

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

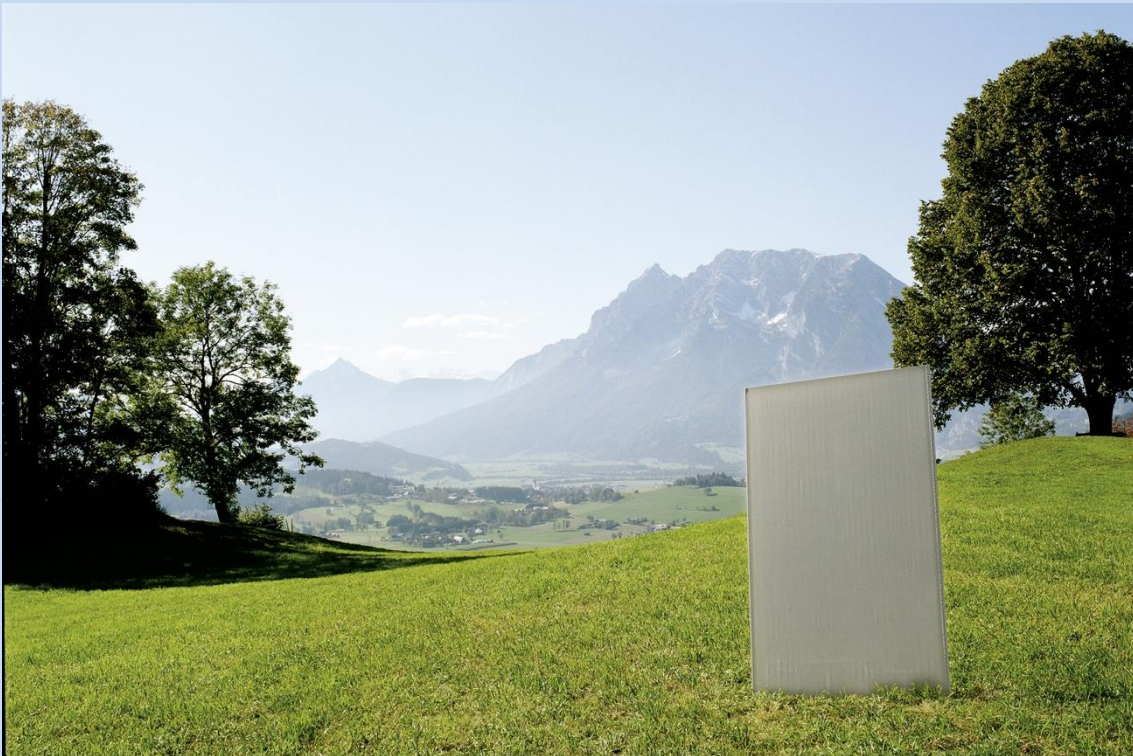


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Part B: Requirements on the EPD for Gypsum boards

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Tracking of versions

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17.0	Various minor changes: EP Freshwater Corrigendum table: unit P instead of PO4, editorial changes, rules for the application of c-PCR, adaptation of rules for new issue (correct term instead of extension, see MS-HB supplement) in interpretation, graphics now only required in project report, deletion of reference to subchapters of valid CEN standards (created by SR, checked by FG and approved by SR)	2023-09-20

Contents

1. Scope	5
Requirements on the layout of the EPD	5
Content of the EPD	5
1. General information	7
2. Product	9
2.1 General product description	9
2.2 Application field	9
2.3 Standards, guidelines and regulations relevant for the product	9
2.4 Technical data	9
2.5 Basic/auxiliary materials	10
2.6 Production	11
2.7 Packaging	12
2.8 Conditions of delivery	12
2.9 Transport	12
2.10 Processing/ installation	12
2.11 Use stage	12
2.12 Reference service life (RSL)	13
2.13 Reuse and recycling	13
2.14 Disposal	13
2.15 Further information	13
3. LCA: Calculation rules	14
3.1 Declared unit/ Functional unit	14
3.2 System boundary	14
3.3 Flow chart of processes/stages in the life cycle	16
3.4 Estimations and assumptions	16
3.5 Cut-off criteria	16
3.6 Data sources	16
3.7 Data quality	16
3.8 Reporting period	16
3.9 Allocation	16
3.10 Comparability	17
4. LCA: Scenarios and additional technical information	17
4.1 A1-A3 product stage	17
4.2 A4-A5 Construction process stage	17
4.3 B1-B7 use stage	18
4.4 C1-C4 End-of-Life stage	19
4.5 D Potential of reuse and recycling	20
5. LCA: results	21

6. LCA: Interpretation	24
7. Literature	25
8. Directory and Glossary	25
8.1 List of figures	25
8.2 List of tables	25
8.3 Abbreviations	26

1. Scope

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

This document applies to gypsum boards and gypsum fibre boards in accordance with the following ÖNORM:

- ÖNORM EN 520 gypsum boards - Terms, requirements and test methods
- ÖNORM B 3410 gypsum boards for dry construction systems (gypsum board) - Types, requirements and tests
- ÖNORM EN 15283-2 Fibre-reinforced gypsum boards - Definitions, requirements and test methods - Part 2: Gypsum fibreboards

The requirements on the EPD include:

- Requirements from EN ISO 14025
- Requirements on the EN 15804 standard as a European core EPD
- Complementary requirements on EPD of Bau EPD GmbH

Complementary PCR (c-PCR) from CEN, if available, must always be applied at the same time as the PCR-B from Bau EPD GmbH. The documents complement each other.

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 gypsum boards** and **specific LCA calculation rules for gypsum boards** 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



Bau-EPD
Baustoffe mit Transparenz



OWNER AND 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

HOLDER OF THE DECLARATION

Name of declaration holder

DECLARATION NUMBER

To be accorded with Bau EPD GmbH

ISSUE DATE

Date

VALID TO

Date

NUMBER OF DATASETS

Number

ENERGY MIX APPROACH

MARKET BASED APPROACH

Name and description of product

Name of declaration holder

picture

To be accorded with declaration holder
and Bau EPD GmbH

(Note: photographic rights must be
clarified and cited)

Company logo of
declaration holder

Contents:

Content of the EPD	5
1. General information	7
2. Product.....	9
2.1 General product description	9
2.2 Application field	9
2.3 Standards, guidelines and regulations relevant for the product	9
2.4 Technical data	9
2.5 Basic/auxiliary materials	10
2.6 Production	11
2.7 Packaging	12
2.8 Conditions of delivery	12
2.9 Transport	12
2.10 Processing/ installation.....	12
2.11 Use stage	12
2.12 Reference service life (RSL).....	13
2.13 Reuse and recycling	13
2.14 Disposal	13
2.15 Further information.....	13
3. LCA: Calculation rules	14
3.1 Declared unit/ Functional unit	14
3.2 System boundary	14
3.3 Flow chart of processes/stages in the life cycle	16
3.4 Estimations and assumptions.....	16
3.5 Cut-off criteria.....	16
3.6 Data sources	16
3.7 Data quality.....	16
3.8 Reporting period	16
3.9 Allocation	16
3.10 Comparability	17
4. LCA: Scenarios and additional technical information	17
4.1 A1-A3 product stage	17
4.2 A4-A5 Construction process stage	17
4.3 B1-B7 use stage.....	18
4.4 C1-C4 End-of-Life stage.....	19
4.5 D Potential of reuse and recycling	20
5. LCA: results.....	21
6. LCA: Interpretation.....	24
7. Literature.....	25
8. Directory and Glossary	25
8.1 List of figures.....	25
8.2 List of tables.....	25
8.3 Abbreviations.....	26

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 Version Characterisation Factors: Quelle, Version</p>
<p>Author of the Life Cycle Assessment Name of the author Institution, Address website</p>	<p>The CEN standard EN 15804:2019+A2+corr2021 serves as the core-PCR. The c-PCR of CEN EN XXXXXX was applied. 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>Holder of the Declaration Name of the manufacturer/owner Institution, Address website</p>	<p>Owner, Publisher and Programme Operator Bau EPD GmbH Seidengasse 13/3 1070 Vienna Austria</p>

DI (FH) DI Sarah Richter
Head of Conformity Assessment Body

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 gypsum boards:

- Explanation based on an example:
- The declared product is, for example, a panel with the following dimensions..., one m² of material with a layer 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 gypsum boards:

None.

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 gypsum boards:

The standards regulating gypsum boards must be cited (i.e. standards, guidelines, other regulations)
Examples for product standards for gypsum boards in Austria are illustrated in table 1.

Table 1: Product specific standards

Standard	Title
ÖNORM EN 520	Gypsum boards - Terms, requirements and test methods

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 gypsum boards:

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
Shear Strength (for gypsum board)		N
Shear strength (for gypsum fiber boards)		N
Bending strength (for gypsum fiberboard) - threshold value		N/mm ²
Flexural strength (for gypsum gypsum board) - threshold value (ÖNORM EN 520)		N
Bending strength in the longitudinal direction (for gypsum gypsum board - ÖNORM B 3410)		N
Bending strength in transverse direction (for gypsum gypsum board - ÖNORM B 3410)		N
Bending modulus of elasticity in the longitudinal direction (for gypsum gypsum board - ÖNORM B 3410)		N/mm ²
Flexural modulus of elasticity in the transverse direction (for gypsum gypsum board - ÖNORM B 3410)		N/mm ²
Shock resistance (system only)		kJ
Airborne sound insulation (system only)		dB
Sound absorption (system only)		-
thermal conductivity 1)		W/(m K)
Water vapor resistance factor (for type E threshold)		-
Classification of fire behavior according to ÖNORM EN 13501-1		-
Raw density 2) or raw density range		kg/m ³

1) If it is not the design value according to ÖNORM EN 12524, but a measured value according to ÖNORM EN 12664, the test conditions must also be specified (e.g. λ_{10} , dry)

2) Mean bulk density

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-%.

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

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.

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

Components	Function	Mass fraction in percent
Stucco ¹⁾	main component	≤ 85
Water ²⁾	crystallization	≤ 8,4
carton ³⁾	minor component	≤ 3,8
Additions	core glue 4)	< 1
	foaming agent 5)	< 1
	condenser 6)	< 1
	condenser6)	< 1
	accelerator 7)	< 1
	accelerator 7)	< 1
	accelerator 7)	< 1
	edge glue 8)	< 1
	impregnation agent 9)	< 1
	fire resistance 10)	< 1

Optional: footnote with description for each component

- 1) Stucco consists of calcium sulphate hemihydrate and is burned from raw gypsum at low temperatures.
- 2) The water used is taken from a deep well on the company premises.
- 3) Two different types of cardboard are used. The back box is made of 100% recycled material, while the green side box is made of 80%.
- 4) To ensure that the gypsum core adheres to the cardboard over a large area, starch is added to the gypsum as a core glue admixed. When exposed to heat, it can physically bind many times its own weight in water, swell and gelatinize.
- 5) The foaming agent is intended to reduce the bulk density of the gypsum boards.
- 6) Plasticizers are added to the gypsum slurry to achieve a flowable consistency while reducing the obtain water entitlement.
- 7) According to the manufacturer's information, the accelerator consists mainly of raw gypsum stone that is not burned, but only is ground up. By using this additive, the early strength of the gypsum paste sets in more quickly. Setting times can be minimized in this way.
- 8) The edge glue is applied to both panel edges at the forming station and thus glues the front and back side cardboard commonality.

2.6 Production

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

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 gypsum boards:

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

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

Description of chart

Example:

Natural gypsum and FGD gypsum, water, cardboard, core glue and additives are used as raw materials for the production of gypsum boards. The largest part of the gypsum boards makes up the stucco (burned raw gypsum) with about 85 percent by mass. The stucco is mixed with the respective additives in the dry state before it is fed into the mixer. Only then is water added and the ingredients homogenized in a continuous mixer. The gypsum slurry is then applied to the visible side cardboard, the edges are pre-formed and the back cardboard is finally unwound over it. The next step on the binding line is to use a laser to check the width and thickness of the panels and adjust them if necessary. The panel hardens on the binding tape, is labelled, cut to raw length and turned over before the residual water evaporates in a multi-level dryer.

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 gypsum boards:

Example: The gypsum boards are delivered on reusable pallets, during transport by truck they are secured several times with reusable straps. Further packaging in the form of foil is not necessary, but can be carried out on request or if necessary. The majority is delivered without foil.

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 gypsum boards:

Example: The energy for installation is neglected. A sensitivity analysis came to the conclusion that the effects of the electrical energy during installation are very small. During installation, there are mainly environmental impacts due to the material used for the screws used to fasten the panels, the filler, joint tapes, a small proportion of water and breakage waste, which are taken into account.

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 gypsum boards:

If gypsum boards products are installed professionally and if the phase of utilization is not disturbed, no modifications of the material composition occur.

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
Product name		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).

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 gypsum boards:

The declared unit for gypsum boards is 1 m² gypsum board or gypsum fibre board.

Table 5: Declared unit 1 m²

characterization	value	unit
declared unit	1	m ²
Layer thickness		m
gross density for conversion into kg		kg/m ³

Note: The functional unit for gypsum boards is based on the function that the product performs in the building. For example, 1 m² gypsum boards (which corresponds to the declared unit) or e.g. 1 piece of gypsum board can be specified as a functional unit.

Table 6: Functional unit, example 1 m²

characterization	value	unit
Functional unit	1	m ²
Layer thickness		m
gross density 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.

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; ND = 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 gypsum boards:

A1-A3

- Accounting of raw materials (cardboard):

If the pre-product cardboard accounts for more than 10% of the calculated impact categories, specific data should be collected for the pre-product. If this is not possible, e.g. due to changing suppliers or a lack of willingness to cooperate on the part of the carton manufacturer, the reasons must be documented in the project report. For the generic data, either excellent representativeness for the specific system must be demonstrated or a worst-case scenario must be applied. The product data sheet and a description of the production process of the carton should be enclosed as a basis for decision-making. The energy flows in the generic dataset need to be modelled with the energy mix of the country/countries where the carton is produced.

- Balance of secondary raw materials (industrial gypsum):

The sulphate sludge produced during flue gas desulfurization is not regarded as a by-product of electricity generation, as it is not itself a usable product. It can only be used as FGD gypsum after it has been specially processed. The sulphate sludge is therefore handed over to the gypsum board product system at the point of origin without any expenditure. The transport from the point of origin to the treatment site as well as the treatment of the sulphate sludge (energy consumption of the vacuum belt filters, etc.) must be taken into account.

- Co-product allocation:

As a rule, no by-products are produced during the manufacture of gypsum boards, otherwise the general rules for the ecological balance apply.

A4-A5

- Description of the type of processing, the machines, tools, dust extraction, etc. to be used, consumption of fastening materials and auxiliary materials and the measures to reduce noise.
- Minimum requirements for material losses

At least 5% loss for wall coverings, ceiling mounting, dry gypsum, partitions, attic conversions, etc.
If lower values are to be used, the manufacturer must provide evidence of this.

B1-B7

- No scenarios are developed for stages B1 use, B2 maintenance and B3 repair, as the consumption of repair materials and energy appears to be negligible according to the manufacturer. The stage B4 replacement is equivalent to the product end of life. There are no material and energy flows when the product is removed. Stages B5 conversion/renewal, B6 energy use and B7 water use are not applicable at the product level.
- Therefore: No product group-specific rules

C1 - C4 und D

When balancing the disposal phase, at least one scenario must contain the landfilling of the gypsum boards. Further scenarios for recycling can be made.

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 the cut-off criteria according to MS-HB Chapter 5 must be documented here.

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.

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 in the same version, 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.

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 gypsum boards:

In the use phase (B1), there are no material and energy flows relevant to the life cycle assessment for gypsum boards (i.e. the results for B1 are to be set at "zero").

No maintenance, repair, replacement or conversion processes take place for gypsum boards during use, which is why modules B2 to B5 cause no environmental impact (i.e. the results for B2 are to be set as "zero"). Modules B6 and B7 are not relevant for gypsum boards, which means that there is no environmental impact either (B6 and B7 are to be declared as "0").

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 gypsum boards:

A large part of the gypsum waste produced is landfilled or used to fill heaps in landfills and mines ("other recycling"). Only a small percentage of gypsum board waste is recycled. The process for recycling gypsum boards into gypsum powder is technically mature, and several stationary plants are already in operation in Germany, even if they are not (yet) fully utilized. However, since the mandatory separate collection of gypsum, municipalities are increasingly setting up gypsum collection systems.

For the time being, landfilling should therefore be shown as the standard scenario for Austria. When data are available, it is recommended to calculate another scenario for gypsum board recycling.

Note: In other countries the disposal of gypsum board may be handled differently (landfilling on inert landfills is sometimes not permitted). It is to be found out via the manufacturers how realistic scenarios can be modelled in the countries where the end-of-life status is relevant.

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 gypsum boards:

The substitution of primary raw materials, taking into account the secondary material share of the material removed in C1, is shown in Module D (net flow), provided such a scenario is calculated.

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 P eq.													
EP marine	kg N eq.													
EP terrestrial	mol N eq.													
POCP	kg NMVOC eq.													
ADPE	kg Sb eq.													
ADPF	MJ H _u													
WDP	m ³ 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	m ³													
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 interpretation of the results in the project report with graphs (e.g. the dominance analysis regarding the distribution of environmental impacts across the modules, etc.). In the EPD, graphs should only be inserted at the express request of the declaration holder (this involves a high level of effort in the course of translation services into other languages).

When declaring average products, the range of possible results for the individual products should be indicated for the main impact categories relevant to the materials used.

Regarding Module D, the interpretation in the EPD shall indicate that the credits and loads are outside the product system boundaries. Graphs for the interpretation of life cycle results shall be designed in such a way that modules A1-C4 are shown in one graph and module D in separate graphs. Alternatively, the results can be interpreted without graphs, it is recommended to include graphs only in the project report, see above.

Re-issuance 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:

- EN ISO 14040 Environmental management - Life cycle assessment -- Principles and framework
- EN ISO 14044 Environmental management - Life cycle assessment -- Requirements and guidelines
- EN ISO 14025 Environmental labels and declarations -Type III environmental declarations -- Principles and procedures
- EN 15804 Sustainability of construction works - environmental product declarations. Core rules for the product category of construction products
- Management system handbook including applicable documents from Bau EPD GmbH

8. Directory and Glossary

8.1 List of figures

Figure 1: Example of a flow chart/graphic production stage 12

8.2 List of tables

Table 1: Product specific standards 9

Table 2: Technical data of the declared construction product (Table normative, only relevant data for the specific data must be declared) 10

Table 3: base materials in mass-% (example) 11

Table 4: Reference service life (RSL) 13

Table 5: Declared unit 1 m²..... 14

Table 6: Functional unit, example 1 m²..... 14

Table 7: Declared life cycle stages 15

Table 8: Description of the scenario „Transport to building site (A4)“ 17

Table 9: Description of the scenario „Installation of the product in the building (A5)“ as per table 8 in ÖNORM EN 15804.... 17

Table 10: Description of the scenario „maintenance (B2)“ based on table 9 in EN 15804 18

Table 11: Description of the scenario „repair (B3)“ 18

Table 12: Description of scenario „replacement (B4)“ 18

Table 13: Description of scenario „refurbishment (B5)“ 18

Table 14: Description of scenarios „energy (B6)“ resp. „Water (B7)“ 19

Table 15: Description of the scenario „Disposal of the product (C1 to C4)“ according to table 12 in EN 15804 20

Table 16: Description of the scenario „re-use, recovery and recycling potential (module D)“ 20

Table 17: Parameters to describe the environmental impact of mineral insulating products per declared/functional unit 21

Table 18: Additional environmental indicators..... 21

Table 19: Parameters to describe the use of resources of mineral insulating products per declared/functional unit 22

Table 20: Classification of disclaimers to the declaration of core and additional environmental impact indicators 23

Table 21: Parameters describing LCA-output flows and waste categories of mineral insulating products per declared/functional unit 24

Table 22: Information for description biogenic carbon content at factory gate 24

8.3 Abbreviations

8.3.1 Abbreviations as per 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



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