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PCR Aluminium Building Products

EAA Environmental Product Declarations
14 March 2007

Table of contents

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0 Purpose of the Product Category Rules (PCR) document

This document establishes the rules for developing the data and indicators underlying a Type III Environmental Product Declaration (EPD) of the product category of "Products for building applications where Aluminium contributes significantly to the product's performance characteristics".
These rules are compiled to provide the specifications of a software tool for generating EPD within the EPD program of the European Aluminium Association. They follow the requirements of ISO DIS 21930, Building construction - Sustainability in building construction – Environmental declaration of building products and the requirements of ISO FDIS 14025, Environmental labelling and declarations – Type III environmental declarations – Principles and procedures and the provisions in ISO 14040 series of standards, Environmental management — Life cycle assessment. The document includes the rules for developing the LCA derived data as well as additional data, both relevant to the environmental performance characteristics of products within this product category. The document also specifies the LC-indicators and other indicators to be declared in the EPD. Finally it settles what information will be declared in the EPD, what information will be available to the public on request, and what information will be contained in the report made available to the verifier.
EPD following these PCR are based on information modules that do not cover all aspects of the product's use. While EPD are intended for comparison in the context of a product's application in a building, comparison of EPD without considering the use stage in the context of a building is not valid. EPD from different programs may not be comparable.

0.1 Contents of short version EPD

A short version is developed which contains the mandatory information according to ISO 14025 and ISO 21930 and which is intended to be distributed by print:

- Date of publication;
- Name of program operator;
- Name and address of company issuing the EPD;
- Product description according to chapter 1; the total weight of the Product will be stated.
- Description of production process using a simple visualisation and the list of production modules and covering all items of chapter 3, however not including:
  - Availability, extraction and origin of raw materials;
  - Occupational health and safety aspects;
  - Environmental aspects during production/ assembly which are not addressed by the LC Impact assessment;
  - Statement on data quality.
- LC-Indicators according to chapter 7.2, as part of the pre-determined parameters, as one set of indicators for the entire information module;
- Indicators for additional information as part of the pre-determined parameters, and covering all items of chapter 4,5 and 6 however not including:
  - Recommendations for avoiding environmental impacts at the building and installation site;
  - External and special influences;
  - Statement on data quality.
- Statement for verification: Review of PCR by third parties, was conducted by:

< name and organisation of the chairperson, and information on how to contact the chairperson through the programme operator
>Independent external verification of the declaration, according ISO 14025, third party verifier:
<name of the third party verifier>

- Statement of comparability according to chapter 0;
- Indication where the long version of the EPD and the PCR document, can be acquired.

0.2 Contents of long version EPD

The long version contains the mandatory information according to ISO 14025 and ISO 21930 as well as further optional information. It is intended to be distributed upon request and to be available in web-based applications. The long version can contain links to relevant documents concerning the LC indicators and additional information. It contains specifically:

- Information on program operator;
- Description of the product, covering all items of chapter 1 and 2;
- Description of production process, covering all items of chapter 3;
- LC indicators according to chapter 7.2;
- Additional information covering all items of chapter 4, 5 and 6;
- Information on recycling issues;
- Statement on data quality.

0.3 Contents of the report for the verifier to verify the EAA-EPD-tool

- Description of product, declared unit;
- Description of production process;
- Description of allocation rules;
- Statement about where the data is accessible;
- LC indicators: statement about plausibility of underlying data;
- Statement about how data quality is achieved;
- Explanatory information (if relevant) and meta-data for additional information.

0.4 Product category

- Products for building applications where Aluminium contributes significantly to the products' performance characteristics.

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1 Description of the building product

1.1 Description of the declared/functional unit and of the application:

Definition of the declared/functional unit	The name and type of product (semi-finished, building element, finished) are stated; The declared unit is defined, including the appropriate reference service life (maintenance); e.g. 1 window and its specifications, for 20 years; If applicable the functional unit for the full life cycle has to be defined.
Function / Application	Final application in a building or construction work even if the product is semi-finished, e.g. in a roof, façade.
Product standard / technical approval	Identification of product by product standard or technical approval.

1.2 Description of the Life Cycle stages of a building product

Group of Life Cycle stages	**Life Cycle stages**
Material production / assembly stage	Material production;
	Transport to manufacturer;
	Assembly / Manufacturing stage;
	Transport to building site;
	Integration and application of the product in a building;
Use stage	Operation in the building, repair, replacement;
	Cleaning, maintenance;
End of life stage	Demolition
	Transport for end of life processes;
	Recycling / treatment / disposal.

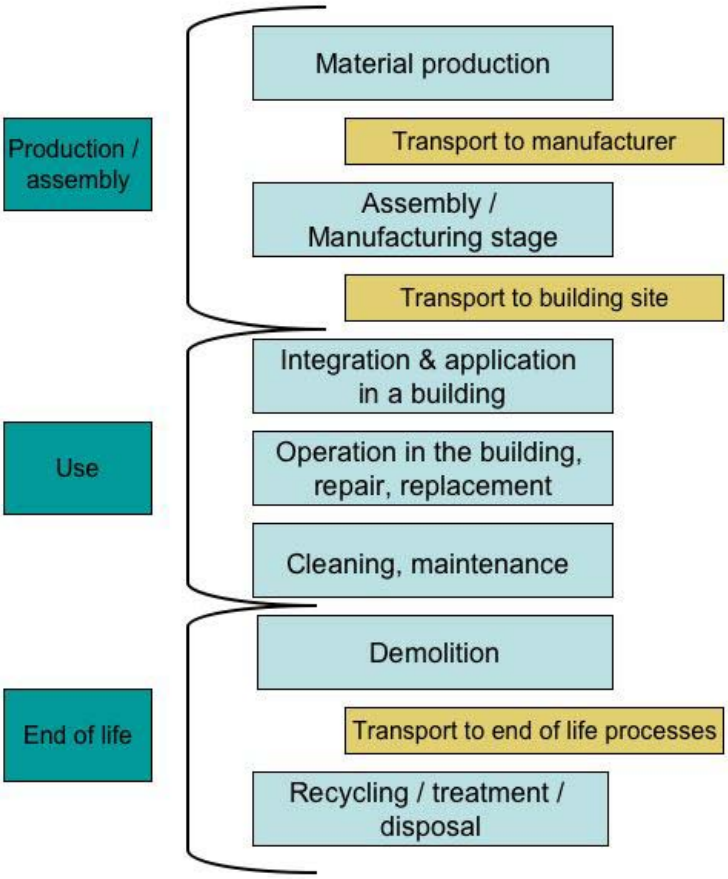

Fig 1: description of the Life Cycle stages of a building product

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2 Components / Materials

Composition / configuration of the product	Specification of the composition (e.g. for aluminium sheet) or configuration (e.g. for a window) of the product, before considering the cut-off criteria chapter 7.1.

Example:

Single side-hung casement window "Super Side-Hung window". Total weight of the product: 51,3 kg

Type of element	**Element definition**	**Weight of element**	**Surface area**	**Material**	**Description**
Al frame and casement (sash and frame)	System “AluFrame Top”	16,2 kg	0,36 m^2	AW-6060	Al profile coated with TIGC free polyester powder coat
		2,3 kg		PA 6.6 GF	Thermal insulation
Double glazing unit	GlassSup "silent top 54/76"	27,9 kg	1,44 m^2	Floatglass	2 x 4mm floatglass, coated on one side
		0,62 kg		Al profile	AW-6060
				Argon	Inert gas filling
		0,41 kg		Polysulphide	Gaskets
		0,40 kg		Alumino silicate	Molecular screen
Gaskets	System “EPDM-1A XY”	1,91 kg		EPDM	
Hardware unit components	HingeCo Centro royal	0,18 kg		Stainless steel	
		0,13 kg		Steel	
		0,34 kg		Al profile	AW-6060
		0,17 kg		Al cast	
		0,75 kg		Zinc cast	
Hazardous substances		Documentation of regulated substances, cut-off criteria according to chapter 7.1.			

3 Additional information on production/ assembly

Documentation of availability, extraction and origin of materials	General information for the main input materials: o Type of resource for raw materials, e.g. mineral, fossil; o Reserve of resource for raw material; o Extraction process of raw materials;

	○ Location of extraction; ○ Recycling- or secondary materials. All material flows contributing more than 5% weight to the material flow of the complete product system have to be addressed.

Production	Schematic description of the production/ assembling process (text and figure if applicable) including the system boundaries.
Packaging	Packaging of the product: Type of packaging, material and if possible end of life procedures for packaging.
Documentation of aspects of occupational health and safety during production	Description of occupational health and safety aspects if relevant.
Environmental management system in place	☐ Yes ☐ No
Data Quality	See chapter 6

4 Additional information concerning integration and application of the product in a building

4.1 Characterisation of the product in delivery condition

Characteristics Items not relevant for the product can be neglected	○ Dimensions, e.g. for windows: surface of transparent area; ○ Mass per declared unit; ○ Number of declared units per delivery; ○ Thermal transmittance of the product (W/m^2 x K) (in line with the values stated for CE marking); ○ Air tightness, consider possible deterioration during life time; ○ Acoustic performance characteristics; ○ Fire resistance/reaction to fire (make use of the existing classification system, see CE marking). A reference to the harmonised product standards (European Standards EN guiding to the CE marking or the appropriate European Technical Approvals ETAG) can be given.

4.2 Fitting, Erection, Installation in the Building

Ancillary materials	Description of typical installation procedures and ancillary materials used. The cut off rules of the product system are to be applied (see chapter 7.1).
Recommendations for avoiding environmental impacts at the building site/ installation site	During transport and storage: o During installation in the building; o When cleaning.
Documentation of aspects of occupational health and safety	Special activities for health and occupational protection at the building site during installation, if applicable.
Documentation of environmental aspects	Special measures for environmental protection at the building site during installation, if applicable.
Recommendations for waste at the building site	E.g. recommendations for collection systems, concerning residual material, scrap, packaging etc.
Data quality	See chapter 6

5 Additional information supporting potential modelling of the use stage of the product

Aspects of health and environment	o Statement on indoor air quality and potential emissions into indoor air; o Potential emissions into the ground water.
Service life **Thermal transmittance** **Maintenance**	o Description of Reference Service Life, according to ISO 15686, part 1 and 8; o Description of thermal transmittance, air tightness and acoustic performance characteristics, see 4.1; o Description of typical maintenance procedures and ancillary materials used. The cut off criteria stated under chapter 7.1 of the product system shall be applied.

External influences	A short description of alteration of the product during use, caused by external effects as from climate or other wearing influences, e.g.: o Cleaning; o Thermal shock; o Mechanical alteration e.g. from wind.
Special influences	A short description of possible environmental impacts caused by special influences, e.g.: o Fire.
Data Quality	See chapter 6

6 Additional information for end of life processes

Documentation of Recycling information	Recycling issues, including collection rates.
Documentation of Disposal / landfill information	Requirements for deposition.
Data Quality	All assumptions and data sources of the additional information of chapters 3 to 6 shall be documented together at the end of the “additional information section”.

7 Life Cycle Assessment

EPD can be based on an information module. An information module is according to ISO 14025 a compilation of LC- and additional data covering a unit process or a combination of unit processes that are part of the life cycle of a product. The information module underlying the EPD based on the PCR of this document shall be prepared according to the provisions of ISO 14040 series of standards, Environmental management — Life cycle assessment.

7.1 LCA requirements

Declared unit	The declared unit describes the unit in reference to which all LCA data is calculated. It includes technical characteristics and, if appropriate, reference service life, e.g. 1 single side-hung casement window "Super Side-Hung window" for 20 years.

System boundary	The information module describing the declared unit is illustrated by a flow diagram. All assumptions are explained. The system boundary is defined. The information module shall include all processes of the life cycle from raw material extraction through production, refining, packaging, storage and transport to the construction site, installation, maintenance and the end of life stage. The end of life stage is described separately. This step starts with scrap recovery and ends with the production of recycled material, which can replace virgin material. If the product‘s actual use is not known, the EPD should give additional information to support modelling of the use stage and calculation of the appropriate information module by the user, when the data of the specific building are given, (see Chapter 5).
Transports	All relevant transports shall be included in the information module, including transports from the production to the building site. Relevant distances and transportation systems shall be documented. Transports from gate to building sites should be documented separately.
Allocation	Allocation within the life cycle (multi output processes) shall reflect the purpose of the process. The allocation procedure shall be explained. Allocation across product systems (recycling) shall be treated as avoided production using the substitution method. Note: the substitution method is applicable only when the recycled material fulfils the same product specifications as the primary material.
Cut off criteria	In principle all environmentally relevant material flows shall be included in the product system. Inventory data available at appropriate quality shall be included in the calculations. For practical reasons this means that all material flows going into the product system (inputs) > 1% of the total mass flow (t) or > 1% of the total primary energy input (MJ) shall be part of the system and modelled in order to obtain elementary flows. All material flows leaving the product system (outputs) causing environmental impacts > 1% of the total impact of its respective impact category, shall be part of the system. Documented estimates are permissible. For hazardous and toxic materials and substances the cut-off rules do not apply.
Data quality	**Temporal:** All data with significant contribution to predetermined parameters should be taken as 12 months averages and should not be older than 10 years. Exceptions shall be justified. **Geographical:** Data describing the direct inputs and outputs of the foreground processes (e.g. aluminium production and

	recycling) shall be collected by the EAA and partners in the program. This data shall be representative of Europe. **Technological:** The data for Aluminium production processes shall represent at minimum 50 % of the present Al-production (based on tonnage) within Europe. A lower ratio shall be stated. **Data source:** The energy supply of the sites shall be modelled site specific where appropriate, e.g. if direct energy supply is derived from one source. Otherwise, energy supply shall be modelled specific for the member state. Transport data from production to the construction site shall be specific data from the producer. Generic data, e.g. supply of ancillary material and energy or transports, shall be taken from GaBi database or equivalent data. Care shall be taken for consistency of any data used to develop EPD in the EAA program. Data from other industries joining the program should be included, e.g. from glass manufacturer. However, care shall be taken for consistency of the combined data sets. Any data taken from a database shall be identified and the data source shall be stated.

7.2 LC-Indicators

Inventory	All data shall be declared separately for: o Production including transport to construction site; o Use (maintenance without operation); o End of life. The pre-determined parameters of the EPD shall be based on information modules, which comprise the production stage and the end-of-life operations, but do not include the use stage. The end-of-life operations, including substitution of lost aluminium, shall also be reported separately. The contributions from installation are considered as part of the use stage and are reported separately as additional information and as part of the pre-determined parameters. The following aggregated LCA- Indicators from the inventory are part of the pre-determined parameters, published in the declaration: o Energy inputs, reported as: • Depletion of non-renewable energy resources (MJ) differentiated into main categories as: - % Fossil oil; - % Natural gas; - % Coal;

	- % Uranium; • Use of renewable energy (MJ) differentiated into main categories as: - Hydropower; - Solar radiation; - Wind power; o Water consumption; o Waste as kg mass flow: • Differentiated into origin of waste as: - Mining residues; - Residues from ore refining; - … • Differentiated into types of waste as: - Non hazardous waste; - Hazardous waste.

Impact assessment	LC Indicators from impact assessment shall be part of the pre-determined parameters, reported for the following categories:		
	Impact category	**Unit/declared unit**	**source**
	Depletion of abiotic resources	[kg Sb equiv]	CML 2001
	Climate change (GWP)	[kg CO_2 equiv]	Latest version of IPCC
	Destruction of atmospheric ozone (ODP)	[kg R11 equiv]	Latest version of WHO
	Acidification (AP)	[kg SO_2 equiv]	CML 2001
	Eutrophication (NP)	[kg PO_4 equiv]	CML 2001
	Photochemical Ozone Creation (POCP)	[kg Ethen equiv]	CML 2001
Interpretation	All data is calculated per declared unit or, if applicable per functional unit.		

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8 References

	The PCR are based on the following studies: Buxmann, Kurt; EAA, 2001; Ökobilanz einer ALUCOBOND-Fassade im Vergleich zu Vollaluminium und Faserzement. EAA; April 2000; Environmental Profile report for the European Aluminium Industry. Werner, Frank; EMPA Dübendorf, 2000, CH; Treatment of recycling of aluminium in LCA. Wicona, 2005, Ökobilanzstudie “VisionenBauen”. The following standard documents were consulted: The French standard NF P01-010 (2004): Qualité environnementale des produits de construction, Déclaration environnementale et sanitaire des produits de construction The Dutch standard NEN 8006: Environmental data for building materials, building products and building elements for use in environmental product declarations - Assessment according to the Life Cycle Assessment (LCA) methodology

9 Review report

	Available upon request from: gilmont@eaa.be