

PRODUCT CATEGORY RULES FOR BUILDING RELATED PRODUCTS AND SERVICES

as per ISO 14025 and EN 15804+A2

for preparation of EPDs (Environmental Product Declarations)
according to the EPD programme of the BAU EPD GmbH

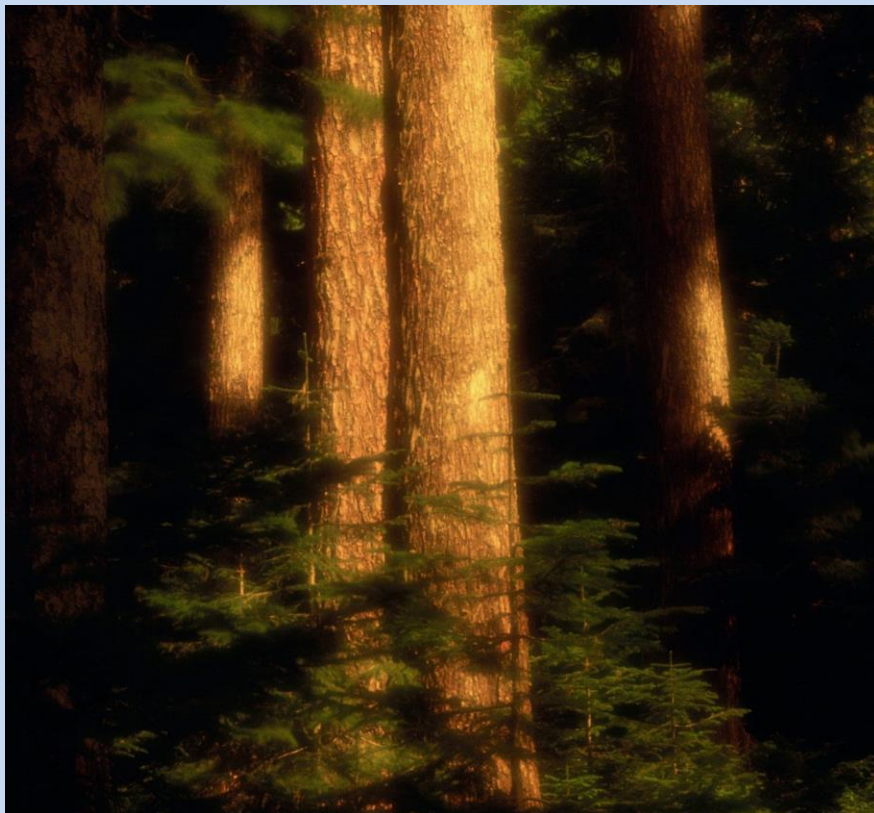


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Part B: Requirements on the EPD for Solid wood products

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A-1070 Vienna

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<http://www.bau-epd.at>

office@bau-epd.at

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1. Scope

This document contains the **Requirements on an Environmental Product Declaration (EPD)** as per EN 15804 and ISO 14025.

The document applies to:

- Solid wood, not technically dried $u > 20\%$ (e.g. sawn timber, not technically dried, building logs, not technically dried)
- Solid wood, technically dried $< 20\%$, one-piece (e.g. technically dried sawn timber, rough-sawn, leveled or planed, MH[®] MassivHolz, building logs, planks, formwork, window scantlings, solid wood parquet, mosaic parquet)
- Solid wood, technically dried $u < 20\%$, multi-piece, joined lengthwise (e.g. one-piece finger-jointed softwood, solid structural timber, KVH[®])
- Solid wood, technically dried $u < 20\%$, multi-part, joined in the longitudinal direction and glued in several layers (e.g. glued laminated timber, Duo-Balken[®] and Trio-Balken[®] (laminated beams), stacked board elements - dowel elements, laminated veneer lumber - S)
- Solid wood, technically dried $u < 20\%$, multi-part, joined lengthwise and glued crosswise (e.g. cross laminated timber, laminated veneer lumber-Q, multi-layer parquet made of solid wood).

The products mentioned consist of one-piece or multi-piece solid wood components made of forest wood or recycled wood, which were produced by sawing, chipping or cutting in the longitudinal direction of the fibres. The solid wood components can be glued together. Excluded from the PKR are products made from shavings, wood fibres or other small wood particles, for which the PKR “wood-based materials” applies.

The requirements on the EPD include:

- Requirements from EN ISO 14025
- Requirements on the EN 15804 standard as a European core EPD
- Requirements from EN 16485- Round and sawn timber - Environmental Product Declarations - Product category rules for wood and wood-based products for use in construction
- Requirements from EN 16449-Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
- Complementary requirements on EPD of Bau EPD GmbH

The calculation rules for the Life Cycle Assessment and Requirements on the project report are specified in a separate document – “Management System Handbook chapter 5” of Bau EPD GmbH.

Requirements on the layout of the EPD

Bau-EPD GmbH determines the following features with regard to the layout of the EPD:

- The document on hand defines the format template for EPD-document that is to fill in (Word file „Format template EPD Bau EPD GmbH“, download at www.bau-epd.at).
- The content of an EPD is not limited in length of text.
- The layout of the front page of the EPD is defined and picture material must be accorded with Bau EPD GmbH (not more than 4 MB).
- On the last page of the EPD the publishing institution as well as the programme operator (Bau EPD GmbH in both cases), the LCA practitioner and owner of the declaration must be indicated with a logo and full address (including telephone number, fax number, email and website).
- Generally the font „Calibri“ must be used.
- In addition to the EPD as Microsoft Word format an Excel-document (BAU EPD M-DOCUMENT 8- excel-file for electronic data transfer Editor baubook ECO Platform) must be created including the result tables for electronic transfer and complying to EN 15942 (ITM Matrix). The templates of Bau EPD GmbH must be used, for these tables also serve to forward data to database owners (ECO Platform/ECO Portal, OEKOBAUDAT and BAUBOOK).

Content of the EPD

The following format template respective guidance describes the required structure of the EPD document including the **required content for each individual chapter**.

In addition to that, this document is giving **specific notes for the creation of an EPD for solid wood** and **specific LCA calculation rules for solid wood** that must be considered when creating the EPD and underlying LCA study.

Parts of the content that are considered as additional information of optional character (=not required as per international standard and/or guidelines from ECO Platform) are marked in lilac colour. This information is free to choose whether to declare or not and indications can be delivered by the owner of the declaration on optional basis.

Legend:

- Blue:** required content for each chapter
- Turquoise:** specific requirements for EPD of materials from the scope of the PCR
- Green:** specific LCA rules for EPD of material from the scope of the PCR
- Violet:** additional information of optional character

EPD - ENVIRONMENTAL PRODUCT DECLARATION

As per ISO 14025 and EN 15804



| | |
|--------------------------|---|
| PUBLISHER | Bau EPD GmbH, A-1070 Wien, Seidengasse 13/3, www.bau-epd.at |
| PROGRAMME OPERATOR | Bau EPD GmbH, A-1070 Wien, Seidengasse 13/3, www.bau-epd.at |
| OWNER OF THE DECLARATION | Name of declaration owner |
| DECLARATION NUMBER | To be accorded with Bau EPD GmbH |
| ISSUE DATE | Date |
| VALID TO | Date |
| NUMBER OF DATASETS | Number |

Name and description of product

Name of declaration owner

picture

To be accorded with declaration owner
and Bau EPD GmbH

(Note: photographic rights must be
clarified and cited)

Company logo of
declaration owner

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1. General information

| | |
|--|---|
| <p>Product name Name and description of product</p> | <p>Declared Product / Declared Unit Description of the declared product and declared unit/functional unit</p> |
| <p>Declaration number To be accorded with Bau EPD GmbH</p> | <p>Number of datasets in EPD Document(s): XX</p> |
| <p>Declaration data <input type="checkbox"/> Specific data <input type="checkbox"/> Average data</p> | <p>Range of validity The products considered in the data of the life cycle assessment and for which the declaration applies must be named.</p> |
| <p>Declaration based on: MS-HB version dated dd.mm.yyyy: Name of PCR PCR Code Version (PCR tested and approved by the independent expert committee = PKR-Gremium) The owner of the declaration is liable for the underlying information and evidence; Bau EPD GmbH is not liable with respect to manufacturer information, life cycle assessment data and evidence.</p> | <p>In the case of an average EPD, this type of EPD must be pointed out. The representativeness of the declaration must be shown with regard to the production volume covered by the life cycle assessment and the technology used. Likewise, the range of fluctuation of the product group considered, must be specified in the interpretation.</p> |
| <p>Type of Declaration as per EN 15804 From cradle to LCA-method: (i.e. Cut-off by classification)</p> | <p>Database, Software, Version Declaration of background database, Software used and both its versions</p> |
| <p>Author of the Life Cycle Assessment Name of the author Institution, Address website</p> | <p>The CEN standard EN 15804:2014+A1 serves as the core-PCR. Independent verification of the declaration according to ISO 14025:2010 <input type="checkbox"/> internally <input checked="" type="checkbox"/> externally Verifier 1: Name Verifier 2: Name</p> |
| <p>Owner of the Declaration Name of the manufacturer/owner Institution, Address website</p> | <p>Publisher and Programme Operator Bau EPD GmbH Seidengasse 13/3 1070 Vienna Austria</p> |

DI (FH) DI DI Sarah Richter
Managing director Bau EPD GmbH

DI Dr. sc ETHZ Florian Gschösser/ N.N.
chairperson/vice chairperson of expert committee (PCR-Gremium)

Academic Title Name
Verifier

Academic Title Name,
Verifier

Note: EPDs from similar product groups from different programmes might not be comparable.

2. Product

2.1 General product description

For the product description the characteristics of the declared product must be described. In case of average EPD (“sector or branch” EPD) all declared products must be described separately.

Indications for the general product description:

- Separate description of products/materials for each product standard applicable, citing the product types and names.
- Description of characteristic components.
- All factory locations for the respective product categories must be declared, alternatively a reference can be made to an overview in an appendix (mandatory information in the project report, voluntary information in the EPD document)

Specific notes for the creation of an EPD for solid wood:

- Explanation based on an example:
- The declared product is, for example, a beam with the following dimensions..., one m² of solid wood wall with a wall thickness of....

2.2 Application field

The use and application purpose of the named products are to specify. The individual applications (including functions) must be declared as a text or table format.

Specific notes for the creation of an EPD for solid wood:

The intended use of the products mentioned must be specified, with the individual applications and the functions of the wood product (statically load-bearing, facing, shaping, decoration...) being specified in text or tables.

2.3 Standards, guidelines and regulations relevant for the product

The respective standard and/or general technical approval or comparable national regulation can be indicated.

Optional: Documentation under the frame of CE -certification such as certificates of constancy of performance, certificates of conformity of the internal production control on the manufacturer’s site, Declarations of performance, Official certificates of registration, European Technical Assessments or Technical permissions of construction industry can be cited.

Specific notes for the creation of an EPD for solid wood:

The standards regulating solid wood must be cited (i.e. standards, guidelines, other regulations)

Examples for product standards for solid wood in Austria are illustrated in table 1.

Table 1: Product specific standards

| Standard | Title |
|--------------------------|---|
| ÖN EN 13986:2015 06 01 | Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking |
| ÖN EN 13964:2014 09 15 | Suspended Ceilings - <i>Requirements</i> and Test Methods |
| ÖN EN 14081-1 2011-03-01 | Timber Structures - Strength-graded structural timber of rectangular cross-section |

2.4 Technical data

For products carrying a CE marking as per Construction Products Regulation (CPR) the EPD must declare at least the same technical data as required and indicated in the declaration of performance of the manufacturer. What kind of data is required in each individual case is to learn from the document underlying the CE marking: any Harmonized European Standard or European Technical Assessment (ETA).

Additional technical data must be listed if relevant for product distinction or specification.

Specific notes for the creation of an EPD for solid wood:

Product designation codes of the declared products must be given.

If relevant for the declared product, the following technical construction data in the delivery status must be provided with reference to the testing standard.

Table 2: Technical data of the declared construction product (Table normative, only relevant data for the specific data must be declared)

| Characterization | Value | Unit |
|---|-------|-------------------|
| Types of wood according to trade names according to ÖNORM B 3012 | | - |
| Wood moisture according to ÖNORM EN 13183-1 or -2 | | % |
| Use of wood preservatives (the test rating of the wood preservatives according to ÖNORM B 3802-2 must be specified) | | - |
| Compressive strength parallel to the current product standard or ETB | | N/mm ² |
| Compressive strength at right angles according to the current product standard or ETB | | N/mm ² |
| Tensile strength parallel to the current product standard or ETB | | N/mm ² |
| Tensile strength perpendicular to current product standard or ETB | | N/mm ² |
| Modulus of elasticity according to the current product standard or ETB | | N/mm ² |
| Shear strength according to the current product standard or ETB | | N/mm ² |
| Shear modulus according to the current product standard or ETB | | N/mm ² |
| dimensional deviation | | mm |
| Length (min - max) | | m |
| Width (min - max) | | m |
| Height (min - max) | | m |
| Density load-bearing components according to ÖNORM EN 338, non-load-bearing components according to ÖNORM B 3012 | | kg/m ³ |
| Surface quality (possible forms are to be named) | | - |
| Hazard class according to ÖNORM B 3802-2 | | - |
| Thermal conductivity according to ÖNORM EN ISO 10456 | | W/(mK) |
| Specific heat capacity according to ÖNORM EN ISO 10456 | | kJ/kgK |
| Rated thermal conductivity | | W/(mK) |
| Water vapor diffusion equivalent air layer thickness according to ÖNORM EN ISO 10456 | | m |
| Water vapor diffusion resistance number according to ÖNORM EN ISO 10456 | | - |

For specific EPD the technical data of the product must be declared as required in Table 2.

For average EPD (“Sector or Branch-EPD”, “Group EPD” or “EPD from Associations”) Table 2 must be filled, average values or ranges are accepted, in addition a note stating „see product sheets“ pointing to single technical product sheets can be cited. Technical data must be provided by the manufacturers. The manufacturers are to ensure that the relevant data are accessible, and the LCA-practitioner must indicate the sources where the technical data can be downloaded.

In this case the average value of nominal density/ weight per m² used for calculating the LCA must be declared as an additional information in chapter 3.1.

2.5 Basic/auxiliary materials

The product components and/or contents and ingredients must be declared in mass-% to enable the user of the EPD to understand the composition and structure of the product in delivery status. These indications shall also support security and efficiency in installation, use and disposal of the product.

The declaration of mass-% can be accurate numbers or a range by analogy with REACH¹. The mass of components that make up less than 1 mass-% of the total product mass can be declared with < 1 mass-%.

The declaration of material product content must list at least those substances contained in the product which are included in the “Candidate List of Substances of Very High Concern for Authorization” where their contents exceed the limit values (0.1 mass-% on product level) for registration by the European Chemicals Agency (ECHA²). If substances and preparations lose their hazardous features during manufacturing (e.g. after a complete chemical reaction) they are exempted from the obligation of declaration.

If the content of the material is below the limit of ECHA the following note must be stated in the EPD:

„The content of XXXX is below the limit values of the registration by the European Chemicals Agency (ECHA). Interpreting statements such as “... free of ...” or “... are entirely harmless ...” are not permissible.

The product components must be described in detail, so that their sort of product is clear, but the protection of sensitive data is assured, and company secrets are not revealed.

For additives, the function and substance class respective chemical group (i.e. hydraulic binders) must be stated. In addition to that all auxiliary materials and additives that stay within the product must be declared.

Specific notes for the creation of an EPD for solid wood:

The raw materials must be declared.

Auxiliaries and additives that remain with the product must also be declared. In particular surface coatings and water repellents.

For additives such as fire retardants or wood preservatives, at least the function and the substance class (e.g. borate-based fire retardants) must be specified.

Table 3: base materials in mass-% (example)

| Components | Function | Mass fraction in percent |
|-------------------------------|------------------------|--------------------------|
| Designation ¹⁾ | i.e. Hydrophobic agent | |
| Solid wood beam ²⁾ | Load bearing element | |
| | | |

Optional: footnote with description for each component

Auxiliaries / additives

Specifications and proportions of excipients are to be stated (in text or tabular format)

2.6 Production

The process of production must be described and illustrated with a simple figure (i.e. flow chart). In case of average EPD the production processes of all sites must be described respective a useful summary must be included and a list of all production sites must be provided in an annex. Quality management systems, eco management systems etc. can be referred to.

Specific notes for the creation of an EPD for solid wood:

Origin and proportion of the raw materials, manufacturer-specific and special process chains, special processing methods.

¹ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

² European Chemicals Agency: <http://echa.europa.eu/de>

Figure 1: Example of a flow chart/graphic production stage

Description of chart

2.7 Packaging

Information concerning each component of packages:

Type (Foil, pallets, etc.),
Material (Paper, Polyethylene; including origin, e.g. recycled paper) and
Possibilities of reuse (e.g. multi way pallets).

Specific notes for the creation of an EPD for solid wood:

Example: As a rule, solid wood products are delivered loose (without packaging material) but sometimes with squared timber or pallets as a stacking aid and with fastening straps for bundling.

2.8 Conditions of delivery

Written description of conditions of delivery, units of delivery, size and dimension as well as requirements on storage important for the declared product(s).

2.9 Transport

Description of delivery (Route and means of transport).

2.10 Processing/ installation

Description of way of treatment, used machines, tools, dust collection etc., auxiliary materials as well as measures of noise reduction. Notes regarding recognized rules of engineering, work safety or protection of the environment can be included. References to detailed processing directives and referrals to user safety (safe use instruction sheets) of the manufacturer are required.

Specific notes for the creation of an EPD for solid wood:

The installation or installation of solid wood materials depends on the planned application and the respective product characteristics. References to detailed processing guidelines and information on safe processing from the manufacturer are possible.

2.11 Use stage

Notes describing specific features of the material composition relevant for the use stage.

Specific notes for the creation of an EPD for solid wood:

The service life of load-bearing solid wood products is not limited if used professionally according to current scientific knowledge and corresponds to the service life of the components or the building. The load-bearing function of the wood product remains unrestricted over its useful life if it is properly and professionally installed and used without problems.

Solid wood products that are not load-bearing can be expanded at any time for economic, aesthetic, usage-related, etc. reasons.

2.12 Reference service life (RSL)

The indication 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 ("from cradle to grave").

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 harmonized European product standards, such data has priority.

The assumption underlying the calculation of the RSL and for those only the RSL can be declared must be stated. Influence on aging as per recognized rules of engineering.

Table 4: Reference service life (RSL)

| Characterization | value | unit |
|--|-------|------------------|
| Load bearing solid wood products | | years |
| Non-load bearing solid wood products | | years |
| | | |
| Differentiation indoor and outdoor etc. so relevant | | years |
| Reference conditions on which the RSL is based (if relevant) | | Individual units |

See EN 15804+A2 clause 6.3.4 and Annex A requirements and guidelines for reference service life

If no reference service life can be determined according to the rules of EN 15804+A2 (Annex A), a default value from a complementary PCR of the CEN/TC product committees, if available, must be used. If no complementary PCR is available, the service life can be declared from service life catalogues, depending on the area of application, stating the source, e.g. according to BAU EPD-M-DOKUMENT-20-Reference-usage-times-20150810 (Austria) or the BBSR table "Useful lives of components on life cycle analysis according to BNB" (Germany). If no information can be found there, the RSL can be derived from other sets of regulations (Eurocodes, other basis).

Note:

The actual service life of a solid wood product depends on many influencing factors. Studies have shown that, depending on whether and how wooden products are exposed to the weather, the service life can deviate from the average values mentioned and must be determined in scenarios according to ISO 15686. Building balancers are required to consider the context of the wood product within the component or the entire building construction.

2.13 Reuse and recycling

Possibilities and scenarios of reuse and recycling must be described.

2.14 Disposal

The different ways of disposal must be described.

The EAK-waste disposal code (Disposal code following the European list of waste) must be declared.

2.15 Further information

Optional details, indication of reference source for additional information, e.g. websites...

3. LCA: Calculation rules

3.1 Declared unit/ Functional unit

The declared resp. functional unit, the mass reference and the conversion factor to 1 kg must be declared in a table.

Specific LCA calculation rules for solid wood:

The declared unit is 1 m³. Alternatively, 1 m² can be declared for flat materials or a meaningful functional unit must be specified for cradle-to-grave EPDs (1 m² is usually suitable). The moisture in the delivery condition must be specified. In the case of the bonded products, the mix of adhesives available on the market (sector EPD) or specific data must be taken into account. The chosen approach must be documented. In the case of non-glued connections, the type of connection must be declared. The reference to mass (density or weight per unit area) must be specified.

Table 5: Declared unit/Functional unit 1 m³

| characterization | value | unit |
|---|-------|-------------------|
| declared unit | 1 | m ³ |
| Wood moisture or moisture content on delivery | | % |
| gross density for conversion into kg | | kg/m ³ |

Table 6: Declared unit/Functional unit 1 m²

| characterization | value | unit |
|---|-------|----------------|
| Deklarierte Einheit/Funktionale Einheit | 1 | m ² |
| Wood moisture or moisture content on delivery | | % |
| Layer thickness | | m |
| Grammage for conversion into kg | | - |

If average results of different products are declared, the methods of calculating the average values must be explained. In this case the average value of nominal density/ weight per unit used for calculating the LCA must be declared as an additional information.

3.2 System boundary

The type of EPD with regard to the applied system boundaries must be specified in the EPD. All building products and materials must declare modules A1-A3, modules C1-C4 and module D. The following EPD types may be specified:

- from the cradle to the factory gate with modules C1-C4 and module D (A1-A3 + C + D);
- from the cradle to the factory gate with options, modules A1-A3, C1-C4 and D (A1-A3 + C + D and additional modules. The additional modules may be one or more modules selected from A4 to B7);
- from cradle to grave and module D (A + B + C + D)

Exceptions to this rule are specified in EN 15804+A2, chapter 5.2.

Note: The specifications for the modules that must be declared no longer correspond to ÖNORM EN 16783:2017 - the specifications from EN 15804:2019+A2 apply primarily.

All declared life cycle stages (modules) are to be marked with an "X" in Table 7. Undeclared modules are to be marked with ND (= not declared).

Table 7: Declared life cycle stages

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

X = included in LCA; MND = Module not declared

The modules assessed in the LCA study must be described shortly. It should be made apparent, which processes are calculated in which module and how the system boundaries to nature resp. to other product systems are set (if relevant for the declared product).

If not all modules are declared in an EPD, a clear justification must be given.

Specific LCA calculation rules for solid wood:

A1-A3

Accounting of secondary raw materials:

- o Recycled wood from other production companies is subject to the allocation rules of the general guideline for life cycle assessment.
- o Recycled wood that is obtained from recycling companies or directly from the place where it occurs must be accounted for as a pollution-free product (without allocation from the previous product life). The carbon content (balancing the bound CO₂) and energy content (based on net calorific value) of the recycled wood is included in the new product system. The transport from the point of origin to the production site and any reprocessing steps must be accounted for.

Co-product allocation:

Co-products (saw by-products such as wood chips, bark, sawdust) and their material flows, which cannot be calculated from the production data, are subject to the allocation rules of the general guideline for the life cycle assessment according to EN16485, -i.e. if the difference in the revenues of the main product and the co-product is less than 25%, an allocation based on physical variables must be carried out. The correct assignment of the loads of the product system to the co-products with regard to the respective functional unit (equivalent co-products) is thus guaranteed. If the difference in the revenues of the main product and the co-product is more than 25%, an economic allocation must be made. The correct assignment of the loads of the product system to the co-products with regard to the respective declared unit (co-products have different values in terms of their benefit) is thus guaranteed. Material flows that contain specific material-inherent properties such as energy content, elementary composition (e.g. biogenic carbon content) should always be allocated in such a way that the physical flows are mapped independently of the allocation method selected for the process.

Note: According to EN 16485, contributions to the total revenue of the product system of the order of 1% or less are classified as very small and can therefore be neglected (cut-off). The correct representation of the physical properties of the product (e.g. carbon content, primary energy content) must be ensured in any case and adjusted accordingly if necessary.

Example 1: A product system generates a main product and a co-product. The main product has a revenue of 100 €/t and the by-product 76 €/t, so this results in a difference in revenue related to the main product of 24 €/t, which corresponds to 24%. This is classified as a high influence of the co-product on the overall system and the allocation is therefore based on physical variables.

Example 2: A product system generates a main product and a co-product. The main product has a revenue of 100 €/t and the by-product 25 €/t, so this results in a difference in revenue related to the main product of 75 €/t, which corresponds to 75%. This is classified as a minor influence of the co-product on the overall system and the allocation is therefore based on economic variables.

A4-A5

Minimum requirements for material losses

Transport: Material losses are negligible.

- Installation:

- In the load-bearing area, solid wood products can usually be viewed as prefabricated parts (wall and ceiling constructions as well as roof trusses). Waste during the construction phase is negligible.
- With roof battens, facade cladding or decor, there is more waste during installation. A realistic material loss must be specified for the product and application.

B1-B7

B1 to B3 are not relevant for the product. The stage B4 replacement is equivalent to the product end of life.

C1 - C4 und D

When balancing the disposal phase in module C1-C4, scenarios for thermal utilization and, if possible, other relevant scenarios (e.g. for recycling and/or reuse) must be described.

Note: Basically, the dumping of wood and wood-based materials in Austria is prohibited according to DepV. However, there are exceptions for individual materials. The corresponding scenario is to be calculated for these.

3.3 Flow chart of processes/stages in the life cycle

A meaningful flow chart describing the manufacturing process shall give further aid to comprehension. The flow chart must be subdivided at least into the phases of life cycle declared (production, use, end-of-life). The phases can be partitioned into appropriate process stages.

3.4 Estimations and assumptions

The assumptions and assessments that are important for the interpretation of the life cycle assessment are to be listed here.

3.5 Cut-off criteria

The application of cut-off criteria must be documented here according to PCR-part A „General Rules for LCA assessment and requirements on the project report“.

3.6 Data sources

The quality of the collected data must be described.

3.7 Data quality

The sources of the background data sets must be declared. If necessary, additional information on the quality of the used data sets shall be made (estimations). The issuing year of the used data material must be indicated.

3.8 Reporting period

The period under review must be documented (in case of average EPD this would be the basis of the calculated average).

3.9 Allocation

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

- System boundary settings/allocation in the use of recycled and/or secondary raw materials
- Allocation concerning co-products
- Allocation of energy, auxiliary and operating materials used for individual products in a factory
- Loads and credits from recycling or energy recovery of packaging materials and production waste
- Loads and credits 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.

Detailed regulations concerning calculation of secondary materials and allocation MS-HB chapter “LCA rules” apply in all studies.

Specific LCA calculation rules for solid wood:

According to ÖNORM EN 16485, all environmental impacts are assigned to the different types of wood, taking into account the yield. Further measures can then be assigned to the assortments that go through the processes

3.10 Comparability

With reference to comparability of EPD data the following facts must be mentioned:

Comparison or benchmarking of EPD data is only possible, if all compared data sets are calculating following EN 15804, the same programme specific PCR-rules or other additional rules. The same background data sources and software versions must be applied. Moreover, the context of the function in the building or product specific features of performance must be considered.

4. LCA: Scenarios and additional technical information

The following information is mandatory to give for all declared modules, for modules not declared it is optional. If need, additional information can be declared.

4.1 A1-A3 product stage

Following EN 15804 no scenario documentation is required for A1-A3 for the declaration and calculation of these modules lies within the responsibility of the manufacturer and must not be altered by the LCA practitioner.

Note: the masses of packaging per declared unit must be indicated, this is especially important if A5 is not declared.

Specific LCA calculation rules for solid wood:

The forest with its diverse functions is outside the product system. The system boundary must be set in such a way that those processes that provide material and energy flows into the system are within (ÖNORM EN 16485, 6.3.4.2). No or a positive change in the C content in the pool is assumed for sustainably managed forests.

All forestry processes associated with timber harvesting, such as thinning, afforestation, etc. are considered to be within the product system. The extraction of biomass for energy purposes is seen as independent of the wood harvest for material use and outside of the product system.

For the balancing of the wood system, the carbon content of the wood taken from the forest at the system entry is calculated negatively (given as CO₂, which was removed from the atmosphere by the wood during the course of growth), but the energy content (net calorific value) as a material property is calculated positively. Energy content and biogenic carbon are considered as material properties (ÖNORM EN 16485, 6.3.4.2). The flows leaving the system are calculated accordingly at the system boundary - the biogenic carbon is calculated positively as the release of carbon dioxide (in the case of thermal use as an emission in Module C, otherwise as a material release), the

energy content used is calculated as the output of renewable final energy (can be calculated in Module D be taken into account (ÖNORM EN 16485, Fig. 1.)).

4.2 A4-A5 Construction process stage

Table 9 and the units listed must be used for calculation the environmental impact of the transport phase.

Table 10 and the units listed must be used for calculation the environmental impact of the installation into the building.

Table 8: Description of the scenario „Transport to building site (A4)“

| Parameters to describe the transport to the building site (A4) | Quantity per unit |
|---|-------------------|
| Average transport distance | km |
| vehicle type, Commission Directive 2007/37/EC (European Emission Standard) | - |
| Fuel type and average consumption of vehicle | l/100 km |
| Maximum transport mass | tons |
| Capacity utilisation (including empty returns) | % |
| Bulk density of transported products | kg/m ³ |
| Volume capacity utilisation factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products) | - |

^{x)} The table must be filled with reference to the information available from the datasets used (i.e. in case of transport by ship). The datasets used must be noted in a footnote.

Table 9: Description of the scenario „Installation of the product in the building (A5)“ as per table 8 in ÖNORM EN 15804

| Parameters to describe the installation of the product in the building (A5) | Quantity per unit |
|--|---------------------------------|
| Ancillary materials for installation (specified by material); | Meaningful unit |
| Water use | m ³ |
| Other resource use | kg |
| Electricity demand | kWh or MJ |
| Other energy carrier(s): | kWh or other unit (e.g. litres) |
| Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type) | kg |
| Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route) | kg |
| Direct emissions to ambient air, soil and water | kg |

4.3 B1-B7 use stage

Reference Service life: [a]

The parameters and the units listed in the following tables must be used for calculation the environmental impact of the use stage (B2-B7). The tables can be excluded if no input or output happens. In this case a note of explanation would be sufficient: "In module BX-BY no material resp. mass flows occur, input +/- output = 0

Table 10: Description of the scenario „maintenance (B2)“ based on table 9 in EN 15804

| Parameters maintenance (B2) | value | unit |
|--|-------|--|
| Maintenance process | | Description or source where description can be found |
| Maintenance cycle | | Number per RSL or year ^a |
| Ancillary materials for maintenance, e.g. cleaning agent, specify materials | | Kg/cycle |
| Waste material resulting from maintenance (specify materials) | | kg |
| Net fresh water consumption during maintenance | | m ³ |
| Energy input during maintenance, e.g. vacuum cleaning, energy carrier type, e.g. electricity, and amount, if applicable and relevant | | kWh |

Table 11: Description of the scenario „repair (B3)“

| Parameters repair (B3) | value | unit |
|--|-------|--|
| Repair process | | Description or source where description can be found |
| Inspection process | | Description or source where description can be found |
| Repair cycle | | Number per RSL or year |
| Ancillary materials, e.g. lubricant, specify materials | | Kg or kg/cycle |
| Waste material resulting from repair, (specify materials) | | kg |
| Net fresh water consumption during repair | | m ³ |
| Energy input during repair, e.g. crane activity, energy carrier type, e.g. electricity, and amount | | kWh |

Table 12: Description of scenario „replacement (B4)“

| Parameters replacement (B4) | value | unit |
|--|-------|------------------------|
| Replacement cycle | | Number per RSL or year |
| Energy input during replacement e.g. crane activity, energy carrier type, e.g. electricity and amount if applicable and relevant | | kWh |
| Exchange of worn parts during the product’s life cycle, e.g. zinc galvanised steel sheet, specify materials | | kg |
| | | |

Table 13: Description of scenario „refurbishment (B5)“

| Parameters refurbishment (B5) | value | unit |
|--|-------|--|
| Refurbishment process | | Description or source where description can be found |
| Refurbishment cycle | | Number per RSL or year |
| Energy input during refurbishment e.g. crane activity, energy carrier type, e.g. electricity, and amount if applicable and relevant | | kWh |
| Material input for refurbishment, e.g. bricks, including ancillary materials for the refurbishment process e.g. lubricant, (specify materials) | | kg or kg / cycle |
| Waste material resulting from refurbishment (specify materials) | | kg |
| Further assumptions for scenario development, e.g. frequency and time period of use, number of occupants | | Units as appropriate |

Table 14: Description of scenarios „energy (B6)“ resp. „Water (B7)“

| Parameters energy (B6) and water (B7) | value | unit |
|--|-------|-----------------------|
| Ancillary materials, e.g. lubricant, specify materials | | Kg or kg/cycle |
| Net fresh water consumption | | m ³ |
| Type of energy carrier, e.g. electricity, natural gas, district heating | | kWh or m ³ |
| Power output of equipment | | kW |
| Characteristic performance, e.g. energy efficiency, emissions, variation of performance with capacity utilisation etc. | | units as appropriate |
| Further assumptions for scenario development, e.g. frequency and period of use, number of occupants | | units as appropriate |

Specific LCA calculation rules for solid wood:

Specification of the use (B1) according to chap. 3.6.3 Use Phase. The carbon stored in the usage phase, calculated according to ÖNORM EN 16449, can be specified as storage of CO₂eq for the duration of the reference usage period as technical information.

For built-in products, any effects of the life cycle phases B1-B7 on the life cycle assessment of the product must be specified. Maintenance, cleaning and other surface treatment, etc. should be mentioned here.

Modules B6 and B7 are not relevant to the product.

4.4 C1-C4 End-of-Life stage

Short description of processes concerning disposal and scenarios going with that (i.e. for transport).

Specific LCA calculation rules for solid wood:

Brief description of the disposal process and the assumed scenarios (e.g. for transport). If the disposal phase is accounted for, at least one scenario must include landfill if this corresponds to standard waste management practice or legislation. Further scenarios for recycling can be created.

The flows leaving the system are accordingly offset at the system boundary – the biogenic carbon is counted positively as carbon dioxide emissions (if the material is landfilled, the whereabouts of the biogenically bound carbon in the landfill must be treated as an emission from the technosphere into the natural environment.)

If waste wood is used, the CO₂ bound in the waste wood must be taken into account on the input side with the corresponding negative GWP; the energy content (net calorific value) is accounted for as consumption of "energy from secondary materials".

However, if the waste end is reached through processing processes (secondary raw materials or fuels), the processing processes required for this are to be calculated in C3, but the actual recycling processes and their loads lie outside the product system. In both cases, credits for the provided energy or secondary raw materials are possible in Germany.

The charging of disposal methods is shown in Table 1 of ÖNORM EN 16485 for comparison.

Table 15: Description of the scenario „Disposal of the product (C1 to C4)“ according to table 12 in EN 15804

| Parameters for End-of-Life stage (C1-C4) | value | Quantity per m ³ insulation material |
|---|-------|---|
| Collection process specified by type | | kg collected separately |
| | | kg collected with mixed construction waste |
| Recovery system specified by type | | kg for re-use |
| | | kg for recycling |
| | | kg for energy recovery |
| Disposal specified by type | | kg product or material for final deposition |
| Assumptions for scenario development, e.g. transportation | | Appropriate units |

4.5 D Potential of reuse and recycling

Short description of assumptions for reuse-, recover- and recycling processes.

Specific LCA calculation rules for solid wood:

The reuse, recovery and recycling potential must be offset in accordance with ÖNORM EN 16485.

For the provision of secondary raw materials, the credit is based on the provision effort of the substituted raw material, e.g. wood chips from waste wood replace the production of wood chips from fresh material (for the production of wood chips, the effort must be used according to the existing market mix, because if only 50% of wood chips are available on the market consist of waste wood, only 50% fresh wood is replaced in the factory.). The alternative provision of gas should be used for thermal energy generated, and the national energy mix for electricity generated. In the case of a defined incineration plant (e.g. return and energy generation in your own company), it is possible to use the operational energy source mix as a basis if the mix can be verified over several years.

Table 16: Description of the scenario „re-use, recovery and recycling potential (module D)“

(Substituted primary materials resp. technologies must be declared in a separate footnote (including technical information).)

| Parameters for module D | value | unit |
|---|-------|-----------------|
| Materials for reuse, recovery or recycling from A4-A5 | | % |
| Energy recovery or secondary fuels from A4-A5 | | MJ/t resp. kg/t |
| Materials for reuse, recovery or recycling from B2-B5 | | % |
| Energy recovery or secondary fuels from B2-B5 | | MJ/t resp. kg/t |
| Materials for reuse, recovery or recycling from C1-C4 | | % |
| Energy recovery or secondary fuels from C1-C4 | | MJ/t resp. kg/t |

5. LCA: results

The declaration of environmental indicators must be listed in the following tables with reference only to the declared life cycle stages. Indicator values should be declared with three valid digits (eventually exponential form (e.g. 1.23E-5 = 0.0000123)). A uniform format should be used for all values of one indicator. It is preferred that the definitions of the environmental indicators are spelled out completely to ensure the best possible readability. If space is needed in case of too many columns the defined abbreviations are accepted.

Table 17: Parameters to describe the environmental impact of mineral insulating products per declared/functional unit

| Parameter | unit | A1-A3 | A4 | A5 | B1 | B2 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|------------------|--|-------|----|----|----|----|----|----|----|----|----|----|----|---|
| GWP total | kg CO ₂ eq. | | | | | | | | | | | | | |
| GWP fossil fuels | kg CO ₂ eq. | | | | | | | | | | | | | |
| GWP biogenic | kg CO ₂ eq. | | | | | | | | | | | | | |
| GWP luluc | kg CO ₂ eq. | | | | | | | | | | | | | |
| ODP | kg CFC-11 eq. | | | | | | | | | | | | | |
| AP | mol H ⁺ eq. | | | | | | | | | | | | | |
| EP freshwater | kg PO ₄ ³⁻ eq. | | | | | | | | | | | | | |
| EP marine | kg N eq. | | | | | | | | | | | | | |
| EP terrestrial | mol N eq. | | | | | | | | | | | | | |
| POCP | kg NMVOC eq. | | | | | | | | | | | | | |
| ADPE | kg Sb eq. | | | | | | | | | | | | | |
| ADPF | MJ H _u | | | | | | | | | | | | | |
| WDP | m3 Welt eq. entz. | | | | | | | | | | | | | |
| Legende | GWP = Global warming potential; luluc = land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP = Eutrophierungspotenzial; 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, deprivation-weighted water consumption | | | | | | | | | | | | | |

Table 18: Additional environmental indicators

| Parameter | Unit | A1-A3 | A4 | A5 | B1 | B2 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|-----------|--|-------|----|----|----|----|----|----|----|----|----|----|----|---|
| PM | disease incidence | | | | | | | | | | | | | |
| IRP | kBq U235 eq. | | | | | | | | | | | | | |
| ETP-fw | CTUe | | | | | | | | | | | | | |
| HTP-c | CTUh | | | | | | | | | | | | | |
| HTP-nc | CTUh | | | | | | | | | | | | | |
| SQP | dimension-less | | | | | | | | | | | | | |
| Legende | PM = Potential incidence of disease due to Particulate Matter emissions; IRP = Potential Human exposure efficiency relative to U235; ETP-fw = Potential Comparative Toxic Unit for ecosystems; HTP-c = Potential Comparative Toxic Unit for humans – cancer effect; HTP-nc = Potential Comparative Toxic Unit for humans – non-cancer effect; SQP = Potential soil quality index | | | | | | | | | | | | | |

Table 19: Parameters to describe the use of resources of mineral insulating products per declared/functional unit

| Parameter | unit | A1-A3 | A4 | A5 | B1 | B2 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|-----------|---|-------|----|----|----|----|----|----|----|----|----|----|----|---|
| PERE | MJ, net calorific value | | | | | | | | | | | | | |
| PERM | MJ, net calorific value | | | | | | | | | | | | | |
| PERT | MJ, net calorific value | | | | | | | | | | | | | |
| PENRE | MJ, net calorific value | | | | | | | | | | | | | |
| PENRM | MJ, net calorific value | | | | | | | | | | | | | |
| PENRT | MJ, net calorific value | | | | | | | | | | | | | |
| SM | kg | | | | | | | | | | | | | |
| RSF | MJ, net calorific value | | | | | | | | | | | | | |
| NRSF | MJ, net calorific value | | | | | | | | | | | | | |
| FW | m³ | | | | | | | | | | | | | |
| Legend | PERE = Renewable primary energy as energy carrier; PERM = Renewable primary energy resources as material utilization; PERT = Total use of renewable primary energy resources; PENRE = Non-renewable primary energy as energy carrier; PENRM = Non-renewable primary energy as material utilization; 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 fresh water | | | | | | | | | | | | | |

contains restrictions that must be declared according to the following classification in the project report and in the EPD with regard to the declaration of relevant core and additional environmental impact indicators.

Table 20 contains restrictions that must be declared according to the following classification in the project report and in the EPD with regard to the declaration of relevant core and additional environmental impact indicators.

Table 20: Classification of disclaimers to the declaration of core and additional environmental impact indicators

| ILCD-classification | Indicator | Disclaimer |
|--|---|------------|
| ILCD-Type 1 | GWP Global Warming Potential | none |
| | ODP Ozone Depletion Potential | none |
| | PM Particulate Matter | none |
| ILCD-Type 2 | Acidification potential, Accumulated Exceedance (AP) | none |
| | Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater) | none |
| | Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine) | none |
| | Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | none |
| | Formation potential of tropospheric ozone (POCP) | none |
| | Potential Human exposure efficiency relative to U235 (IRP) | 1 |
| ILCD-Type 3 | Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) | 2 |
| | Abiotic depletion potential for fossil resources (ADP-fossil) | 2 |
| | Water (user) deprivation potential, deprivation-weighted water consumption (WDP) | 2 |
| | Potential Comparative Toxic Unit for ecosystems (ETP-fw) | 2 |
| | Potential Comparative Toxic Unit for humans (HTP-c) | 2 |
| | Potential Comparative Toxic Unit for humans (HTP-nc) | 2 |
| | Potential Soil quality index (SQP) | 2 |
| Disclaimer 1 – 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 – 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. | | |

Table 21: Parameters describing LCA-output flows and waste categories of mineral insulating products per declared/functional unit

| Parameter | unit | A1-A3 | A4 | A5 | B1 | B2 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|-----------|---|-------|----|----|----|----|----|----|----|----|----|----|----|---|
| HWD | kg | | | | | | | | | | | | | |
| NHWD | kg | | | | | | | | | | | | | |
| RWD | kg | | | | | | | | | | | | | |
| CRU | kg | | | | | | | | | | | | | |
| MFR | kg | | | | | | | | | | | | | |
| MER | kg | | | | | | | | | | | | | |
| EEE | MJ | | | | | | | | | | | | | |
| EET | MJ | | | | | | | | | | | | | |
| Legend | 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 electric energy; EET = Exported thermal energy | | | | | | | | | | | | | |

Table 22: Information for description biogenic carbon content at factory gate

| Biogenic carbon content | unit |
|--|------|
| Biogenic carbon content in the product | kg C |
| Biogenic carbon content of packing | kg C |
| Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO ₂ | |

If the mass of biogenic carbon containing materials in the product is less than 5 % of the mass of the product, the declaration of biogenic carbon content may be omitted.

If the mass of biogenic carbon containing materials in the packaging is less than 5 % of the total mass of the packaging, the declaration of the biogenic carbon content of the packaging may be omitted.

6. LCA: Interpretation

For better understanding of the LCA, the aggregated indicators of the inventory analysis as well as those of the impact assessment (LCIA) from chapter 5 must be interpreted in a dominance analysis. The interpretation must describe a range resp. variance of LCIA results, if the EPD is valid for more than one product.

It is recommended to illustrate the results with graphic elements (i.e. the dominance analysis showing distribution of environmental impacts over several modules...)

When declaring average products, the range of possible results for the individual products for the main impact categories that are relevant to the materials used must be specified.

As for module D, the interpretation must declare, that the benefits and loads lie beyond the system boundary. Any graphic elements showing result interpretation of the life cycle must be created in a way, that modules A1-C4 and module D are displayed separate picture elements. Alternatively, the results can be interpreted without graphic elements.

Extension of an EPD:

It is mandatory to declare in a separate block in the project report:

Reasons for deviations of results of single indicators of more than 15% compared to the results before. This serves as an information for verifiers and enhances legal compliance. Users of the data can be informed of such facts.

Claims that can be published (i.e. same framework conditions, different electricity mix) can be declared in the EPD, if desired.

7. Literature

Relevant standards and sources for the preparation of the EPD resp. for the definition of the product must be listed here. The full documentation of references is to be done as follows:

- Author, First name. and Author, First name. (year). Title of article. subtitle. location: publishing company.
- Author, First name. (year). Title of article. In: Surname, First name. and Surname, First name. (Publishing company): Name of paper. Bd. 2 or year number, 207-210.
- Organisation (Year): Full name of standard or rule. Date of Issue. Location. Legal institution.

Always to be quoted:

- ÖNORM EN ISO 14040 Environmental management - Life cycle assessment -- Principles and framework
- ÖNORM EN ISO 14044 Environmental management - Life cycle assessment -- Requirements and guidelines
- ÖNORM EN ISO 14025 Environmental labels and declarations -Type III environmental declarations -- Principles and procedures
- ÖNORM EN 15804 Sustainability of construction works - environmental product declarations. Core rules for the product category of construction products
- ÖNORM EN 16485- Round and sawn timber - Environmental Product Declarations - Product category rules for wood and wood-based products for use in construction
- ÖNORM EN 16449-Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
- General Principles and Guidelines Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. Bau-EPD GmbH, in the current version

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8.3 Abbreviations

8.3.1 Abbreviations as per ÖNORM EN 15804

| | |
|------|--|
| EPD | environmental product declaration |
| PCR | product category rules |
| LCA | life cycle assessment |
| LCI | life cycle inventory analysis |
| LCIA | life cycle impact assessment |
| RSL | reference service life |
| ESL | estimated service life |
| EPBD | Energy Performance of Buildings Directive |
| GWP | global warming potential |
| ODP | depletion potential of the stratospheric ozone layer |
| AP | acidification potential of soil and water |
| EP | eutrophication potential |
| POCP | formation potential of tropospheric ozone |
| ADP | abiotic depletion potential |

8.3.2 Abbreviations as per PCR on hand

| | |
|---------|---|
| CE-mark | french: Communauté Européenne or Conformité Européenne = EC certificate of conformity |
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals |



Publisher

Bau EPD GmbH
Seidengasse 13/3
1070 Wien
Österreich

Tel +43 699 15 900 500
Mail office@bau-epd.at
Web www.bau-epd.at



Programme Operator

Bau EPD GmbH
Seidengasse 13/3
1070 Wien
Österreich

Tel +43 699 15 900 500
Mail office@bau-epd.at
Web www.bau-epd.at

Logo

Author of the Life Cycle Assessment

Name of creator in person
Name of Institution (if rel.)
Address
Postcode, Location

Mail Person creator
Tel
Fax
Mail
Web

Logo

Owner of the declaration

Name of creator in person
Name of Institution (if rel.)
Address
Postcode, Location

Tel
Fax
Mail
Web