General Program Category Rules for Construction Products

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1. General information

This document is based on the following standards:

- DIN EN ISO 14025: Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- DIN EN 15804: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

2. Scope

This document defines the calculation rules according to EN 15804 for the life cycle assessment as well as for the background report. According to DIN EN 15804, for every Environmental Product Declaration an additional background report has to be provided.

3. Background report specifications

The background report is a systematic and comprehensive summary of the project documentation. It contains all relevant information on which the Life Cycle Assessment is based.

The background report is intended to show in a comprehensible way how the declared data of the specific EPD were collected and calculated. The background report is disclosed to the verifier. Since this document contains internal, secret and not publicly accessible plant data, this is done under utmost confidentiality. The background report is not intended for public communication.

The following information must be included in the background report:

- Principal, name of the LCA partitioner
- Date of the report
- Declaration of conformity to DIN EN 15804

4. Setting the objective and the scope

According to EN 14040, the goal of the life cycle assessment must be defined. The following information must be provided:

- Reasons for carrying out the study
- intended application
- target group addressed (business-to-consumer or business-to-business communication)

The definition of the system boundary must contain the following information:

- Description of the considered information modules (see chapter 5.4), possibly represented by flow diagrams
- Omission of life cycle phases, processes or data requirements
- Assumptions about electricity generation, incl. indication of reference year

5. Scope of the study

5.1 Product description

The technical and functional specifications for the product shall be described.

5.2 Application

The application of the product shall be described.

5.3 Declared / functional unit

The term "functional unit" may only be used if the whole life cycle of the construction product is considered. In all other cases, the term "declared unit" applies.
The results of the life cycle assessment are to be related to the declared unit defined in the specific product category rules (PCR).
Both the declared unit and the mass reference to the declared unit must be specified in the background report.

5.4 System boundaries

The system boundaries must be specified according to the modular structure according to EN 15804. The life cycle stages A1 to A3 (manufacturing phase) must be specified as mandatory (cradle-to-gate EPD). Further life cycle stages can optionally be specified (cradle-to-gate with options). For a cradle-to-grave EPD, the complete life cycle of the product must be considered (A1-A3, A4-A5, B1-B7, C1-C4 and D).
For all life cycle phases the provision of all materials, products and energy as well as the complete waste treatment up to the end of the waste status or disposal of residual waste must be considered. Losses (loss of material during transport, disposal of packaging, etc.) must also be taken into account.

5.4.1 A1 – A3: Manufacturing phase (mandatory)

The manufacturing phase includes:

A1 Raw material extraction and processing and processing of secondary input materials (e.g. recycling processes)

A2 Transport to manufacturer

A3 Production

For secondary materials or secondary fuels as input, the system boundary between the investigated and the preceding system is defined. The system boundary of the previous system is reached from the complete waste treatment [according to the European Waste Framework Directive] (see EN 15804 section 6.3.4.5 and Annex B).
Flows leaving the system in the manufacturing phase must be treated as co-products. This includes:

- Production waste that is reused or recycled. The materials can be reused during the manufacturing phase (closed loop) or can leave the system as co-products (open loop).
- Heat and electricity from the energy recovery of production waste. The energy can be used during the production phase (closed loop) or it can leave the system as a co-product (open loop).

If debits and credits are assigned to the co-products, these may not be specified in module D. The manufacturing phase may be specified as aggregated module A1-A3.

5.4.2 A4 – A5: Construction phase (optional)

The construction phase includes:

A4 Transport to construction site

A5 Installation in the building

5.4.3 B1 – B7: Use phase (optional)

The use phase includes:

B1 Use or application of the built-in product

B2 Maintenance

B3 Repair

B4 Replacement

B5 Renewal

B6 the energy input for the operation of the building (e.g. operation of a heating system and other building services equipment)

B7 the use of water for the operation of the building

5.4.4 C1 – C4: Disposal phase (optional)

The disposal phase includes:

C1 Dismantling, demolition

C2 Transport for waste treatment

C3 Waste treatment for reuse, recovery and/or recycling

C4 Disposal

Depending on the disposal scenario, this phase can begin with the disposal phase of the building. The dismantled products are initially regarded as waste. If the following criteria are met, they can be defined as secondary materials:

- further use of the recovered substances, products or components
- an economic value can be assigned to the recovered material
- the recovered material meets the technical requirements for the intended re-use and complies with existing legislation and standards
- when reused, harmful effects on the environment and human health are to be excluded (limit values for pollutants from the respective current legislation)

The system boundary to module D shall be drawn when complete waste treatment has been completed. If energy recovery is to be considered, the energy recovery process must have an efficiency rate of more than 60 %.

5.4.5 Benefits and burdens outside the life cycle

The following credits shall be indicated in accordance with EN 15804:
D Reuse, recovery and / or recycling potentials, indicated as net flows and credits (benefits).
Information module D is intended to create transparency about environmental benefits or burdens for the further use of substances and products.

5.5 Energymix

The electricity mix must be calculated according to the geographical and temporal system boundaries can be selected. When using green electricity, certificates must be verified over the entire validity period of the EPD.
CO2 certificates are not counted.

5.6 Criteria for the exclusion of inputs and outputs and their application

The cut-off criteria must not be used to hide data. All inputs and outputs for which data are available must be taken into account in the calculation. Data gaps can be filled with conservative assumptions of average data or generic data. Any such assumption must be documented.
All flows contributing to more than 1 % of the total mass, energy or environmental impact of the system shall be included in the life cycle assessment. In total, the neglected processes must not contribute more than 5% to the impact categories considered. Material and energy flows that can lead to significant environmental impacts must not be cut off. The cut-off criteria applied shall be documented in the background report.

6. Life Cycle Inventory

6.1 Data collection

The life cycle inventory must be carried out in accordance with ISO 14044 (2006). Data collection and calculation procedures must be documented in the project report. The following points must be observed:

- Scenarios must be used to calculate the information modules (with the exception of module A1 - A3). The scenarios must be based on relevant technical information and must be documented in the report. The scenarios must be state-of-the-art and representative of the most likely alternative. The technical information must be documented in the project report with reference to the literary sources.
- Specific data collected from specific production processes or average data derived therefrom shall have priority in the calculation of environmental impacts.
- The environmental impact of an average product must be calculated using data representing a representative average for the declared products.
- To describe a specific product, process-specific data must be used in the calculation. Generic data can be used for processes over which the manufacturer has no control.
- To calculate the energy content of a substance, the lower calorific value must be used.

Die Anforderungen an die Datenqualität werden weiterhin wie folgt definiert:

- Manufacturer-specific data may be a maximum of 5 years old, generic data a maximum of 10 years old.
- Process-specific data must be based on the average of an operating year.
- Data records must be complete and consistent.

The generic data must be specified with the background database and the year. In addition, the treatment of missing data and the data quality must be documented.

6.2 Allocations

Allocations occur as soon as co-products occur in the investigated system. Co-products are products that arise in addition to the desired outputs and can be reused in other processes. The allocation of environmental impacts between product and co-product is called allocation. In principle, allocations should be avoided as far as

possible (e.g. by system expansion, splitting processes into sub-processes). In general, the principle applies that allocation should reflect the objective of the process. If an allocation must be made, the following points must be observed:

- the allocation must be based on economic values
- if the economic difference between product and co-product is small, the allocation must be based on physical properties (mass, volume)

In a multi-input allocation, different products are jointly recycled within a process, e.g. in a waste incineration plant or a combined heat and power plant. The allocation is based on a physical allocation of the material flows. Where appropriate, the environmental impacts associated with the inputs are distributed according to the way they affect the subsequent production process.

For the reuse, recycling and recovery of products, the system boundary is set where the outputs have reached the state of complete waste treatment. If the system boundary is not left in module A1 - A3, the credits and debits achieved will be reflected in module D.

The allocations made must be presented in the project report. The allocation procedures chosen shall be justified and the allocation factors used, such as recycling rates, shall be supported by sources.

6.3 Representation of unit processes

The modelling of the life cycle assessment shall be illustrated by the presentation of the unit process. This can be done in tabular form or as a screenshot of the LCA model.

The following points must be taken into account:

- Assignment of company data to the data records used
- Assignment of the process data to the life cycle stages

7. Life Cycle Assessment

The LCA results must be presented in tabular form for all modules in the project report. The impact assessment shall include the potential environmental impacts to describe the use of resources, waste and other outputs as well as the potential environmental impacts. The information is given for the following indicators:

Table 1: Parameters used to describe the use of resources

Parameter	Unit
Renewable primary energy as an energy source	MJ, lower calorific value [Hi]
Renewable primary energy for material use	MJ, lower calorific value [Hi]
Total renewable primary energy	MJ, lower calorific value [Hi]
Non-renewable primary energy as an energy source	MJ, lower calorific value [Hi]
Non-renewable primary energy for material use	MJ, lower calorific value [Hi]
Total non-renewable primary energy	MJ, lower calorific value [Hi]
Use of secondary materials	kg
Use of renewable secondary fuels	MJ, lower calorific value [Hi]
Use of non-renewable secondary fuels	MJ, lower calorific value [Hi]
Use of freshwater resources	m^3

Table 2: Parameters used to describe waste generation and other output materials

Parameter	Unit
Hazardous waste for landfill	kg
Non-hazardous waste disposed	kg
Disposed radioactive waste	kg
Components for further use	kg
Materials for recycling	kg
Materials for energy recovery	kg
Exported energy	MJ, lower calorific value [Hi]

Table 3: Parameters used to describe the impact assessment

Parameter	Unit
Global Warming Potential (GWP)	kg CO_2-eq.
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11-eq.
Acidification potential (AP)	kg SO_2-eq.
Eutrophication potential (EP)	kg $(PO_4)^{3-}$ eq.
Photoozone creation potential for tropospheric ozone (POCP)	kg Ethen-eq.
Abiotic Depletion Potential for Elemets (ADPE)	kg Sb-eq.
Abiotic Depletion Potential for fossil fuels (ADPF)	MJ

The characterisation factors (CF) published in EN 15804:2012+A1(October 2013) (Annex C) are used to calculate the impact categories. These CF were published in the 2012 version by CML (Institute of Environmental Sciences Faculty of Science University of Leiden, Netherlands) as "baseline".
Long-term emissions >100 years are not considered in the impact assessment.
There are no statements to be made about endpoints of impact categories, exceedances of threshold values, safety margins or risks.

8. Interpretation

For interpretation, the aggregation variables of the Life Cycle Inventory and the impact assessment indicators are to be discussed in the project report by means of a dominance analysis related to the declared unit, stating specifications that have a significant influence on the result. The following points should be addressed:

- Results
- the relationship between Life Cycle Inventory results and impact assessment results
- Assumptions and limitations regarding the interpretation of results in the EPD, both methodological and data related
- Assessment of data quality

The description of the deviation from the average of the impact assessment results is not necessarily a quantitative statement; it may also be a qualitative statement in the sense that the deviation from the declared average is large or small.

9. References

DIN EN ISO 14044	DIN EN ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044:2006 + Amd 1:2017); German version EN ISO 14044:2006 + A1:2018
EN 15804	DIN EN 15804:2014-07, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; German version EN 15804:2012+A1:2013
CEN/TR 15941	CEN/TR 15941:2010-03: Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data; German version CEN/TR 15941:2010