technical specifications must be specified in accordance with information in the declaration of performance.

**Constructional Data**

| Name | Value | Unit |
|---|---|---|
| Gross density | | $kg/m^3$ |
| Dimensional stability | | % |
| Thermal conductivity (Bemessungswert) | | W/(mK) |
| Specific heat capacity | | kJ/kgK |
| Water vapour diffusion resistance factor | | - |
| Compressive strength (nach 7 Tagen) | | $N/mm^2$ |
| flexural stress (nach 7 Tagen) | | kPa |
| Tensile strength (nach 7 Tagen) | | $N/mm^2$ |
| Melting point | | °C |
| Building material class | | - |
| Equilibrium moisture content | | % |

Please select one of the following options and delete the header of the selected [alternative]:

**[Alternative 1a: Product according to the CPR, based on a hEN]:**

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN xyz:date, title.*
- Voluntary data: *source, date, title* (not part of CE-marking).

**[Alternative 1b: Product according to the CPR, based on an ETA]:**

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *ETA no. xyz, date, title*.
- Voluntary data: *source, date, title* (not part of CE-marking).

**[Alternative 2a: Product not harmonised in accordance with the CPR but in accordance with other provisions for harmonisation of the EU]:**

- Performance data of the product according to the harmonised standards, based on provisions for harmonization.
- Voluntary data: *source, date, title* (not part of CE-marking).

**[Alternative 2b: Product harmonized as well in accordance with the CPR as with other legal provisions of the EU]:**

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN*

*xyz: date, title* or *ETA no. xyz, date, title* respectively.
- Performance data of the product, based on the harmonised standards, in accordance with the other provisions for harmonization.
- Voluntary data: *source, date, title* (not part of CE-marking).

**[Alternative 3: Product for which no legal provisions for harmonisation of the EU exist]:** Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

### 2.4 Delivery status

The dimensions/quantities must be declared for the products covered in this EPD in their delivery status.

### 2.5 Base materials/Ancillary materials

The main constituents of the product or its components shall be indicated as mass percentages to enable the user of the EPD to understand the composition of the product in delivery status. This information should support safety and efficiency during installation, use, and disposal of the product.

When substances from the "Candidate List of Substances of Very High Concern for Authorisation" (SVHC) are part of the formulation with a mass percentage of > 0,1 of the mass of the construction product, i.e. when they were added to the formulation on purpose, then the substances shall be declared including CAS-number.

If the construction product is a substance or mixture under the chemical law (*REACH*), the concentration limit value refers to the entire product; if it is an article, the partial product or component applies as a unit of reference.

The Candidate list can be found on the ECHA website address: https://echa.europa.eu/de/home.

This declaration is mandatory for all EPDs and must be formulated as follows:

1) "This product/article/at least one partial article contains substances listed in the candidate list (date: dd.mm.yyyy) exceeding 0.1 percentage by mass: yes/no".
[if yes: List of respective SVHC and their CAS-number]
..

[If yes:] - Information on the concentration and/or concentration range (comparable information on hazardous properties and if relevant, information on the partial article in the case of articles

If the construction product is a substance or mixture under the chemical law (REACH), the safety data sheet shall be made available in the EPD, e.g. by a link. In addition, the concentrations of the hazardous substance as well as its hazardous properties have to be stated in the EPD.

CMR substances in categories 1A and 1B must also be declared including CAS-number if a European harmonised classification is available as well as information on treatment with biocides. For IBU-EPDs statement 2) and 3) are mandatory.

This statement on other CMR substances which are not listed as SVHC and on biocides must be formulated as follows:

2) "This product/article/at least one partial article contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: yes/no"

[If yes:] – List the concentration and/or concentration ranges (comparable to the information on a safety data sheet), provide information on hazardous properties and if relevant information on the partial article in the case of articles.

3) "Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): yes/no"

[If yes:] - List the biocides referred to above.
The active substance and the product type (in-can preservative, film preservative, wood protection, etc. according to the Ordinance on Biocide Products (see also 1.4) must be indicated.

Ancillary materials and additives remaining on the product must also be declared.
If additives such as fire retardants, softeners or biocides are used, their functional chemical group must be indicated.
.

Statements like "…free of …." and/or "…does not contain…" may not be used.

### 2.6 Manufacture

The manufacturing process must be described and can be illustrated using a simple graphic. If the EPD applies for several locations, the production processes must be described for all sites in case they differ.

Quality management systems can be referred to.

### 2.7 Environment and health during manufacturing

Presentation of measures relating to health protection during the manufacturing process extending beyond national guidelines (of the production country).

Presentation of measures relating to environmental protection during the manufacturing process extending beyond national guidelines or plant-specific requirements, e.g. description of special environmentally-friendly dealings with waste air, waste water, and waste as well as noise emissions.

Information on the Environment Management System or similar (if available).

### 2.8 Product processing/Installation

Description of the type of processing,
machinery and tools used, dust extraction etc.,
auxiliary materials needed for installation as well as measures for noise reduction.
Information on the rules of technology as well as on workers safety and environmental protection is possible.

### 2.9 Packaging
Information on product-specific packaging:
type, composition, and possible reuse, recycling, energy recovery, and disposal of packaging materials (paper, pallets, foils, etc.).

### 2.10 Condition of use
Information should be provided here regarding changes in material composition over the service life of the product and/or regarding environmentally relevant material inherent properties over the service life of the product.

### 2.11 Environment and health during use
Information on the relationships between the product, the environment and health.

Information on the possible content of harmful substances or emissions.

Note: recommendations concerning cleaning, maintenance, etc. for the declared product should be listed in the corresponding section in 4 “Technical information on scenarios”.

### 2.12 Reference service life
The declaration of the reference service life (RSL) is imperative for EPDs covering the complete use stage (modules B1-B7), or if a use stage scenario is described, which refers to the lifetime of the product. If not all modules of the use stage are declared and no use stage scenario covering the full lifetime of the product is described, then the indication of the RSL (according to *ISO 15686:1, -2, -7 and -8*) is voluntary.

The RSL must refer to the declared technical and functional quality of the product. It must be established in line with all of the specific rules in the European product standards and must also take consideration of the *ISO 15686:1, -2, -7 and -8* standards.
Where information is available for deriving the RSL from European product standards, such data has priority.
Information on the product’s RSL requires specification of compatible scenarios for the product stage, construction process stage and use stage. The RSL is dependent on the properties of the product and reference in-use conditions. These conditions shall be declared together with the RSL in clause 4 and it shall be stated that the RSL applies for the reference conditions only.

If a reference service life (RSL) cannot be declared according to ISO 15686 (or it is not relevant for consideration of the LCA), this has to be stated clearly in the EPD.

In such cases, a service life can be declared in accordance with the BBSR table "Service lives of components for life cycle assessment according to BNB" (http://www.nachhaltigesbauen.de/baustoff-und-gebaeudedaten/nutzungsdauern-von-bauteilen.html).

It shall be unambiguously stated that a service life (*not*: a reference service life) in accordance with the BBSR table (or based on a manufacturer’s declaration (see below)) is not a RSL according to ISO 15686.

A service life provided by the manufacturer can be declared as an alternative to the value from the BBSR table. This information shall be accompanied by explanations on the origin of the declared service life, e.g. referring to simulations, tests, an assessment of the manufacturer or statistical data, etc. and shall contain the specification of the application for which the stated service life is valid (to be provided in clause 4).

The requisite information for technical building installations should be taken from *VDI 20673*.

Description of the influences on the ageing of the product when applied in accordance with the rules of technology.

### 2.13 Extraordinary effects

**Fire**

Information on the fire performance according to *EN 13501:1* or established national standards. According to *EN 13501:1*:

- The classes of building products regarding their fire performance are predefined as: A1, A2, B, C, D, E, and F;
- The classes of flaming droplets/particles are pre-defined as: d0, d1, or d2;
- The classes for smoke density are pre-defined as: s1, s2, or s3

| Name | Value | Unit |
|---|---|---|
| Building material class | | - |
| Burning droplets | | - |
| Smoke gas development | | - |

**Water**
Information on the product performance including possible impacts on the environment following the unforeseeable influence of water, e.g. flooding.

**Mechanical destruction**
If relevant: information on the product performance including possible impacts on the environment following unforeseeable mechanical destruction.

### 2.14 Re-use phase
The possibilities of re-use, recycling, and energy recovery must be described.

### 2.15 Disposal
The possible disposal channels must be indicated. The waste code in accordance with the European Waste Index must be described.

### 2.16 Further information
Possible sources of additional information, e.g. website, a reference source for safety data sheet.

## 3. LCA: Calculation rules

### 3.1 Declared Unit

The declared unit, the mass reference and the conversion factor [Mass/Declared unit] must be indicated in the appropriate table as declared.

If averages are declared across various products, the average breakdown must be explained
The declared unit is one cubic metre (1m³) of inorganic foam.

**Declared Unit**

| Name | Value | Unit |
|---|---|---|
| Gross density (trocken) | | kg/m³ |
| conversion factor [Mass/Declared Unit] | | - |
| Declared unit | | m³ |

For IBU core EPDs (where clause 3.6 is part of the EPD): for average EPDs, an estimate of the robustness of the LCA values must be made, e.g. concerning variability of the production process, geographical representativeness and the influence of background data and preliminary products compared to the environmental impacts caused by actual production.

### 3.2 System boundary

Type of the EPD: choose as appropriate: cradle to gate, cradle to gate - with options, cradle to grave.

The modules considered in the life cycle assessment as per “system boundaries” outlined in section 5.5. of the PCR, Part A: “Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report” must be described in brief. The description should be product specific; it should be apparent as to what processes are considered in what modules.
If green electricity has been calculated, the following sentence must be declared in the IBU EPD under the assumptions:
For the environmental impact, the use of green electricity was calculated taking into account the residual electricity mix for the remaining electricity. The proportion of the electricity demand covered by green electricity in the total electricity demand is x%.

### 3.3 Estimates and assumptions

Key assumptions and estimates for interpretation of the life cycle assessment should be listed here, provided that they are not dealt with in other sections of the main clause 3 “LCA: Calculation rules”.

### 3.4 Cut-off criteria

The use of cut-off criteria as per the PCR, Part A: “Calculation Rules for the Life Cycle Assessment and Requirements on the project report” must be documented here.

### 3.5 Background data

The sources for background data in the LCA used must be provided.

### 3.6 Data quality

An estimate should be made as regards data quality (addressing both foreground and background data), whereby the age of background data used must be indicated.

For average EPDs, an estimate of the robustness of the LCA values must be made, e.g. concerning variability of the production process, geographical representatively and the influence of background data and preliminary products compared to the environmental impacts caused by the actual production.

### 3.7 Period under review

The period under review for the collection of production data and the resulting averages (if applicable) shall be documented.

### 3.8 Allocation

The allocations of relevance for calculation (appropriation of expenses across various products) must be indicated,
at least:

- Allocation of energy, auxiliary and operating materials used for individual products in a factory;
- Allocation of co-production processes;
- Allocation in the use of recycled and/or secondary raw materials;
- Loads and benefits beyond the system boundary from recycling or energy recovery of packaging materials and production waste;
- Loads and benefits beyond the system boundary from recycling or energy recovery from the end of life of the product.

whereby reference must be made to the modules in which the allocations are performed.

### 3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

The used background database has to be mentioned

## 4. LCA: Scenarios and additional technical information

**Characteristic product properties**
**Information on biogenic Carbon**
The biogenic carbon content quantifies the amount of biogenic carbon in a construction product leaving the factory gate, and it shall be separately declared for the product and for any accompanying packaging.
If the total mass of biogenic carbon containing materials is less than 5 % of the total mass of the product and accompanying packaging, the declaration of biogenic carbon content may be omitted. The mass of packaging containing biogenic carbon shall always be declared.

Note: 1 kg biogenic Carbon is equivalent to 44/12 kg of $CO_2$

**Information on describing the biogenic Carbon Content at factury gate**

| Name | Value | Unit |
|---|---|---|
| Biogenic Carbon Content in product | | kg C |
| Biogenic Carbon Content in accompanying packaging | | kg C |

The following technical scenario information is required for the declared modules and optional for non-declared

modules. Modules for which no information is declared can be deleted; additional information can also be listed if necessary.

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared (MND).

If the use of packaging material for the declared product is declared in EPDs in Module A3, but Module A5 is not declared including the disposal of the packaging material on the construction site, the amounts of packaging materials included in the LCA calculations must be declared as technical scenario information for Module A5.

.

**Transport from the gate to the site (A4)**

| Name | Value | Unit |
|---|---|---|
| Litres of fuel | | l/100km |
| Transport distance | | km |
| Capacity utilisation (including empty runs) | | % |
| Gross density of products transported | | kg/m$^3$ |
| Capacity utilisation (including empty runs) | | % |

**Assembly (A5)**

| Name | Value | Unit |
|---|---|---|
| Auxiliary | | kg |
| Water consumption | | m$^3$ |
| Other resources | | kg |
| Electricity consumption | | kWh |
| Other energy carriers | | MJ |
| Material loss | | kg |
| Output substances following waste treatment on site | | kg |
| Dust in the air | | kg |
| VOC in the air | | kg |

**Use or application of the installed product (B1) see section 2.12 "Use"**

| Name | Value | Unit |
|---|---|---|

**Maintenance (B2)**

| Name | Value | Unit |
|---|---|---|
| Information on maintenance | | - |
| Maintenance cycle | | Number/ RSL |
| Water consumption | | m$^3$ |
| Auxiliary | | kg |
| Other resources | | kg |
| Electricity consumption | | kWh |
| Other energy carriers | | MJ |
| Material loss | | kg |

**Repair (B3)**

| Name | Value | Unit |
|---|---|---|
| Information on the repair process | | - |
| Information on the inspection process | | - |
| Repair cycle | | Number/ RSL |
| Water consumption | | m$^3$ |
| Auxiliary | | kg |
| Other resources | | kg |
| Electricity consumption | | kWh |
| Other energy carriers | | MJ |
| Material loss | | kg |

**Replacement (B4)/ Refurbishment (B5)**

| Name | Value | Unit |
|---|---|---|
| Replacement cycle | | Number/ RSL |
| Electricity consumption | | kWh |
| Litres of fuel | | l/100km |
| Replacement of worn parts | | kg |

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies for the reference conditions only

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list on service life by *BNB* is declared.

**Reference service life**

| Name | Value | Unit |
|---|---|---|
| Reference service life (according to ISO 156868-1,-2,-7 and -8) | | a |
| Life Span (according to BBSR) | | a |
| Life Span according to the manufacturer | | a |
| Declared product properties (at the gate) and finishes | | - |
| Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes | | - |
| An assumed quality of work, when installed in accordance with the manufacturer's instructions | | - |
| Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature | | - |
| Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure | | - |
| Usage conditions, e.g. frequency of use, mechanical exposure | | - |
| Maintenance e.g. required frequency, type and quality and replacement of components | | - |

**Operational energy use (B6) and Operational water use (B7)**

| Name | Value | Unit |
|---|---|---|
| Water consumption | | m$^3$ |
| Electricity consumption | | kWh |
| Other energy carriers | | MJ |
| Equipment output | | kW |

**End of Life (C1-C4)**

| Name | Value | Unit |
|---|---|---|
| Collected separately type | | kg |
| Collected as mixed construction waste | | kg |
| Reuse | | kg |
| Recycling | | kg |
| Energy recovery | | kg |
| Landfilling | | kg |

**Reuse, recovery and(or recycling potentials (D), relevant scenarion information**

| Name | Value | Unit |
|---|---|---|

LOGO

## 5. LCA: Results

In Table 1 "Description of the system boundary", all declared modules shall be indicated with an "X"; all modules that are not declared shall be indicated with "MND" (As default the modules B3, B4, B5 are marked as MNR – module not relevant).In the following tables, columns can be deleted for modules that are not declared. Indicator values should be declared with three valid digits (eventually using exponential form (e.g. 1,23E-5 = 0,0000123). A uniform format should be used for all values of one indicator.
If several modules are not declared and therefore have been deleted from the table, the abbreviations for the indicators can be replaced by the complete names, while the readability and clear arrangement should be maintained; the legends can then be deleted.
If due to relevant data gaps, an indicator cannot be declared in a robust way, then the abbreviation “IND” (indicator not declared) should be used for this indicator.

- 0 – calculated value is 0
- 0 – value falls under the cut-off
- 0 – assumption which exclude any flows (e.g. exported electricity A1-A3)
- IND – in cases where the inventory does not support the methodological approach or the calculation of the specific indicator IND shall be used.

If no reference service life is declared (see chapter 2.13 "Reference Service Life"), the LCA results of the modules B1-B2 and B6-B7 shall refer to a period of one year. This shall then be indicated as an explanatory text below the tables. In addition, the formula for the quantification of such B-modules over the total life cycle shall be provided.

**DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)**

| PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse- Recovery- Recycling- potential |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| | | | | | | | | | | | | | | | | |

**RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: declared unit and product**

| Core Indicator | Core Indicator | Unit | |
|---|---|---|---|
| GWP | Global warming potential | [kg $CO_2$-Eq.] | |
| GWP-total | Global warming potential - total | [kg $CO_2$-Eq.] | |
| GWP-fossil | Global warming potential - fossil fuels | [kg $CO_2$-Eq.] | |
| GWP-biogenic | Global warming potential - biogenic | [kg $CO_2$-Eq.] | |
| GWP-luluc | GWP from land use and land use change | [kg $CO_2$-Eq.] | |
| ODP | Depletion potential of the stratospheric ozone layer | [kg CFC11-Eq.] | |
| AP | Acidification potential of land and water | [kg $SO_2$-Eq.] | |
| AP | Acidification potential, accumulated exceedance | [mol $H^+$-Eq.] | |
| EP | Eutrophication potential | [kg $(PO_4)^{3-}$-Eq.] | |
| EP-freshwater | Eutrophication, fraction of nutrients reaching freshwater end compartment | [kg $P_4$-Eq.] | |
| EP-marine | Eutrophication, fraction of nutrients reaching marine end compartment | [kg N-Eq.] | |
| EP-terrestrial | Eutrophication, accumulated exceedance | [mol N-Eq.] | |
| POCP | Formation potential of tropospheric ozone photochemical oxidants | [kg ethene-Eq.] | |
| POCP | Formation potential of tropospheric ozone photochemical oxidants | [kg NMVOC-Eq.] | |
| ADPE | Abiotic depletion potential for non-fossil resources | [kg Sb-Eq.] | |
| ADPF | Abiotic depletion potential for fossil resources | [MJ] | |
| WDP | Water (user) deprivation potential, deprivation-weighted water consumption (WDP) | [m³ world-Eq deprived] | |

| Caption | GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential |
|---|---|

**RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: declared unit and product**

| Indicator | Indicator | Unit | |
|---|---|---|---|
| PERE | Renewable primary energy as energy carrier | [MJ] | |
| PERM | Renewable primary energy resources as material utilization | [MJ] | |
| PERT | Total use of renewable primary energy resources | [MJ] | |
| PENRE | Non-renewable primary energy as energy carrier | [MJ] | |
| PENRM | Non-renewable primary energy as material utilization | [MJ] | |

| | | | |
|---|---|---|---|
| PENRT | Total use of non-renewable primary energy resources | [MJ] | |
| SM | Use of secondary material | [kg] | |
| RSF | Use of renewable secondary fuels | [MJ] | |
| NRSF | Use of non-renewable secondary fuels | [MJ] | |
| FW | Use of net fresh water | [m³] | |

| | |
|---|---|
| Caption | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water |

**RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: declared unit and product**

| Indicator | Indicator | Unit | |
|---|---|---|---|
| HWD | Hazardous waste disposed | [kg] | |
| NHWD | Non-hazardous waste disposed | [kg] | |
| RWD | Radioactive waste disposed | [kg] | |
| CRU | Components for re-use | [kg] | |
| MFR | Materials for recycling | [kg] | |
| MER | Materials for energy recovery | [kg] | |
| EEE | Exported electrical energy | [MJ] | |
| EET | Exported thermal energy | [MJ] | |

| | |
|---|---|
| Caption | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy |

**RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: [declared unit and product]**

| Indicator | Indicator | Unit | |
|---|---|---|---|
| PM | Potential incidence of disease due to PM emissions | [Disease Incidence] | |
| IRP | Potential Human exposure efficiency relative to U235 | [kBq U235-Eq.] | |
| ETP-fw | Potential comparative toxic unit for ecosystems | [CTUe] | |
| HTP-c | Potential comparative toxic unit for humans - cancerogenic | [CTUh] | |
| HTP-nc | Potential comparative toxic unit for humans - not cancerogenic | [CTUh] | |
| SQP | Potential soil quality index | [-] | |

| | |
|---|---|
| Caption | PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index |

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”.
This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”.
The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

## 6. LCA: Interpretation

To facilitate comprehension of the life cycle assessment, both the relevant indicators of the life cycle inventory and the indicators of the impact assessment declared in section 5 “LCA results” have to be interpreted in a dominance analysis.
An illustration of the results with figures is recommended, e.g. for the dominance analysis, the distribution of impacts across the modules, the $CO_2$-balance, etc. as appropriate for a reader to understand the environmental profile of the declared product.
The interpretation shall also include a description of the time frame and/or variability of the LCIA results (in qualitative or quantitative terms) if the EPD is valid for several products or producers.

## 7. Requisite evidence

As a general rule, all statements must be documented with measured data (presented by the corresponding test certificates). The methods of evidence and the test conditions have to be described together with the results.

If substances are not detected, the limit of detection must be included in the declaration.

Interpreting statements such as “… free of …” or “… are entirely harmless …” are not allowed.

If evidence required by the specific PCR part B is not provided, this has to be justified under the respective title for the required evidence.

If relevant for the scope of application of the declared product, or if derivable from its material composition, it is recommended to provide additional adequate evidence.

## 8. References

**Standards**

**EN 15804**
EN 15804:2012+A1:2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

**EN 15804**
EN 15804:2012+A2:2019, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

**ISO 14025**
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

**Further References**

**Title of the software/database**
Title of the software/database. Addition to the title, version. Place: Publisher, Date of publication [Access on access date].

**IBU 2021**
Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021
www.ibu-epd.com

The literature referred to in the Environmental Product Declaration must be listed in full.

Standards already fully quoted in the EPD do not need to be listed here again.
The current version of PCR Part A and PCR Part B of the PCR document on which they are based must be referenced
.

**Publisher**
Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

**Programme holder**
Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Logo

Logo

**Author of the Life Cycle Assessment**
Name
Straße, Nr.
PLZ, Ort
Land

Tel Nummer
Fax Nummer
Mail e-mail
Web **Web-Adresse**

Name
Straße, Nr.
PLZ, Ort
Land

Tel Nummer
Fax Nummer
Mail e-mail
Web **Web-Adresse**

Logo

Logo

Logo

Logo

Logo

**Owner of the Declaration**
Name
Straße, Nr.
PLZ, Ort
Land

Tel Nummer
Fax Nummer
Mail e-mail
Web **Web-Adresse**

Name
Straße, Nr.
PLZ, Ort
Land

Tel Nummer
Fax Nummer
Mail e-mail
Web **Web-Adresse**

Name
Straße, Nr.
PLZ, Ort
Land

Tel Nummer
Fax Nummer
Mail e-mail
Web **Web-Adresse**

Name
Straße, Nr.
PLZ, Ort
Land

Tel Nummer
Fax Nummer
Mail e-mail
Web **Web-Adresse**

Name
Straße, Nr.
PLZ, Ort
Land

Tel Nummer
Fax Nummer
Mail e-mail
Web **Web-Adresse**

## Additional contents for the transmission of the EPD data set to the ÖKOBAUDAT system

**A: Technology description and included processes**
Description of the manufacturing process and specification of the processes and materials used.