Product Category Rules for preparing an environmental product declaration (EPD) for Product Group:

Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels

VERSION October 9, 2012
VALID THROUGH October 9, 2017

PRODUCT CATEGORY RULE

Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels
Product Category Rule Number 000000

According to ISO 14025

Product Category Rule for Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels

Scope of validity of this PCR:

Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels

Content

These PCR determine the product group specific rules for:

- the creation of the Environmental Product Declaration (EPD)
- the calculation of the Life Cycle Assessment (LCA) and the creation of the project report on the LCA

Further requirements are given in UL Requirements for Product Category Rules and Environmental Product Declarations.

Versions overview

Version	Description	History
1	Version by UL Environment with input from a coalition was approved by the panel	10/9/2012

Editor's Notes:

This proposed PCR is based on revisions made to existing PCRs from other countries that address structural steel, insulation and construction products, and building metals. Revisions/discussion points to make this PCR applicable to the U.S. include: units, functional unit, impact assessment methods, testing methods and requirements, use phase options, references, and standards.

This proposed PCR has been prepared with input from the following organizations:

American Iron and Steel Institute
Alcoa Architectural Products
ATAS International
Centria
Fabral
Kingspan
McElroy Metals
Metal Sales
Mitsubishi Alpolic
Petersen Aluminum

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Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels
Product Category Rule Number 000000

According to ISO 14025

1.0 INTRODUCTION TO THE PRODUCT CATEGORY RULE

1.1 Purpose of this PCR

These Product Category Rules create a common platform for communication of the life cycle impact assessment results and other salient environmental information for Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels, for business-to-business or business-to-consumer communication.

This information is intended to complement existing environmental impact metrics for existing certification schemes, procurement policies, etc. For example, this product category rule facilitates the creation of Environmental Product Declarations that may satisfy optional criteria within LEED.

The PCR is based on the European standard EN15804: 2012 - Sustainability of construction works – Environmental Product Declarations – core rules for the product category of construction products. For the promotion of harmonization, the Rules for Environmental Product Declarations - Structural Steel published by IBU (September 2010) was referenced to international consistence. However, adaptations were made from the European context for regional applicability in North America. The PCR complies with the standard ISO14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines, and ISO14025: 2006, Environmental management – Type III environmental declarations – Principles and procedure.

This PCR also addresses core issues in ISO 14025 Section 6.7.2 Requirements for Comparability. The provision of a true quantitative metric to guide the interpretation of results is preferred. However, in most cases, this type of metric is unavailable. While conformance to this PCR minimizes that variations and deviations, there are still components that might influence the comparability of EPDs. Caution should be used when interpreting results and applying them for comparative decisions making. The declarer must, where possible, use quantitative metrics to capture the uncertainty. At a minimum, the declarer will provide qualitative guidance in relevant sections to guide users in interpreting the information contained within the EPD relative to comparability and use for decision-making. The declarer must state that differences between environmental declarations are not guaranteed for comparative purposes. (See Section 3.0 of the PCR)

1.2 PCR Scope Validity

The scope of coverage for this PCR is the following: Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels.

Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels
Product Category Rule Number 000000

According to ISO 14025

These product category rules (PCR) are applicable to:

- Construction of unpainted or painted galvanized or zinc-aluminum alloy coated steel, including coil and sheets. Other metals such as copper, aluminum, etc. would also be covered by this PCR.
- Factory-made metal roof and wall cladding capable of functioning as structural elements to resist transverse and in-plane loads and act as a water and air barriers, made from the above described coils and sheets.
- Factory-made insulated metal sandwich panels (IMP) capable of functioning as structural elements to resist transverse and in-plane loads, provide thermal insulation and act as a water and air barrier, with a rigid metal skin on both sides, made of the above described coil and sheets.
- Factory-made Metal Composite Materials (MCM) capable of resisting transverse loading sufficient to act a building cladding as part of either a sealed wall or rain screen system, made of rigid metal skins with a solid thermoplastic core to provide flatness but not thermal insulation. Aluminum Composite Material (ACM) is also covered by this PCR.

The products considered in this PCR fall under UNCPC Code:

Section: 4 - Metal products, machinery and equipment

Division: 42 - Fabricated metal products, except machinery and equipment
Group: 429 - Other fabricated metal products
Class: 4299 - Other metal goods

Not all products that are considered under the aforementioned UNCPC code are applicable to this PCR. Section 2.3 Functional Unit must be applied in order to be considered under this PCR.

This PCR is valid for 5 years from the date of review and is subject to annual review and/or modification as needed by UL Environment.

1.3 PCR Content

This PCR determines the product group specific rules for:

- conducting an Life Cycle Assessment (LCA) and the development of a project report on the LCA
- the development of an Environmental Product Declaration (EPD)

1.4 Abbreviations and Definitions

Abbreviations and Definitions are per ISO 14040:2006, ISO 14044, 14025: 2006, ISO 21930 and EN 15804

Insulated metal panel: Factory fabricated composite panel comprised of inner and outer metal skins separated by a continuous insulating core, which acts as an air, water vapor, and thermal barrier.

Metal Cladding: Sheet steel that has been roll formed into a profile intended to control the infiltration of weather elements, or for aesthetic purposes.

Metal Composite Materials: MCMs are comprised of two metal skins with a solid thermoplastic core not containing foam plastic insulation.

1.5 Normative References

ISO 14040: 2006 Environmental management -- Life cycle assessment -- Principles and framework

ISO 14044: 2006 Environmental management -- Life cycle assessment -- Requirements and guidelines

ISO 14025: 2006 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures

ISO 21930: 2007 Sustainability in building construction -- Environmental declaration of building products

EN 15804: 2012 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products

2.0 RULES FOR COMPLETEING THE LIFE CYCLE ASSESSMENT

A life cycle assessment, complying with ISO 14040/14044, describing the declared product and based on plausible, transparent and credible data, must be presented. Model assumptions with a relevant influence on the declared results must be clearly stated in the EPD. For methodical details on calculation and documentation of the LCA, see part 2 “Rules for the Creation of the Background Report”. Comparative descriptions with other products are inadmissible.

For the respective product, an LCA complying with ISO 14040 and based on plausible, transparent and credible data must be submitted. All model assumptions with a decisive influence on the result should be specified. The report structure complies with the structure of this document, following ISO 14040.

The background report must address all building material-specific stages of the life cycle. The stages which are taken into account in the assessment must be thoroughly presented in relation to the considered processes. That is to say, the production (cradle to gate) must always be thoroughly presented. If use and/or recycling/disposal are part of the analysis, these stages must also be addressed. If use and/or disposal are not considered, this fact has to be justified. In this case, the processes must be documented in detail. As the use stage generally depends on the construction and environment, it is not required within this PCR. If desired, a hypothetical use stage scenario may be included. Assumptions and key parameters must be clearly stated.

The following sections must be carefully considered for any form of comparative decision-making.

2.1 Aim of the Study

The aim of the study shall be described, including the following attributes:

- the reasons for the execution of the study
- intended use
- target audience
- use of the study for public comparisons

2.2. Period under Consideration

The primary data collected from the involved plants should be average values from a period of 12 months. The 12 month period is to begin no later than 5 years prior to the date of the LCA calculations. A new LCA study is not required at the end of the 5 year period, however the study will be required to be updated and based on current data.

The period under consideration underlying the LCA must be documented.

2.3 Declared/Functional Unit

Wall and roof panels can provide multiple functions; among these are covering a certain area, creating a barrier that controls noise, air, water, and thermal transmission between the external environment and the interior space of a building, as well as other functions such as load carrying capacity and aesthetics.

A functional unit is a quantified description of the performance of a product system for use as a reference. The declared unit is used instead of the functional unit when the precise function of the product or scenarios at the building level is not stated or is unknown. The declared unit shall be applied when an EPD covers one or more life cycle stages as information modules, i.e. in the case of a "cradle to gate" EPD and "cradle to gate with options" EPD and when the EPD is not based on a full “cradle to grave” LCA. The declared unit provides a reference by means of which the material flows of the information module of a construction product are normalized (in a mathematical sense) to produce data, expressed on a common basis. It provides the reference for combining material flows attributed to the construction product and for combining environmental impacts for the selected stages of the construction product’s incomplete life cycle. The declared unit shall relate to the typical applications of products.[1]

The declared unit for this PCR is “coverage of 1000 sq. ft. (92.90 square meters)[2] with metal product” for each process evaluated. The coverage area refers to the projected flat area covered by the product as output by the final manufacturing process step, and does not account for losses due to overlap and scrap during installation.

2.4 System Boundaries

LCA is conducted by defining product systems as models describing the key elements of physical systems. The system boundary defines the unit processes to be included in the system model.

This section specifies the boundary of the product system under study and, in particular, the boundary with any previous or subsequent product systems in the life of a building. It also specifies the processes that are to be included in each of the life cycle stages listed in Sections 2.4.1 and 2.4.2 below.

The modular set up of the LCA underlying an EPD allows easy organization and expression of data packages throughout the life cycle of the product. This approach requires that the system boundaries for the life cycle stages and the information modules included are transparent, well defined and applicable to any construction product.

The setting of the system boundaries follows two principles:

[1] EN15804: 2012 - Sustainability of construction works – Environmental Product Declarations – core rules for the product category of construction products.
[2] The study that was used as a reference for the development of this PCR used english units, therefore, the declared unit defined is in english units.

- The “modularity principle”: Where processes influence the product’s environmental performance during its life cycle, they shall be assigned to the module of the life cycle where they occur; all environmental aspects and impacts are declared in the life cycle stage where they appear;
- The “polluter pays principle”: Processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached.

Example: The system boundaries for the product are broken into Manufacturing, which includes extraction and processing of resources, Installation and Use, which includes periodic maintenance and replacement and effects on the building’s energy performance, and End of Life, which includes separation and final disposition of the product (see figure 1).

2.4.1 System Boundary Requirements for the Life Cycle Inventory[3]

For the purposes of creating EPDs from this PCR, the following life cycle stages are required:

- A1 Raw Material extraction and processing, processing of secondary material (e.g. recycling processes)
- A2 Transport to the manufacturer
- A3 Manufacturing

2.4.1.1. Product Stage (includes A1 through A3)

The production stage will account for:

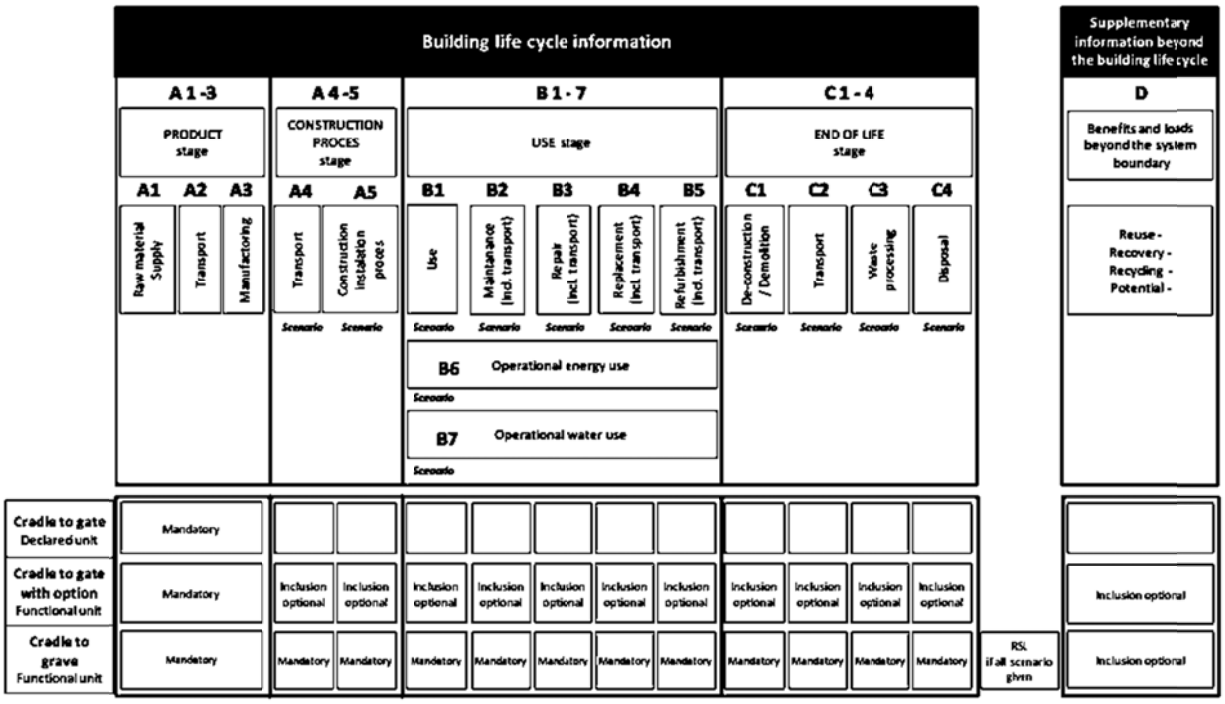
- Extraction and processing of raw materials (e.g. mining processes) and biomass production and processing (e.g. agricultural or forestry operations);
- Reuse of products or materials from a previous product system;
- Processing of secondary materials used as input for manufacturing the product, but not including those processes that are part of the waste processing in the previous product system;
- Generation of electricity, steam and heat from primary energy resources, also including their extraction, refining and transport;
- Energy recovery and other recovery processes from secondary fuels, but not including those processes that are part of waste processing in the previous product system;
- Transportation up to the factory gate and internal transport;
- Production of ancillary materials or pre-products;
- Manufacturing of products and co-products;
- Manufacturing of Packaging;
- Waste disposal, including any packaging waste.

[3] EN15804: 2012 - Sustainability of construction works – Environmental Product Declarations – core rules for the product category of construction products.

Product stage includes provision of all materials, products, and energy including waste disposal during the production stage However, production of capital goods, infrastructure, production of manufacturing equipment and personnel related activities are not included. Heating, artificial lighting and transports within the production site are, in general, not considered, and will only be considered if they are relevant for the production process (e.g. climate control required for inventory, etc.).

Allocation associated with transport will be based on weight or volume, as appropriate for realistic modeling.[4]

Figure 1: Types of EPD with respect to life cycle stages and modules covered for the building assessment[5]



2.4.2 Optional System Boundaries for the Life Cycle Inventory

This PCR also covers optional EPDs.

- Cradle to gate with options for modules A4 to A5 and B1 to B7 and,

[4] For example, in the case of low-density finished insulation products, the volume, not the weight, restricts the amount of cargo on a vehicle, and thus volume will be used in allocating material for transport.
[5] EN15804: 2012 - Sustainability of construction works – Environmental Product Declarations – core rules for the product category of construction products.

- Cradle to grave would include the options for modules C1 to C4

For the purposes of creating EPDs from this PCR the following life cycle stages are optional:

2.4.2.1 Construction Process Stage (includes A4 and A5)

When choosing to incorporate the construction stage, modules A4 and A5 shall be included.

The construction stage will report:
- A4: Transport to the building site
- A5: Installation into the building

Construction Process Stage includes provision of all materials, products and energy, as well as waste processing up to the end-of-waste state or disposal of final residues during the construction process stage. Also included are all impacts and aspects related to any losses during this construction process stage (i.e. production, transport, and waste processing and disposal of the lost products and materials).

2.4.2.2 Use Stage

2.4.2.2.1 Related to the Building Fabric

When choosing to incorporate the building fabric, modules B1 through B5 shall be included.

The use stage related to the building fabric includes:

- B1: Use or application of the installed product
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment

B1 through B5 shall be incorporated under normal conditions to achieve the defined reference service life (RSL) and according to manufacturers' guidelines. The number of replacements of the membrane shall be declared accordingly. Maintenance/replacements are to be modeled according to manufacturer's guidelines. Assumptions and key parameters must be clearly stated and the manufacture is to submit supporting documentation to justify the assumptions made.

In the case of a full replacement cycle, the total impacts of the product's manufacturing, production, installation, etc. should be dived over the fraction of expected life. For example, if a product lasts 50 years within a 60 year

building life, then the full impacts should be counted for the first life cycle. For the replacement, the full impacts should be dived over the remaining life required to service the building. (10/50 or 20% of the total)

2.4.2.2.2 Related to the Operation of the Building

When choosing to incorporate the operation of the building, modules B6 and B7 may be included either in combination or independent of one another.

- B6: Operational energy use (e.g. operation of the heating system and other building related installed services),
  - The reference service life of the building is defined as 60 years and the number of replacements of the products will be declared accordingly.
  - Due to the complexity of building energy modeling, independent review is required for the calculations and results. When reporting in the EPD, operational energy use models for (insert regions), calculation methods, software/tools, and other key parameters must be declared.
- B7: Operational water use
  - This is not anticipated to be a utilized as part of the LCA calculation for use phase, however, for consistency with EN 15804, this is an optional reporting module.

2.4.2.3 End of life stage

When choosing to incorporate end-of-life, modules C1 through C4 shall be included.

End-of-life stage includes:

- C1: Deconstruction, demolition
- C2: Transport to waste processing
- C3: Waste processing for reuse, recovery, and/or recycling
- C4: Disposal

2.5 Cut-off Criteria

Criteria for the exclusion of inputs and outputs (cut-off rules) in the LCA and information modules and any additional information are intended to support an efficient calculation procedure. Any application of the criteria for the exclusion of inputs and outputs shall be documented. All inputs and outputs to a (unit) process shall be included in the calculation, for which data are available, unless otherwise stated in this PCR, including, but not limited to, fasteners, clips, gaskets, sealants, trim, flashing, any other components associated with the final assembly of the product.

In case of insufficient input data or data gaps for a unit process, the following criteria shall be used to determine the inclusion of inputs and outputs within each system boundary:

- Mass: If a flow is no more than 1% of the total mass input of the product system being modeled it may be excluded, providing its environmental relevance is minor.
- Energy: If a flow is no more than 1% of the total energy inputs it may be excluded, providing its environmental relevance is minor.
- Environmental relevance: If a flow results in less than 1% of the total impact in any LCIA category it may be excluded. If data is missing and meets the criteria above for exclusion, yet is thought to potentially have a significant environmental impact, it is evaluated with proxies identified by chemical and material experts. If the proxy for an excluded material results in a contribution that would warrant its inclusion, more information must collected and evaluated in the system to further determine inclusion/exclusion.

The sum of the neglected input flows must not exceed 5% of the total mass, energy or environmental relevance. For additional clarification, reference EN 15804 Section 6.3.5.

2.6 Allocation rules

Most industrial processes produce more than the intended product. Normally more than one input is needed to produce one product and sometimes products are co-produced with other products. As a rule the material flows between them are not distributed in a simple way. Intermediate and discarded products can be recycled to become inputs for other processes. When dealing with systems involving multiple products and recycling processes, allocation should be avoided as far as possible. Where unavoidable, allocation should be considered carefully and should be justified. Metal scrap generated during manufacturing is a valuable co-product and shall be addressed with the avoided burden modeling approach.

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

- Allocation in the use of recycled and/or secondary raw materials
- Allocation of energy, auxiliary and operating materials used for individual products in a factory
- Credits from recycling or energy recovery of packaging materials and production waste
- 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.

The avoided burden approach subtracts impacts from the main product system for co-products or by-products that would have otherwise been produced from primary raw materials. To be consistent with the WorldSteel

dataset for galvanized Steel Coil, scrap steel input is given a burden based on the WorldSteel ”value of scrap” model which utilized the modeling approach described in a study of recycling methodologies (Avery & Coleman, Sept 2009).

The “value of scrap” shall be used as the upstream burden of any scrap input in the production of Steel Coil, and its inverse is then to be consistently used again throughout the LCA to provide credit for any steel scrap generated. A corresponding “value of scrap” model shall be created for aluminum based upon the aluminum LCI data published by the International Aluminum Institute and the Aluminum Association.[6]

This is a cradle-to-gate PCR, therefore no credit is applied for the potential end of life recycling of the products (post-consumer). Recycling credit is only given to scrap generated within the manufacturing process (post-production) which is known to be recycled.

For all other allocations, reference EN 15804 6.4.3.2 on co-product allocation and Section 6.4.3.3 on the allocation procedure of reuse, recycling and recovery.

2.7 Life Cycle Inventory Analysis

Quantitative and qualitative description of the unit processes shall be included in the LCA inventory analysis. Modeling of the unit processes underlying the LCA shall be reported in a transparent way. This can be done, for example, in tabular form or with the help of flow-charts (e.g. screenshots from LCA software).

If several products are declared in one EPD or if one product is produced at several locations, modeling has to be done for each product or location, and weighting of the data sets shall be documented.

2.7.1 Data acquisition and data processing

Data acquisition and data processing methods must be reported.

2.7.2 Inventory Data and Data Quality

The inventory data collected will be flow-based, complete and follow ISO 14025, ISO 21930, and EN 15804 requirements as relevant regarding data quality, e.g. reproducibility, consistency, precision, uncertainty etc. Data

[6] For example, assume the steel contains 25% scrap. Therefore, the Cradle-to-Gate production of 1 kg of steel receives the environmental burdens associated with combining 0.75 kg of primary steel with 0.25 kg of scrap steel represented by the “value of scrap”. Upon end of life, based on a 90% recycling rate, 0.90 kg of scrap steel is recovered, and therefore 0.90 kg worth of “value of scrap” is credited. In this example, the "net scrap recovered" is equal to 0.90 minus 0.25 = 0.65 kg. Separate the value of scrap used during product manufacture from that potentially available at end of life. This is done for two reasons: for transparency in modeling, and in recognition of the uncertainty around end of life treatment. The “value of scrap” itself is calculated as the difference between producing a given amount of material from 100% primary material and the same amount of material through secondary production means.

shall be representative of the manufacturer's data and conditions according to temporal, geographical and technological requirements.

- Temporal: The obtained information from the manufacturing process will be annual approximate values, and shall be no older than 5 years from the date of use. Average background (secondary) data shall not be older than 10 years.[7] Deviations shall be justified.
- Geographical: The geographic region of the production sites included in the calculation of representative data shall be documented.
- Technological: Data will represent technology in use and reflect the physical reality of the material and/or product. Industry average data shall be checked for plausibility by the verifier.

2.8 Impact Assessment

The impact assessment is carried out for the following impact categories. At a minimum characterization factors from both the US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI 2.0) shall be reported. Characterization factors taken from the University of Leiden (CML) methodology shall be reported for EPDs outside of North America.[8]

- global warming;
- ozone depletion;
- acidification of land and water;
- eutrophication;
- photochemical ozone creation;
- depletion of abiotic resources (elements);
- Depletion of abiotic resources in net calorific value (fossil).

To provide results for abiotic depletion potential, an indicator not available in TRACI, impact characterization shall be taken from the University of Leiden (CML) methodology, last updated in 2010. The characterization factors for ADP-fossil fuels are the net calorific values at the point of extraction of the fossil fuels.

See Section 3.2.2 Parameters describing environmental impacts for reporting requirements for a published environmental product declaration.

[7] For the use of secondary data our side of North America, regional proxies are acceptable. For example, the modification of electricity grid values to applicable regions.
[8] TRACI 2.0 and CML 2010 or the most current version of the characterization factors.

2.9 LCA Project Report

This report is not part of the published environmental product declaration, but is a required submission to a program operator for the verification of an environmental product declaration.

The results, data, methods, assumptions and limitations and conclusions of the LCA shall be completely and accurately reported without bias. They shall be transparent and presented in sufficient detail to allow independent verification and to permit an understanding of the complexities and trade-offs inherent in the LCA.

The report should also allow the results and interpretation to be used in support of the data and additional information made available in the respective EPD.

The report shall give the following:

- General aspects:
  - commissioner of the LCA study, internal or external practitioner of the LCA study;
  - date of report;
  - statement that the study has been conducted according to the requirements of ISO 14040/44.
- Goal of the study:
  - reasons for carrying out the study and its intended application and audience, i.e. providing information and data for an EPD for business-to-business and/or business-to-consumer communication;
- Scope of the study:
  - declared/functional unit, including
  - definition, including relevant technical specification(s);
  - calculation rule for averaging data, e.g. when the declared/functional unit is defined for:
    - a group of similar products produced by different suppliers or
    - the same product produced at different production sites;
  - system boundary according to the modular approach as outlined in Figure 1, including omissions of life cycle stages, processes or data needs;
- Quantification of energy and material inputs and outputs, taking into account how plant-level data is allocated to the declared products; and
  - assumptions about electricity production and other relevant background data;
- Cut-off criteria for initial inclusion of inputs and outputs, including
  - description of the application of cut-off criteria and assumptions;
  - list of excluded processes.
- Life cycle inventory analysis:
  - qualitative/quantitative description of unit processes necessary to model the life cycle stages of the declared unit, taking into account the provisions of ISO 14025 regarding data confidentiality;

  - sources of generic data or literature used to conduct the LCA;
  - validation of data, including
    - data quality assessment; and treatment of missing data;
- Allocation principles and procedures, including
  - documentation and justification of allocation procedures; and
  - uniform application of allocation procedures.
- Life cycle impact assessment:
  - the LCIA procedures, calculations and results of the study;
  - the relationship of the LCIA results to the LCI results;
  - reference to all characterization models, characterization factors and methods used, as defined in this PCR;
  - a statement that the LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.
- Life cycle interpretation:
  - the results;
  - assumptions and limitations associated with the interpretation of results as declared in the EPD, both methodology and data related;
  - the variance from the means of LCIA results should be described, if generic data are declared from several sources or for a range of similar products
  - data quality assessment;
  - full transparency in terms of value-choices, rationales and expert judgments.

2.9.1 Interpretation

The aggregation factors of the life cycle inventory analysis and the categories of the life cycle impact assessment should be interpreted by assigning them to the declared unit and stating any specifications, which have a significant effect on the result. The interpretation of the background report should report at least:

- The interpretation of results based on a selected-dominance analysis of indicators (for the relevant modules);
- The ratio of life cycle inventory results and impact assessment results;
- Assumptions and limitations in relation to the interpretation of results in the EPD, both methods, and data-related;
- The deviation from the average of the impact assessment results must represented if generic data are presented from several sources, or the results are based on a number of similar products;
- Assessment of data quality; and
- Full transparency in relation to value judgments, justifications and “expert judgments.”

To check the declaration, a dominance analysis should be carried out. Primary energy and impact categories are to be divided according to the relevant influences. The influence of assumptions due to data gaps or other

uncertainties should be assessed with a sensitivity analysis, as far as the assumptions are relevant to the result. Comparative descriptions of different building materials within one EPD are inadmissible.

3.0 RULES FOR THE CREATION OF THE ENVIRONMENTAL PRODUCT DECLARATION

3.1 Declaration of General Information

The following items of general information are required and shall be declared in an EPD:

- The declaration number;
- The name and address of the manufacturer(s);
- The description of the construction product's use and the functional or declared unit of the construction;
- Product to which the data relates;
- Construction product identification by name (including any product code) and a simple visual representation of the construction product to which the data relates;
- A description of the main product components and or materials. This description is intended to enable the user of the EPD to understand the composition of the product as delivered and also support safe and effective installation, use and disposal of the product;
- Name of the program used and the program operator's name and address and, if relevant, logo and website;
- The date the declaration was issued and the 5 year period of validity;
- Information on which stages are not considered, if the declaration is not based on an LCA covering all lifecycle stages;
- A statement that EPD of construction products may not be comparable if they do not comply with this PCR, ISO 14025, and where relevant EN 15804. Specific attention should be given to comparability in data sources and data quality;
- In the case where an EPD is declared as an average environmental performance for a number of products, a statement to that effect shall be included in the declaration together with a description of the range/ variability of the LCIA results if significant; the site(s), manufacturer or group of manufacturers or those representing them for whom the EPD is representative.

3.1.1 Materials

3.1.1.1 Substances of high concern

The following is required for those EPDs meant to be in compliance with EN 15804:2012 and utilized in the European market:

- The declaration of material content of the product shall list as a minimum substances contained in the product that are listed in the “Candidate List of Substances of Very High Concern for authorization” when their content exceeds the limits for registration with the European Chemicals Agency. The source location of any safety data sheet can be provided. „Substances of very high concern" are listed in the Candidate List of Substances of Very High Concern for Authorization of the European Chemicals Agency.

For EPDs in all other markets, this section is considered optional.

3.1.1.2 Raw materials/primary products

All raw materials and/or intermediate products, which are used for the production of the declared products or product groups, including plastic, metal, coatings, fire retardants, foam systems, catalysts and blowing agents, must be declared in percentage by mass.

3.1.1.3 Auxiliary substances/Additives

Declaration of all auxiliary substances and additives (substances that come in direct contact with the used raw materials or the manufactured building product during the manufacturing process), and which remain on the product, e.g., adhesives, joint ligaments, blowing agents etc. Information like "... is free of ..." cannot be used.

3.1.1.4 Material explanation

Material designations listed under the previous items must be explained here.

3.1.1.5 Raw Material Extraction and Origin

Information on raw material extraction and on the average transport distance for the raw materials or intermediate products used, for example:

- Process steps for the production of intermediate products
- Mining locations

- Production sites
- Suppliers

It is acceptable to reference accepted industry average numbers as a representation for recycled content or material representation.

3.1.1.6 Availability of Raw Materials

Information on general and regional availability of the raw materials used, for example:

- Resources,
- Reserves,
- Recycling or secndary material

Information on the availability of resources must be issue-related (not: "...the company's consumption compared to world consumption is negligible...").[9]

3.1.2 Manufacturing

The manufacturing process shall be described and illustrated with a simple chart or diagram. The illustration should be representative of the dominant process and technology and should be representative of the process modeled within the LCA. The coatings (e.g., strip coating of cold-rolled sheets), surface coatings (e.g., profile sheets), and the auxiliary materials used as a function of atmospheric burden must also be addressed.

If the EPD applies to multiple locations, the production locations must be disclosed and the processes of those locations must be described where the primary technology and processes are not represented in the illustration provided.

Health Protection in Production

Description of health protection measures taken during production process that exceed national regulations (of the country of production). Precautionary measures for certain process steps, if applicable.

[9] For example, the most significant copper mining areas include this lake region in North America and the South West of the USA, Zambia, and the southern part of the African continent, the west coast of South America (mainly Chile and Peru) and Mexico. Furthermore, the copper mines of Kazakhstan and Uzbekistan. Australia, China, Indonesia, Papua New Guinea and the Philippines also have stocks worth mentioning. In Europe, only the remaining copper deposits in Poland and Turkey are of any economic importance. In Germany – for example in the Mansfelder countryside – there were only small quantities of copper, and these deposits have either been exhausted or can no longer be mined in terms of economic efficiency. One source of copper as a raw material with increasing importance is the return of the metal using specific separation processes – basically a common practice for thousands of years, relatively easy to carry out, based on the easy refoundability of copper. The raw material copper is available anywhere, as copper is traded on the 'London Metal Exchange. The reserves that have been developed will suffice for several decades and there is still the potential of developing new resources. The base materials used are limited in their availability. The copper reserves that can economically be mined using today's technology are currently estimated to contain approx. 320 m tons worldwide. The reuse or recycling potential of copper is almost 100 % which helps conserve resources.

Environmental Protection in Production

Description of environmental protection measures taken in the production process, which exceed national regulations or system-dependent requirements, e.g., description of especially eco-friendly treatment of exhaust air, wastewater, waste, and noise-emissions. Information on the Environmental Management System (if existent).

3.1.3 Application

The application of these products must be specified.

Example:

- Applications of building products, for example:
  - sheeting in excavation pit
  - anchor structures
  - supporting and retaining structures
  - Sub-structures and covering for roof and wall
  - Steel for composite steel structures
- Steel-Concrete Composite, Composite Steel Structures
  - Self-supporting sandwich elements for:
    - roofs and roofings;
    - exterior walls and wall coverings;
    - walls (including partition walls) and (sub) ceilings within the building envelope.

The characteristics of the product that are a result of the application should also be specified. These could be an important part of a specification decisions.

Examples may include but are not limited to:

- Air barrier properties
- Acoustical properties
- Thermal properties
- Etc.

The applications relate to the supplied product and the intended purpose(s) of use, even if it is only achieved through further processing by subsequent manufacturers.

3.1.4 Product Performance Data

The applicable standard(s) or the general approval by building authorities or a comparable national regulation must be indicated.

See Appendix 1 for examples.

3.1.5 Quality Control

Information on quality control must be product-related. Quality management systems (QMS), environmental management systems (EMS) and factory-own production control measures according to North American regulations or national regulations can be indicated, if applicable.

3.1.6 Delivery Conditions and Properties

The dimensions of the declared products in delivery condition must be indicated. Given the changes in the delivery conditions, a typical range of delivery conditions should be specified. This is not intended to require an exact measurement of all products as delivered.

3.1.7 Singular Effects

3.1.7.1 Fire

Information on fire behavior including, if relevant:

- Building materials
- Smoke production
- Critical material temperature (failure temperature)
- Melting temperature
- Other responses to fire.

3.1.8 Weathering

For metallic surfaces, empirical values for the weathering per year must be declared. The data source, the location of the sampling, and the duration of the weathering test must be declared as applicable. See Appendix 1.

3.1.9 Product Processing/Installation

3.1.9.1 Processing/Installation Recommendations

Description of the processing method, machinery, tools, dust extraction, etc. to be employed, and auxiliary substances, as well as noise reduction measures.

- Basic principles:
  - Transportation and storage
- Construction:
  - With other metals
  - With other building materials
  - Fasteners (mechanical, adhesive etc.)
  - Details which must be noted (life time)
- Additional products
- Tools
- Processing operation:
  - Easy/medium/difficult to process;
  - Required level of professional competence;
  - Mounting effort: Processing steps (e.g., screwing, welding)
  - Processing conditions (e.g., outside temperature)

Indication of the processing regulations and standards, if possible. Information on technical rules and rules on safety and environmental protection, if possible.

3.1.9.2 Occupational Safety/Environmental Protection

Information on measures of occupational safety and environmental protection (e.g. professional associations) and own systems, information on special hazard potentials (e.g., handling of acids).

3.1.9.3 Residual Material

The treatment of the residual materials, e.g. handling of the residuals, sorting, recycling, and disposal must be declared.

3.1.9.4 Packaging

Information on product-specific packaging: type, composition, and possible re-use of packaging material (paper, pallets, films etc.); Indication of the waste code.

Example: PE shrink film (15 01 02 plastic packaging); disposal of the film packaging

3.2 Reference PCR and Verification

The verification of the Environmental Product Declaration shall be documented according to the template below and in compliance with the requirements of ISO 14025. The Product Category Rules underlying the Environmental Product Declaration shall be indicated, including the version.

The PCR review was conducted by:	(PROGRAM OPERATOR) (PANEL REVIEW CHAIR) (ADDRESS)
This declaration was independently verified by Underwriters Laboratories in accordance with ISO 14025 ☐ INTERNAL ☐ EXTERNAL	INSERT SIGNATURE NAME, Declaration Verifier
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	INSERT SIGNATURE (NAME), LCA Verifier

3.3 Declaration of environmental parameters derived from LCA

To illustrate the product system studied, the EPD shall contain a simple flow diagram of the processes included in the LCA. They shall be sub-divided at least into the life cycle stages of the product: production, and if applicable construction, use and end-of-life (see Figure 1). The stages may be further sub-divided.

This PCR also addresses core issues in ISO 14025 Section 6.7.2 Requirements for Comparability. The provision of a true quantitative metric to guide the interpretation of results is preferred. However, in most cases,

this type of metric is unavailable. While conformance to this PCR minimizes that variations and deviations, there are still components that might influence the comparability of EPDs. Caution should be used when interpreting results and applying them for comparative decisions making. The declarer must, where possible, use quantitative metrics to capture the uncertainty. At a minimum, the declarer will provide qualitative guidance in relevant sections to guide users in interpreting the information contained within the EPD relative to comparability and use for decision-making. The declarer must state that differences between environmental declarations are not guaranteed for comparative purposes.

3.3.1 Rules for declaring LCA information

The EPD shall specify which EPD-type is declared:

- "Cradle to Gate" EPD: For a "Cradle to Gate" EPD a declaration of the RSL is not possible. The RSL shall be declared as: "not specified". Normally in this type of EPD module D is not declared;
- "Cradle to Gate with Options" EPD: For a "Cradle to Gate with Options" EPD the declaration of the RSL is possible only if all scenarios for the modules A1-A3 and B1-B5 are given (see Figure 1);
    - The reference service life of the building is defined as 60 years.
    - The number of replacements of the membrane shall be declared accordingly.
    - Maintenance/replacements are to be modeled according to manufacturer's guidelines
- "Cradle to Grave" EPD: For a "Cradle to Grave" EPD (life cycle declaration covering all modules in the stages A to C) a declaration of the RSL is required.

In some cases, certain modules may not be relevant to the environmental performance of a product. In such cases, the irrelevant module shall be declared as "not relevant". Such a declaration shall not be regarded as an indicator result of zero.

3.3.2 Parameters describing environmental impacts

The following information on environmental impacts is expressed with the impact category parameters of LCIA using characterization factors. These predetermined parameters are required and shall be included in the EPD as follows: (At a minimum characterization factors from both the US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI 2.0) shall be reported. Characterization factors taken from the University of Leiden (CML) methodology shall be reported for EPDs outside of North America)

IMPACT CATEGORY	PARAMETER	TRACI	CML
Global Warming	Global warming potential, GWP	kg CO_2 equiv	kg CO_2 Equiv
Ozone Depletion	Depletion potential of the stratospheric ozone layer, ODP	kg CFC 11 equiv	kg CFC-11 equiv
Acidification for Soil and Water	Acidification potential of soil and water, AP	mol H+ equiv.	kg SO_2 equiv

Eutrophication	Eutrophication potential, EP	kg N equiv	kg $(PO_4)^{3-}$ equiv
Photochemical Ozone Creation	Formation potential of tropospheric ozone, POCP	kg O_3 equiv	kg Ethene equiv
Depletion of Abiotic Resources – Elements*	Abiotic depletion potential (ADP-elements) for non-fossil resources.		kg Sb equiv
Depletion of Abiotic Resources – Fossil Fuels**	Abiotic depletion potential (ADP-fossil fuels) for fossil resources.		MJ, net calorific value

* ADP-Elements includes all non-renewable, abiotic material resources (i.e. excepting fossil resources).
** ADP-Fossil Fuels includes all fossil resources.

The categories of the life cycle impact assessment should be interpreted by assigning them to the declared unit and stating any specifications, which have a significant effect on the result. The declarer must state that differences between environmental declarations are not guaranteed for comparative purposes. Comparative descriptions of different building materials within one EPD are inadmissible.

3.3.3 Parameters describing resource use

The following environmental parameters apply data based on the LCI. They describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water. They are required and shall be included in the EPD as follows:

PARAMETER	UNITS
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value
Use of renewable primary energy resources used as raw materials	MJ, net calorific value
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value
Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value
Use of secondary material	kg
Use of renewable secondary fuels	MJ, net calorific value
Use of non-renewable secondary fuels	MJ, net calorific value
Use of net freshwater	m^3

In order to identify the input part of renewable/non-renewable primary energy used as an energy carrier and not used as raw materials, the parameter “use of renewable/non-renewable primary energy, excluding renewable/non-renewable primary energy resources used as raw materials” is considered and can be calculated as the difference between the total input of primary energy and the input of energy resources used as raw materials.

3.3.4 Other environmental information describing different waste categories and output flows

The parameters describing waste categories and other material flows are output flows derived from LCI. They are required and shall be included in the EPD as follows:

PARAMETER	UNITS
Hazardous waste disposed	kg
Non-hazardous waste disposed	kg
Radioactive waste disposed	kg
Components for re-use	kg
Materials for recycling	kg
Materials for energy recovery	kg
Exported energy	MJ per energy carrier

The parameters in the table above are calculated on the gross amounts leaving the system boundary when they have reached the end-of-life stage. The parameter “Materials for energy recovery” does not include materials for waste incineration. Waste incineration is a method of waste processing and is allocated within the system boundaries. Waste incineration plants have a lower energy efficiency rate than power plants using secondary fuels. Materials for energy recovery are based on thermal energy efficiency rate of a power plant not less than 60% or 65% for installations after 31st of December 2008 in order to be in line with the distinction made by the EC. Exported energy relates to energy exported from waste incineration and landfill.

3.4 Scenarios and additional technical information

Scenarios for certain life cycle stages should support the application of product related data in the corresponding life cycle stage of the building assessment. Additional technical information as defined in Section 3.3 supports the consistent development of scenarios by which the LCA derived parameters. Therefore, if optional life cycle stages are declared, the scenarios to which the calculated parameters relate shall be specified according to Section 3.3 and be included in the EPD. If an EPD claims to cover all life cycle stages, all relevant optional modules shall be calculated for specified scenarios and the LCA derived parameters shall be declared. Alternatively, in the cradle to gate EPD, a manufacturer may choose to declare additional technical information without calculating optional life cycle stages to ensure proper understanding of a product’s function in a building and thus support proper scenario development at the building level. Additional technical information is declared in the module to which it refers (e.g. technical information about the use of a product in the appropriate use stage modules B.) Any additional technical information shall be documented separately from the LCA derived parameters. If additional technical information is not complete at the product level as specified in Section 3.3, this shall be stated. The following tables are not exhaustive with respect to examples or given units and parameters.

3.4.1 Transport to the building site

If additional technical information is provided in the EPD for transport from the production gate to the construction site, the following information shall be provided to specify the transport scenarios used or to support development of the scenarios at the building level:

PARAMETER	UNITS
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat etc.	L of fuel type per distance)
Distance	km
Capacity utilization (including empty returns)	%
Bulk density of transported products	kg/m^3
Volume capacity utilization factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	*N/A*

Transportation directly to the site does not always occur and it is possible to transport in stages. When this scenario occurs and if affects the reporting of the above parameters, it should be clearly stated.

3.4.2 Installation in the building

Information on where explanatory material on installation can be found shall be stated in the EPD. Guidance on safe and effective installation, use and disposal of the product can be supplied within the EPD if desired.

If additional technical information is provided in the EPD for installation in or onto the building, the following information shall be provided to specify the product's installation scenarios or to support development of the scenarios describing the product's installation at the level of the building assessment:

PARAMETER	UNITS
Ancillary materials for installation (specified by material);	kg
Water use	m^3
Other resource use	kg
Quantitative description of energy type (regional mix) and consumption during the installation process	MJ
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

3.4.3 Use in the building

If additional technical information is provided in the EPD for products requiring maintenance (including maintenance required for warranty), repair, replacement, or refurbishment the following information shall be provided to specify the scenarios or to support the development scenarios of these modules at the building level. Information given for the following table shall be consistent with the reference service life data given in Section 3.3.4:

PARAMETER	UNITS
Maintenance	
Maintenance process	Description or source of description
Maintenance cycle	# per RSL or year
Ancillary materials for maintenance, (e.g. cleaning agent, specify materials)	kg/cycle
Wastage material during 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
Direct emissions to ambient air, soil and water	kg
Repair	
Repair Process	Description or source of description
Inspection process	Description or source of description
Repair cycle	# per RSL or year
Ancillary materials, (e.g. lubricant, specify materials)	kg/cycle
Waste material during repair (specify materials)	kg
New fresh water consumption during repair	m^3
Energy input during repair (e.g. crane activity), energy carrier type e.g. electricity, and amount	kWh/RSL
Replacement	
Replacement cycle	# 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 galvanized steel sheet), specify materials	kg
Refurbishment	
Refurbishment process	Description or source of description
Refurbishment cycle	# per RSL or year
Energy input during maintenance (e.g. vacuum cleaning), 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
Wastage material during maintenance (specify materials)	kg

3.4.4 Reference Service Life

The description of the reference service life may be based on data collected as average data or at the beginning or end of the service life. The reference conditions for achieving the declared technical and functional performance and the declared reference service life shall include the reference service life data as described in the following table, where relevant:

PARAMETER	UNITS
Reference service life	Years
Declared product properties (at the gate) and finishes, etc.	As appropriate
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices	As appropriate
An assumed quality of work, when installed in accordance with the manufacturer's instructions	As appropriate
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	As appropriate
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)	As appropriate
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	As appropriate
Usage conditions, e.g. frequency of use, mechanical exposure	As appropriate
Maintenance e.g. required frequency, type and quality and replacement of replaceable components.	As appropriate

*Parameters listed in this table shall be the same as the parameters used in the LCA model if appropriate.

3.4.5 Use of Water

If additional technical information is provided in the EPD for building integrated technical systems using energy or water related to the operation of the building, the following information shall be provided to specify the scenarios or to support the development of the use of energy and use of water scenarios at the building level:

PARAMETER	UNITS
Ancillary materials specified by material	As appropriate
Net fresh water consumption	m^3
Type of energy carrier, (e.g. electricity, natural gas, district heating)	kWh
Power output of equipment	kW
Characteristic performance (e.g. energy efficiency, emissions, variation of performance with capacity utilization etc.)	As appropriate
Further assumptions for scenario development, (e.g. frequency and time period of use, number of occupants)	As appropriate

Guidance on the selection of standards to calculate operational energy use can be obtained from CEN/TR 15615 "Explanation of the general relationship between various European standards and the Energy Performance of Buildings Directive".[10]

[10] The North American equivalent to CEN/TR 15615 is ASTM E2797 - 11 Standard Practice for Building Energy Performance Assessment

3.4.6 End-of-life

If additional technical information is provided in the EPD about end-of-life processes, the following information shall be provided for all construction products to specify the end-of-life scenarios used or to support development of the end-of-life scenarios at the building level. Scenarios shall only model processes, e.g. recycling systems that have been proven to be economically and technically viable.

PROCESSES	UNITS
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	As appropriate

3.5 Additional information on release of dangerous substances to indoor air, soil and water during the use stage

3.5.1 Indoor Air

The following information shall be provided for products exposed to indoor air after their installation in buildings during the use stage in order to support use stage scenarios with respect to health at the building level for EPDs to be used in European markets:

– Emissions to indoor air, according to the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized testing methods according to the provisions for European or North American product standards, where applicable.

If the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions for European or North American product standards are not available, the EPD can lack this information.

3.5.2 Soil and Water

The following information shall be provided for products exposed to soil and water after their installation in buildings during the use stage in order to support use stage scenarios for soil and water pollution at the building level:

– Release to soil and water according to the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized testing methods according to the provisions European or North American product standards, where applicable.

If the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available, the EPD can lack this information.

3.6 Documentation on additional information

The project report shall include any documentation on additional environmental information declared in the EPD as required in this PCR. Such documentation on additional environmental information may include, e.g. as copies or references:

- laboratory results/measurements for the content declaration;
- laboratory results/measurement of functional/technical performance;
- documentation on declared technical information on life cycle stages that have not been considered in the LCA of the construction product and that will be used for the assessment of buildings (e.g. transport distances, RSL according to Annex A, energy consumption during use, cleaning cycles, etc.);
- laboratory results/measurements for the declaration of emissions to indoor air, soil and water during the product's use stage.

3.7 Data availability for verification

To facilitate verification it is considered good practice to make the following information available to the verifier, taking into account data confidentiality according to ISO 21930:2007-10, clause 7.4 and 9.1:

- analysis of material and energy flows to justify their inclusion or exclusion;
- quantitative description of unit processes that are defined to model processes and life cycle stages of the declared unit;
- attribution of process and life cycle data to datasets of an LCA-software (if used);
- LCIA results per modules of unit processes, e.g. structured according to life cycle stages;

- LCIA results per production plant/product if generic data is declared from several plants or for a range of similar products;
- documentation that substantiates the percentages or figures used for the calculations in the end-of-life scenario;
- documentation that substantiates the percentages and figures (number of cycles, prices, etc.) used for the calculations in the allocation procedure, if it differs from the PCR.

3.8 Verification and validity of an EPD

After verification, an EPD is valid for a 5 year period from the date of issue, after which it shall be reviewed and verified. An EPD shall only be reassessed and updated as necessary to reflect changes in technology or other circumstances that could alter the content and accuracy of the declaration. An EPD does not have to be recalculated after 5 years if the underlying data has not changed significantly. The process for verification and establishing the validity of an EPD shall be in accordance with ISO 14025, ISO 21930, and EN 15804.

A reasonable change in the environmental performance of a product to be reported to the verifier is +/- 10% on any one of the declared parameters of the EPD (see clause 7). Such a change may require an update of the EPD.

3.9 References Standards and Legislation

All literature cited in the PCR has to be referenced (see also references in this document).

Standards and laws cited in the EPD must be correctly referenced.

Example: ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006)

Insulated Metal Panels & Metal Composite Panels, and Metal Cladding: Roof and Wall Panels
Product Category Rule Number 000000

According to ISO 14025

Appendix 1

The applicable standard(s) or the general approvals by building authorities or a comparable national regulation that may be indicated include the following:

For Metal Cladding Roof and Wall:

AAMA 501.1, Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure
AAMA 620, Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Aluminum Substrates
AAMA 621, Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates
ASCE 7
ASCE Assignment of Authority and Responsibility for the Design of Steel Structures
ASHRAE 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings
ASTM A240 - [Stainless Steel]
ASTM A463 - [Aluminized Steel], (option-Mil-S-4174B)
ASTM A653, Steel Sheet, Zinc-Coated or Zinc Iron Alloy Coated by the Hot Dip Coating Process
ASTM A666 - [Annealed or Cold Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar]
ASTM A755, Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
ASTM A792, Steel Sheet Coated with 5% Al-Zn Alloy
ASTM A875, Steel Sheet Coated with 5% Al-Zn Alloy
ASTM A924, Hot Dip Coating Process
ASTM B101 - [Lead-coated copper sheet]
ASTM B117, Salt Spray Corrosion Test
ASTM B209 - [Aluminum Sheet Material Specification]
ASTM B209, Specification for Aluminum and Aluminum Alloy Sheet and Plate
ASTM B370 - [Copper Sheet and Strip for Building Construction}
ASTM C1371 - Standard Test Method for Determination of Emittance of Materials near Room Temperature Using Portable Emissometers
ASTM C1549 - Standard Test Method for Determination of Solar Reflectance near Ambient Temperature Using a Portable Solar Reflectometer
ASTM C236 - Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box (Withdrawn 2001)
ASTM D2244, Calculation of Color Difference
ASTM D2247, Water Resistance of Coatings
ASTM D2794, Resistance of Organic Coatings to Effects of Rapid Deformation
ASTM D4214, Evaluation of Degree of Chalking
ASTM D4977, Granule Adhesion
ASTM D522, Mandrel Bend Test of Attached Organic Coatings
ASTM D523, Specular Gloss
ASTM D968, Abrasion Resistance of Organic Coatings by Falling Sand

ASTM E108 - [Fire Tests of Roof Coatings]
ASTM E119 - [Fire Test of Building Construction & Materials] When required, UL 263 may be specified for fire tests
ASTM E1592 – [Structural Wind Uplift Test]
ASTM E1646 - [Water Penetration]
ASTM E1680 - [Air Infiltration]
ASTM E283 - [Air Infiltration]
ASTM E330 - [Structural Test - Chamber Method]
ASTM E331 - [Water Penetration]
ASTM E72, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
ASTM E84 - [Surface Burning Characteristics of Building Materials]
ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
ENERGY STAR®
SMACNA, [Architectural Sheet Metal Manual - Gutter design and flashing details]
UL - Building Materials Directory
UL, Fire Resistance Directory
UL 1897
UL 2218
UL 580
UL Fire Resistance Directory

For Metal Composite Panels:

AAMA 2605
AAMA 509
AAMA 620
ASCE 7
ASTM A653
ASTM B209
ASTM C1371
ASTM C1549
ASTM D1781
ASTM D1929
ASTM D3359
ASTM D635
ASTM E283
ASTM E329
ASTM E330
ASTM E331
ASTM E84
ASTM E 408
NFPA 285

For Insulated Metal Panels:

AAMA 501.1

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AAMA 501.2
AAMA 620
AAMA 621
ANSI/FMG 4471
ANSI/FMG 4880
ASCE 7
AS-TL1923A
ASTM A 653
ASTM A 755
ASTM A240
ASTM A653
ASTM A755
ASTM A792
ASTM A924
ASTM B117
ASTM B209
ASTM C1371
ASTM C1363
ASTM C1549
ASTM C209
ASTM C273
ASTM C518
ASTM D1014
ASTM D1621
ASTM D1622
ASTM D1623
ASTM D1729
ASTM D1929
ASTM D2244
ASTM D2247
ASTM D2794
ASTM D3359
ASTM D4145
ASTM D4214
ASTM D4585
ASTM D4587
ASTM D4752
ASTM D523
ASTM D7091
ASTM D968
ASTM E 119
ASTM E 1646
ASTM E 1680
ASTM E 1980
ASTM E 72

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ASTM E 84
ASTM E119
ASTM E1332-10a
ASTM E1592
ASTM E1646
ASTM E1680
ASTM E18
ASTM E1886
ASTM E1996
ASTM E283
ASTM E330
ASTM E331
ASTM E413-87
ASTM E72
ASTM E84
ASTM E408
ASTM E90-99
ASTM F1642
ASTM G151
ASTM G154
CAN/ULC S101
CAN/ULC S102
CAN/ULC S126
CAN/ULC S134
CAN/ULC S138
City of Los Angeles
FM 4471
FM 4880
FM 4881
GSA-TS01-2003
Florida Department of Business and Professional Regulation - Roof
Florida Department of Business and Professional Regulation - Wall
NFPA 259
NFPA 285
NFPA 286
T315-09
UL 1040
UL 1256
UL 1715
UL 1897
UL 263
UL 580
UL 723