PRODUCT CATEGORY RULES (PCR)
DATE 2026-02-23

BASIC ALUMINIUM PRODUCTS AND SPECIAL ALLOYS

PRODUCT CATEGORY CLASSIFICATION: UN CPC 4153

PCR 2022:08
VERSION 1.0.2

VALID UNTIL 2027-06-09

TABLE OF CONTENTS

1 INTRODUCTION

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD® System: a programme for type III environmental declarations[1] according to ISO 14025:2006, ISO 14040:2006, ISO 14044:2006, and product-specific standards such as EN 15804 and ISO 21930 for construction products. Environmental Product Declarations (EPD) are voluntary documents for a company or organisation to present transparent, consistent and verifiable information about the environmental performance of their products (goods or services).

The rules for the overall administration and operation of the programme are the General Programme Instructions (GPI), publicly available at www.environdec.com. A PCR complements the GPI and the normative standards by providing specific rules, requirements and guidelines for developing an EPD for one or more specific product categories (see Figure 1). A PCR should enable different practitioners using the PCR to generate consistent results when assessing products of the same product category.

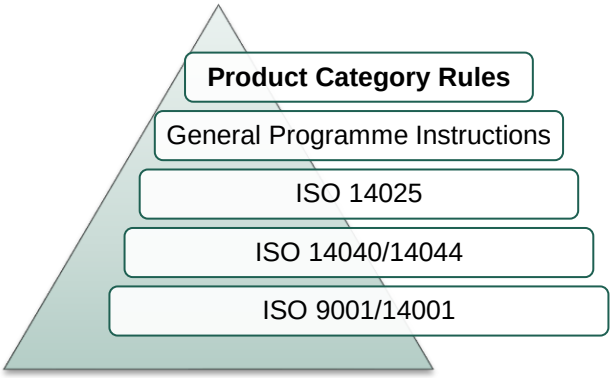

Figure 1 The hierarchy between PCRs, standards and other documents.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory, i.e. a requirement.
- The term “should” is used to indicate a recommendation, rather than a requirement. Any deviation from a “should” requirement shall be justified in the PCR development process.
- The terms “may” or “can” is used to indicate an option that is permissible.

For definitions of further terms used in the document, see the normative standards.

A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. The latest version of the PCR is available at www.environdec.com. Stakeholder feedback on PCRs is very much encouraged. Any comments on this PCR may be sent directly to the PCR Moderator and/or the Secretariat during its development or during its period of validity.

Any references to this document shall include the PCR registration number, name and version.

The programme operator maintains the copyright of the document to ensure that it is possible to publish, update, and make it available to all organisations to develop and register EPDs. Stakeholders participating in PCR development should be acknowledged in the final document and on the website.

[1] Type III environmental declarations in the International EPD® System are referred to as EPDs, Environmental Product Declarations.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Basic Aluminium products and special alloys
Registration number and version:	2022:08, version 1.0.2
Programme:	The International EPD® System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
PCR Moderator:	Elena Neri, INDACO$_2$ srl, elena.neri@indaco2.it
PCR Committee:	Raffmetal SpA Ecodynamics Group - University of Siena, INDACO$_2$ Srl
Date of publication and last revision:	2026-02-23 (version 1.0.2) See version history in Section 8.
Valid until:	2027-06-09
Schedule for renewal:	A PCR is valid for a pre-determined time period to ensure that it is updated at regular intervals. When the PCR is about to expire, the PCR Moderator shall initiate a discussion with the Secretariat how to proceed with updating the PCR and renewing its validity. A PCR may be also be updated without prolonging its period of validity, provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for the latest version of the PCR. When there has been an update of the PCR, the new version should be used to develop EPDs. The old version may however be used for 90 days after the publication date of the new version, as long as the old version has not expired.
Standards conformance:	▪ General Programme Instructions of the International EPD® System, version 4.0, based on ISO 14025 and ISO 14040/14044
PCR language(s):	At the time of publication, this PCR was available in English. If the PCR is available in several languages, these are available at www.environdec.com. In case of translated versions, the English version takes precedence in case of any discrepancies.

2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of basic aluminium products and special alloys and the declaration of this performance by an EPD. The product category corresponds to UN CPC 4153 "Semi-finished products of aluminium or aluminium alloys'', except for material destined to become a construction product.

Basic aluminium can be in solid or liquid form (whether alloyed or not) and is referred to semi-finished products that will be further processed by a third party into a finished consumer product. Aluminium can be supplied in solid form (e.g. ingots, bars, sheets, extrusions, billets, ...) or in a liquid state. Ingots, billets, plates, tubes, bars (and other semi-finished products) of solid aluminium and aluminium in liquid form, manufactured for the purpose of being supplied to further producers and then processed, fall within the scope of this PCR. Further processing to obtain the finished consumer product (e.g. remelting, shaping, surface finishing) are out of the scope of this PCR. Final products are used in a wide range of sectors like e.g. auomotive, transport, mechanics, domestic appliances, packaging.

Aluminium used for the construction sector is not included in this PCR, as this product is covered by the general PCR 2019:14 ”Construction products” (15804+A2) and c-PCR ”Steel and Aluminium structural products, and other metal products, for use in construction works” (CEN Product TC PCR). This PCR is not compliant with the EN 15804 standard, but for those semi-finished aluminium alloys destined to become construction products it may be additionally used as general guideline for e.g. production process, allocation and co-product rules. This approach may be adopted also for other outputs generated by the same production process.

The classification in the UN CPC system is Class 4153 and 4143:

- Division: 41 – Basic metals
  - Group: 415 - Semi-finished products of copper, nickel, aluminium, lead, zinc and tin or their alloys
    - Class: 4153 - Semi-finished products of aluminium or aluminium alloys **(this PCR)**

and

- Group: 414 - Copper, nickel, aluminium, alumina, lead, zinc and tin, unwrought
  - Class: 4143 - aluminium unwrought; alumina **(this PCR)**

More information is available at: https://unstats.un.org/unsd/classifications/Family/Detail/1074

This PCR covers both primary aluminium (i.e. obtained by using bauxite ore from mining processes) and aluminium from recycling (i.e. obtained by using aluminium (pre and post-consumer) scraps e.g. cans, sheets, turnings, cables, profiles, aluminium castings, risings, drosses, spills). The two products are manufactured by using different materials/processes/technologies, as described below.

PRIMARY ALUMINIUM is produced using aluminium oxides (alumina), that derive from the bauxite mineral. Main production steps are:

1. MINING: bauxite occurs as a granular or rocky clay, that is mined in open-pit mines in the upper layer of the ground (from 4 to 6 m deep). It is transported to special refineries, where it is washed, ground and added with lime and caustic soda. Through a series of chemical and physical reactions (i.e. Bayer process), pure aluminium oxide is separated from other substances, removing all insoluble particles (i.e. waste as red mud).
2. ELECTROLYSIS: Aluminium oxides are transported to reduction plants (smelters) where pure aluminium is extracted by the Hall-Hèroult electrolytic process. The transformation of alumina into liquid aluminium takes place at a temperature of 950 °C in a fluorinated bath with a high-intensity electric current flowing through it. The electrolytic process takes place in so-called electrolytic cells ('pots') where carbon cathodes form the bottom of the cell act as negative electrodes, while the anodes consist of large blocks of carbon suspended in the electrolytic solution. Liquid aluminium is deposited on the cathode at the bottom of the cell and is periodically extracted for subsequent smelting operations. There are two main types of electrolytic cells:
   - Søderberg: uses a continuous anode, made in situ from a paste of calcined petroleum coke and coal tar pitch, fired by heat from the molten bath and electric current through the anode, or
   - Prebake: uses multiple anodes (replaced when about 80% consumed), made from a mixture of calcined petroleum coke, cleaned and recycled anode butts and coal pitch. The anodes are made into blocks and fired in a separate anode plant. The anode production plant is often integrated into the primary aluminium plant. The remains of the anodes, which are known as anode butts, are cleaned from the bath material and recycled through the anode plant.
3. MELTING, ALLOYING AND CASTING: Liquid aluminium is kept in induction or reverberatory holding furnaces. Alloying elements (e.g. Si, Mg, Pb, Sn, Zn, Cu, Zr, Sr) or master alloys (e.g. Ti, Cr, Fe, Mn, Ni included in an aluminium alloy) are added to obtain the required composition. The molten aluminium extracted from the reduction cells is analyzed before being poured into a holding

furnace and heated to 750°C. Alloying elements such as magnesium, silicon and manganese are added to the aluminium to give it greater strength and resistance. Cleaned and sorted scrap can also be added at this stage*. The main products are e.g. ingots, billets, slabs, bars, t-bars and liquid aluminium.

* scrap pre-treatment (e.g. cleaning and sorting) is included in the scope

ALUMINIUM FROM RECYCLING is produced using aluminium scraps (e.g. cans, sheets, turnings, cables, profiles, aluminium castings, risings, drosses, spills) both pre-consumer and post-consumer. Different types of furnaces (e.g. rotary drum, tilting rotary, hearth, shaft, crucible, channel induction) can be used, mainly depending on the type and composition of input materials and final product quality. Main and typical production steps are:

1. SCRAP PRE-TREATMENT AND SELECTION: Pre- or post-consumer aluminium scraps follow a series of pre-treatment processes that consist in sorting different types of metals and impurities, grinding or compacting, drying, if necessary. These operations are useful to select and classify the quality of materials and obtain the desired composition afterwards in the furnace, according to specific recipes.
2. MELTING, ALLOYING AND CASTING: Scraps are melted in rotary or reverberatory furnaces (also known as shaft, chamber or hearth furnaces). Usually, salt mixtures (i.e. a mixture of sodium and potassium chlorides and some fluorides) are used in the recycled aluminium industry to reduce oxidation, absorb impurities and increase thermal efficiency. The amount of salt depends on the furnace used and the oxide content of the material in input. There are also options available for salt-free melting in some furnaces using many types of feed materials. Salt residues (slags) are tapped separately from the metal and, after a series of treatments (i.e. made internally by the company or externally by third parties), are regenerated and re-used for other melting cycles. Alloying elements (e.g. silicon, copper, magnesium, manganese, master alloys) are then added to the molten aluminium to reach the right composition required. Subsequently, the casting phase follows and liquid aluminium is tapped. It can be sold in liquid or solid state. In case of solid state, liquid metal is cooled and shaped (e.g. ingots, billets, bars).

In some cases, ingots of both primary aluminium and aluminium from recycling (as raw material in input) can be re-melted and added to other alloying elements and aluminium scraps, in order to obtain the aluminium alloy according the desired requirement.

2.2.2 GEOGRAPHICAL SCOPE

This PCR may be used globally.

2.2.3 EPD VALIDITY

An EPD based on this PCR shall be valid for a 5-year period starting from the date of the verification report (“approval date”), or until the EPD has been de-registered from the International EPD® System.

An EPD shall be updated and re-verified during its validity if changes in technology or other circumstances have led to:

- an increase of 15% or more of any of the declared indicators of environmental impact,
- errors in the declared information, or
- significant changes to the declared product information, content declaration, or additional environmental, social or economic information.

If such changes have occurred, but the EPD is not updated, the EPD owner shall contact the Secretariat to de-register the EPD.

3 PCR REVIEW AND BACKGROUND INFORMATION

This PCR was developed in accordance with the PCR development process described in the GPI of the International EPD® System, including open consultation and review.

3.1 OPEN CONSULTATION

3.1.1 VERSION 1.0

This PCR was available for open consultation from *2021-11-05* until *2022-01-05*, during which any stakeholder was able to provide comments by contacting the PCR Moderator and/or the Secretariat.

Stakeholders were invited via e-mail or other means to take part in the open consultation and were encouraged to forward the invitation to other relevant stakeholders. The following stakeholders provided comments during the open consultation and agreed to be listed as contributors in the PCR and at www.environdec.com.

- Valentina Niccolucci PhD, University of Siena (IT)

3.2 PCR REVIEW

3.2.1 VERSION 1.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members is available at www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR Committee, and if there were conflicts of interest they were excused from the review.
Chair of the PCR review:	Hüdai Kara
Review dates:	2022-02-09 until 2022-09-09

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

As part of the development of this PCR, existing PCRs and other internationally standardized methods that could potentially act as PCRs were considered to avoid unnecessary overlaps in scope and to ensure harmonisation with established methods of relevance for the product category. The existence of such documents was checked among the following EPD programmes and international standardisation bodies:

- International EPD® System. www.environdec.com.
- AENOR https://www.en.aenor.com/
- IBU https://ibu-epd.com/
- EPD-NORGE https://www.epd-norge.no/
- PEP Ecopassport http://www.pep-ecopassport.org/
- EPD Italy https://www.epditaly.it/view-pcr/
- Product Environmental Footprint (PEF) www.ec.europa.eu/environment/eussd/smgp

Table 1 lists the identified PCRs and other standardized methods.

Table 1 Existing PCRs and other internationally standardized methods that were considered to avoid overlap in scope and to ensure harmonisation with established methods.

NAME OF PCR/STANDARD	PROGRAMME/ STANDARDISATION BODY	REGISTRATION NUMBER, VERSION NUMBER/DATE OF PUBLICATION	SCOPE
NPCR 013 Part B for steel and aluminium construction products	EPD NORGE	NPCR 013 V. 3.0, 2019-04-10	No overlap in scope. Rules for developing EPDs for finished steel and aluminium products (construction)
PEFCR 2019-06-28 for Metal Sheets for Various Applications	European Commission	PEFCR 2019-06-28	No overlap in scope. Rules for developing PEFs for metal sheets (construction and non-construction)
Part B: Requirements on the EPD for Products of aluminium and aluminium alloys	IBU	V. 1.0 2013-04-11	No overlap in scope. Rules for developing EPDs for aluminium products and alloys (construction)
PCR 2015:03 Basic iron or steel products & special steels, except construction steel products	International EPD® System	PCR 2015:03, V. 2.0, 2020-03-27	No overlap in scope. Rules for developing EPDs for basic steel and iron products (non-construction)
PCR 2014:10 Fabricated steel products, except construction products, machinery and equipment	International EPD® System	PCR 2014:10, V. 2.11, 2019-09-06	No overlap in scope. Rules for developing EPDs for finished steel products (non-construction)
European Aluminium General Programme Instructions	European Aluminium	v.3, 2020	Building products EPD programme according to EN15804

No existing PCRs or other relevant internationally standardized methods with overlapping scope were identified

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed to enable publication of EPDs for this product category based on ISO 14025, ISO 14040/14044. The PCR enables different practitioners to generate consistent results when assessing the environmental impact of products of the same product category, and thereby it supports comparability of products within a product category.

3.5 UNDERLYING STUDIES USED FOR PCR DEVELOPMENT

The methodological choices made during the development of this PCR (declared/functional unit, system boundary, allocation methods, impact categories, data quality rules, etc.) were primarily based on the following underlying studies:

- Neri E. and Pulselli F.M., 2020. Project Report - Life Cycle Assessment “from cradle to gate” of aluminium ingots and aluminium in liquid state produced from scraps by Raffmental SpA.
- G.Cusano, M.R.Gonzalo, F.Farrell, R.Remus, S.Roudier, L.Delgado Sancho, 2017. JRC Science for policy report. Best available Techniques (BAT) Reference Document for the Non-Ferrous Metals Industries
- European Aluminium, 2018. Environmental Profile Report. Life-Cycle inventory data for aluminium production and transformation processes in Europe.

4 GOAL AND SCOPE, LIFE CYCLE INVENTORY AND LIFE CYCLE IMPACT ASSESSMENT

The goal of this section is to provide specific rules, requirements and guidelines for developing an EPD for the product category as defined in Section 2.2.1.

4.1 DECLARED UNIT

This PCR uses a declared unit instead of a functional unit as all functional and qualitative aspects are not possible to capture in the same unit. A declared unit is used when the function of the product in the use stage is unknown, the product can be used for several different functions, or the function cannot be clearly defined. Basic aluminium and aluminium alloys are intermediate products which are further processed, or combined with other products, into different end products with different functions.

These aspects should be taken into consideration when comparing EPDs based on this PCR. To increase comparability between EPDs, it is therefore important to specify technical properties of relevance for the application/use of the product, when known. A description of the applications of the product shall be included in the EPD, if known.

The declared unit shall be defined as 1 kg of semi-finished aluminium, or aluminium alloy, in solid (e.g. ingots) or liquid state at the manufacturer gate. When applicable, the packaging shall be assessed (the weight of the packaging is not included in this 1 kg)

The declared unit shall be clearly stated in the EPD. The environmental impact shall be given per declared unit. The EPD shall specify that a “cradle-to-gate” approach is applied.

4.2 TECHNICAL SPECIFICATION, LIFESPAN AND REFERENCE SERVICE LIFE (RSL)

Not applicable to this product category.

4.3 SYSTEM BOUNDARY

The scope of this PCR and EPDs based on it is “cradle-to-gate”.

As basic aluminium is a semi-finished/intermediate product that need to be further processed to obtain the final consumer product, it can be physically integrated with other products in subsequent life-cycle processes (i.e. no longer identifiable) and its final use/end-of-life is unknown, system boundaries shall be limited to cradle-to-gate approach.

Basic aluminium can be used in a wide variety of sectors and its subsequent processing depends on the application of the final product. Then, environmental impacts of Downstream stage (i.e. use and end-of-life) should be defined, assessed by and attributed to the manufacturer of the finished consumer product (i.e. in the next supply chain), and the production process and related environmental impacts of basic aluminium (based on this PCR), used as intermediate product, constitutes the upstream stage of the next whole system.

4.3.1 LIFE-CYCLE STAGES

For the purpose of different data quality rules and for the presentation of results, the life cycle of the product is divided into three life cycle stages:

- Upstream processes (from cradle-to-gate)
- Core processes (from gate-to-gate)
- Downstream processes (from gate-to-grave). EPDs based on this PCR shall exclude this stage, following a “cradle-to-gate” approach.

In the EPD, the environmental performance associated with each of the two life-cycle stages above shall be reported separately and in aggregated form. The processes included in the scope of the PCR and belonging to each life cycle stage are described in Sections 4.3.1.1–4.3.1.3.

4.3.1.1. Upstream processes

The following unit processes are part of the product system and shall be classified as upstream processes:

- extraction and processing of raw materials (e.g. bauxite ore, caustic soda, lime, petroleum coke, pitch, aluminium fluoride, electrodes). Some indications for specific materials in each technology are shown below:
  - Bauxite ore: the source of the bauxite used shall be specified as well as its production process (e.g. mining operations) and included in the LCA study.
  - Petroleum coke and pitch (coal): mining operations and production of anodes and cathodes shall be taken into account. If specific data are not available, a global average source of coal mix can be used, i.e. data from LCA databases or recognized literature.
  - Scrap: the origin and type of scrap used in aluminium production shall be described, whether it is external or internal scrap. Any kind of scrap pre-treatment (e.g. sorting, grinding, compacting), if (externally or internally) carried out, should be assessed and included in LCA calculations.
- transport of scraps from supplier to the manufacturing site, if scrap is internally pre-treated. If pre-treatment is carried out by third parties, an average distance (i.e. supplier to pre-treatment plant) should be used (see section 4.7.3.1), if specific data are not available.
- recycling processes of other secondary materials from other product life cycles,
- production of alloying elements, chemicals and auxiliaries. Some indications for specific material in each technology are shown below:
  - Alloying elements (e.g. silicon, copper, magnesium, manganese, master alloys);
  - Salts (e.g. sodium chloride, potassium chloride, descaling salts);
  - Materials for emission treatment (e.g. sodium bicarbonate, activated carbon);
  - Water treatment materials (e.g. antialgae, scale inhibitor, pre-treatment water density regulator);
  - Plant auxiliary materials (e.g. sulphuric acid, hydrochloric acid, soda ash, oxygen);
- production of spare parts (e.g. refractories, machinery tires, conveyer belts) and all material needed for maintenance operations more frequent than every 3 years
- relevant services, such as transport of raw materials and components along the upstream supply chain to a distribution point (e.g. a stockroom or warehouse),
- production of distribution packaging, if relevant
- generation of electricity and production of fuels, steam and other energy carriers used in upstream processes.

Upstream processes not listed may also be included. All elementary flows at resource extraction shall be included, except for the flows that fall under the general cut-off rule in Section 4.5.

The following processes shall not be included:

- scrap production, i.e. processes from other previous lifecycles that generate (pre or post-consumer) scraps (see Section 4.6 for rules on scrap allocation),
- maintenance of machineries and other operations made occasionally (i.e. > 3 years frequency) or in emergency situations,
- packaging of raw materials used for the manufacturing of aluminium, as it is considered irrelevant.

Any other exclusion of life-cycle stages and unit processes shall be described and justified in the EPD.

4.3.1.2. Core processes

The following unit processes are part of the product system and shall be classified as core processes:

- transportation of materials and components to the aluminium manufacturing site,
- manufacturing processes for aluminium and aluminium alloy production, from melting, alloying, casting (according to the specific technology used)

- end-of-life treatment of manufacturing waste (e.g. slags, sludge, dust), even if carried out by third parties, including transportation,
- direct emissions generated in the core processes (e.g. CO, NOx, SOx, heavy metals, PM, halogens from electrolyte used),
- generation of electricity and production of fuels, steam and other energy carriers used in core processes,
- combustion fumes, slag treatment: the aluminium production process generates different types of co-products, either as materials (e.g. dross, skimming, aluminium granules, salt, oxides) or as energy sources (hot fumes converted into electricity or heat). **Any treatment that anticipates the placing of these co-products on the market (or the internal re-use) shall be included in the calculations.The allocation of these co-products shall follow the rules described in Section 4.6, and the allocation method used shall be described in the EPD ,**
- packaging of the manufactured product, if applicable and relevant. Not applicable to liquid aluminium.

Core processes not listed may also be included. Manufacturing of a minimum of 99% of the total weight of the declared product, including packaging if relevant, shall be included.

If the primary and/or aluminium ingots from recycling are purchased as raw material from suppliers to be re-melted with other alloying elements and aluminium scraps, in order to obtain the aluminium alloy with the desired requirement, the production process, necessary for the supplied ingots (as raw material in input), shall be accounted in upstream. This means that, in this specific case, the production of the ingot used as raw material (i.e. from primary and/or recycled aluminum), if purchased, shall be accounted for in upstream, while the re-melting to obtain the final product shall be accounted for in core, as described and listed in this paragraph. See Figure 3 for this type of production.

The following processes shall not be included:

- manufacturing of production equipment, buildings and other capital goods,
- maintenance of machineries and other operations made occasionally (i.e. > 3 years frequency) or in emergency situations,
- business travel of personnel,
- travel to and from work by personnel, and
- research and development activities, including the production and manufacture of laboratory equipment.

Any other exclusion of life-cycle stages and unit processes shall be described and justified in the EPD.

4.3.1.3. Downstream processes

The downstream processes are not included in the scope of this PCR (see Section 4.3)

4.3.2 OTHER BOUNDARY SETTING

4.3.2.1. Boundary towards nature

Boundaries to nature are defined as where the flows of material and energy resources leaves nature and enters the technical system (i.e. the product system). Emissions cross the system boundary to nature when they are emitted to air, soil or water.

4.3.2.2. Boundary towards other technical systems

Boundaries towards other technical systems define the flow of materials and components to/from the product system under study and from/to other product systems. If there is an inflow of recycled material to the product system in the production/manufacturing stage, the transport from the scrapyard/collection site to the recycling plant, the recycling process, and the transportation from the recycling plant to the site where the material is being used shall be included. If there is an outflow of material or component to recycling, the transportation of the material to the scrapyard/collection site shall be included. The material or component going to recycling is then an outflow from the product system.

See Section 4.6 for further guidance.

4.3.2.3. Temporal boundary

The temporal boundary defines the time period for which the life cycle inventory data is recorded, e.g. for how long emissions from waste deposits are accounted. As default, the time period over which inputs to and outputs from the product system is accounted for shall be 100 years from the year that the LCA model best represents, considering the representativeness of the inventory data. This year shall, as far as possible, represent the year of the publication of the EPD.

4.3.2.4. Geographical boundary

The geographical boundary defines the geographical coverage of the LCA. This shall reflect the physical reality of the product under study, accounting for the representativeness of technology, input materials and input energy.

4.4 SYSTEM DIAGRAM

- Basic Aluminium production process for primary aluminium (i.e. from bauxite)

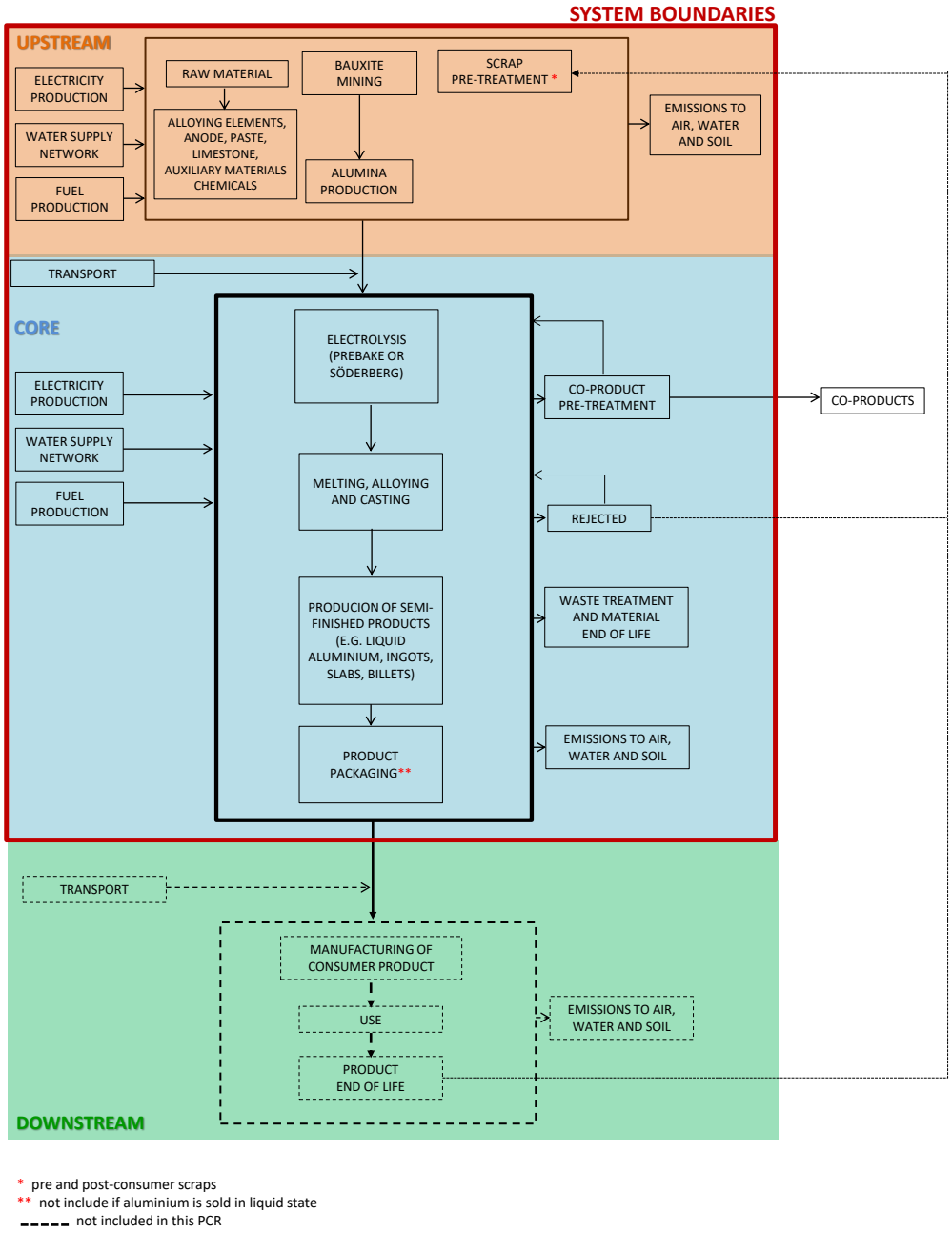

Figure 2 System diagram illustrating the processes for primary aluminium, that shall be included in the product system, divided into upstream, core and downstream processes. The illustration of processes to include may not be exhaustive. If any omission of life-cycle stages and processes are made, the system diagram should indicate it.

- Basic Aluminium production process for aluminium from recycling (i.e. scraps)

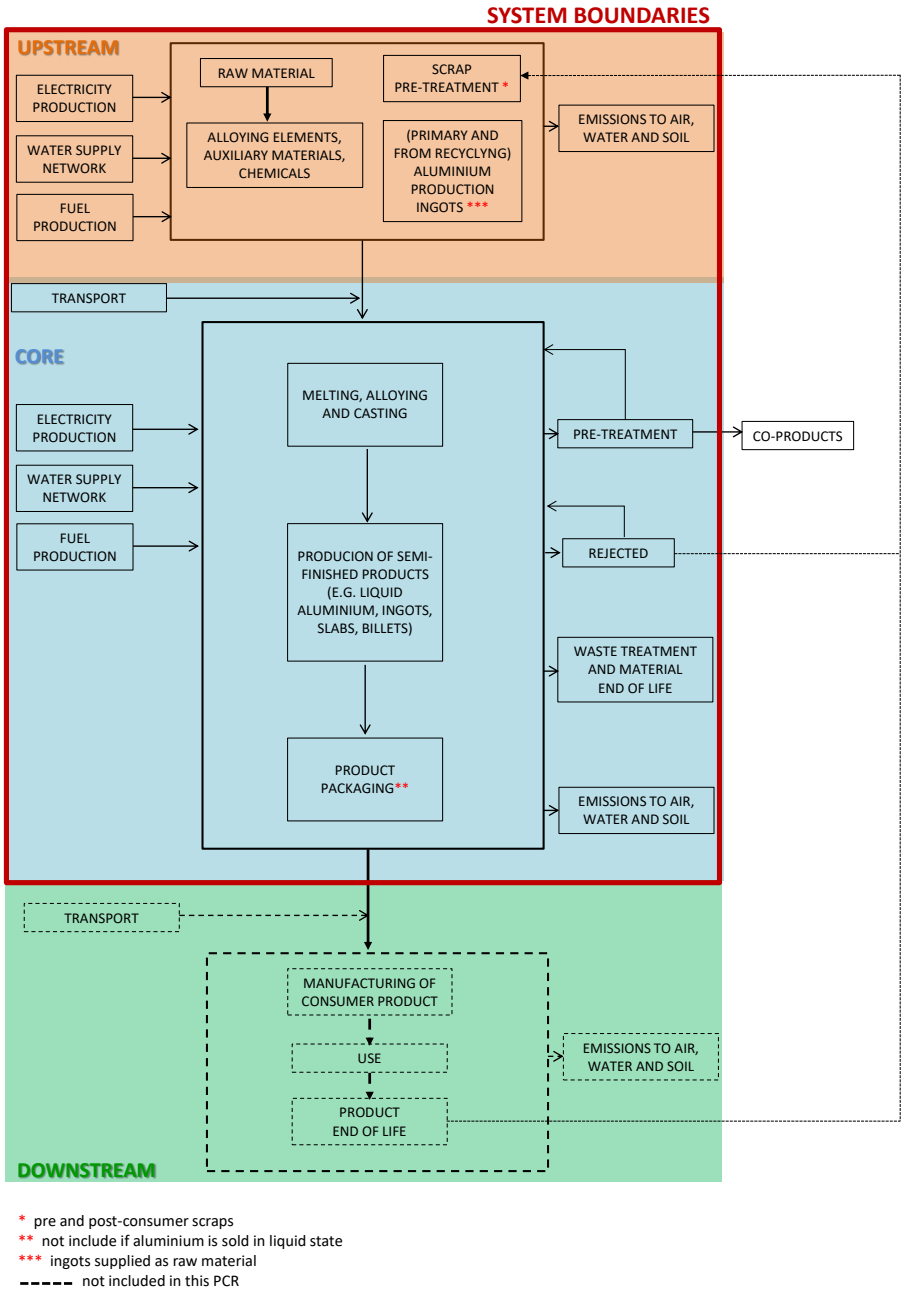

*Figure 3 System diagram illustrating the processes for aluminium from recycling, that shall be included in the product system, divided into upstream, core and downstream processes. *** in some cases, aluminium (e.g. ingots from recycling and/or primary) is supplied and melted in core with other elements to obtain the final product. The illustration of processes to include may not be exhaustive. If any omission of life-cycle stages and processes are made, the system diagram should indicate it.*

4.5 CUT-OFF RULES

A cut-off rule of 1% shall be applied. In other words, the included inventory data (not including inventory data of processes that are explicitly outside the system boundary as described in Section 4.3) shall together give rise to at least 99% of the results of any of the environmental impact categories. Also, 99% of the mass of the product content and 99% of the energy use of the product life cycle shall be accounted for. The cut-off of inventory data should, however, be avoided, and all available inventory data shall be used.

The cut-off of inventory data, based on the above cut-off rule, should be an output of a sensitivity analysis, alone or in combination with expert judgment based on experience of similar product systems. Further, the cut-off shall be possible to verify in the verification process, hence the exclusion of inventory data based on the cut-off rule shall be documented in the LCA report, and the EPD developer shall provide the information the verifier considers necessary to verify the cut-off.

4.6 ALLOCATION RULES

Allocation can be divided into allocation of co-products, i.e. allocation of unit processes that generate several products, and allocation of waste, i.e. allocation of unit processes that generate materials that are, for example, landfilled recovered, recycled or reused, and which require further processing to cease being waste and become products (see criteria for end-of-waste state in Section 4.6.2).

The principles for allocation of co-products and allocation of waste are described separately in the following subsections.

Addition made to version 1.0.1 of this PCR: *regarding the environmental burden of inputs of pre-consumer scrap, there are two interpretations on the allocaton rules of this PCR: 1) scrap is always waste and is therefore free of environmental burden (see Section 4.6.2) or 2) scrap can be a co-product and therefore come with an environmental burden (see Section 4.6.1). For now, both interpretations are allowed, but the EPD shall clearly declare which allocation method has been applied and the approach used to estimate the environmental burden. It is also allowed to declare two set of results, following the two allocation methods.The rules on scrap allocation will be further clarified in next large update of the PCR.*

4.6.1 CO-PRODUCT ALLOCATION

The following hierarchy of allocation methods shall be followed for co-product allocation:

1. Allocation shall be avoided, if possible, by dividing the process to be allocated into sub-processes and collecting the inventory data for each sub-process.
2. If allocation cannot be avoided, the inventory data should be partitioned between the different co-products in a way that reflects the underlying physical relationships between them, i.e. allocation should reflect the way in which the inventory data changes if the quantities of delivered co-products change.

   For key processes in the product system, Table 2 provides specific allocation guidance for the core stage.

Table 2 Allocation method for key processes in the product system.

PROCESS	MAIN PRODUCT AND CO-PRODUCTS	ALLOCATION METHOD
Manufacturing	Aluminium (main product) and all other sub-products generated by the same process (e.g. granulates, salt)	Mass allocation
Co-product treatment (after manufacturing)	Products containing aluminium or not (e.g. granulate, salt, aluminium oxides coming from the salt slag) internally treated	Mass allocation

Co-products that are treated after the manufacturing (e.g. melting) shall carry the allocated environmental impact of previous processes from which they derive (e.g. melting).

Any process needed to recover/regenerate the co-products should be included in the assessment and attributed to each co-product, by mass allocation.

Manufacturing that uses fluxing salt, produces aluminium and salt slag in the melting phase. Environmental impact of the melting process should be allocated between the mass in output of aluminium and salt slag. Salt slag follows a series of treatment to recover/regenerate a series of co-products (e.g. crushing grinding to obtain aluminium granulate, leching, evaporation, crystallization, wet and dry processing to obtain salt, additional filtrations to obtain oxides and sulphites). Environmental impact of these treatment phase should be attributed and allocated among co-products till the co-product is ready to be used (e.g. aluminium granulate should carry the allocated environmental impact till the crushing/grinding, in addition to the melting process for the core stage; oxides should carry the allocated environmental impacts from melting to

filtration, in addition to the melting process for the core stage) if treatments are internally carried out (i.e. within the system boundaries).

3. If a physical relationship between the inventory data and the delivery of co-products cannot be established, the inventory data should be allocated between the co-products in a way that reflects other relationships between them. For example, inventory data might be allocated between co-products in proportion to their economic values (e.g. hot fumes converted into electricity or heat and sold). If economic allocation is used, a sensitivity analysis exploring the influence of the choice of the economic value shall be included in the LCA report. Reference values to take into account are represented by the selling prices of the products (average market price over three years), set by the producer.

Any deviation shall be justified.

4.6.2 ALLOCATION OF WASTE TREATMENT PROCESSES

Allocation of waste shall follow the polluter pays principle and its interpretation in EN 15804: “processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached.” The end-of-waste state is reached when all the following criteria for the end-of-waste state are fulfilled (adapted from EN 15804):

- the recovered material, component or product is commonly used for specific purposes;
- a market or demand, identified e.g. by a positive economic value, exists for such a recovered material, component or product;
- the recovered material, component or product fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and
- the use of the recovered material, product or construction element will not lead to overall adverse environmental or human health impacts.

The above outlined principle means that the generator of the waste shall carry the full environmental impact until the point in the product life cycle in which the end-of-waste criteria are fulfilled. Waste may have a negative economic market value, and then the end-of-waste stage is typically reached after (part of) the waste processing and further refinement, at the point at which the waste no longer has a negative market value. This allocation method is (in most cases) in line with a waste generator’s juridical and financial responsibilities. See the GPI for further information and examples.

For waste being recycled or reused, processes after the end-of-waste state, if any, shall be attributed to the product system using the recycled/reused material flow (recycled materials are thereafter considered secondary raw materials).

This is valid both for scraps in input in the upstream stage (i.e. carrying the environmental impacts of transport and pre-treatment, not the impacts generated in the earlier lifecycle) and waste produced in the core stage (i.e. carrying the environmental impacts of waste treatment).

In particular:

a) waste treatment (e.g. incineration, landfill) shall be attributed to the process that generated the waste,

b) waste generated in the core process shall be attributed to the system under study (i.e. basic aluminium manufacturer). For example, systems that use salt during the melting phase, and send it to treatment as waste, shall include the environmental impact related to the salt slag treatment, even if carried out by third parties.

c) the scrap user (i.e. recycling aluminium manufacturer) has not to carry the environmental impact from the production of that scrap, but only its pre-treatment (e.g. processing and refining) and transport to the manufacturing site.[2]

d) no credits shall be attributed to the scrap used in the aluminium making process.

Even if benefits of reuse, recycling or recovery by default should be considered to be outside the system, quantitative information on recovered material/energy that potentially can lead to environmental benefits may be declared separately as additional environmental information (see Section 5.4.6).

Further information is given in Sections 4.6.1 and 4.6.2. See GPI 4.0 for more details.

Any deviation from this approach shall be justified.

[2] Addition made to version 1.0.1 of this PCR: As “scrap” is not a well-defined term in this PCR, there are to interpretations of how to allocate pre-consumer scrap that are accepted under this PCR, see the introduction to Section 4.6.

4.7 DATA QUALITY REQUIREMENTS AND SELECTION OF DATA

Life cycle inventory data are classified into specific data and generic data, where the latter can be selected generic data or proxy data. The data categories are defined as follows:

- specific data (also referred to as “primary data” or “site-specific data”):
  - data gathered from the actual manufacturing plant where product-specific processes are carried out;
  - actual data from other parts of the life cycle traced to the product under study, for example site-specific data on the production of materials or generation of electricity provided by contracted suppliers, and transportation data on distances, means of transportation, load factor, fuel consumption, etc., of contracted transportation providers; and
  - LCI data from databases on transportation and energyware that is combined with actual transportation and energy parameters as listed above.
- generic data (sometimes referred to as “secondary data”), divided into:
  - selected generic data: data (e.g. commercial databases and free databases) that fulfil prescribed data quality requirements for precision, completeness, and representativeness (see below Section 4.7.1),
  - proxy data: data (e.g. commercial databases and free databases) that do not fulfil all of the data quality requirements of “selected generic data”.

Specific data shall be used for the core processes. Specific data shall be used for upstream processes, when available, otherwise generic data may be used. Generic data should be used in cases in which they are representative for the purpose of the EPD, e.g. for bulk and raw materials on a spot market, if there is a lack of specific data on the final product or if a product consists of many components.

4.7.1 RULES FOR USING GENERIC DATA

For generic data to be classified as “selected generic data”, the following requirements apply:

- datasets shall be based on attributional LCA modelling (e.g., not be based on marginal data and not include credits from system expansion),
- the reference year shall be as current as possible and should be representative for the validity period of the EPD,
- the 1% cut-off rule (as described in Section A.3.3) shall be met on the level of the product system,
- datasets shall represent average values for a specific reference year; however, how data are generated could vary, e.g. over time, and then they should have the form of a representative annual average value for a specified reference period (such deviations shall be justified and declared in the EPD), and
- the representativeness of the data shall be assessed to be better than ±5%, in terms of the environmental impact calculated on the basis of the data, of data that is fully representative for the given temporal, technological and geographical context.

If selected generic data that meets the above data quality requirements are not available, proxy data may be used. The environmental impacts associated with proxy data shall not exceed 10% of the overall environmental impact of the product system.

The EPD may include a data quality declaration to demonstrate the share of specific data, selected generic data and proxy data contributing to the results of the environmental impact indicators.

4.7.2 EXAMPLES OF DATABASES FOR GENERIC DATA

No specific database are recommended for generic data.

4.7.3 DATA QUALITY REQUIREMENTS AND OTHER MODELLING GUIDANCE PER LIFE-CYCLE STAGE

Below are further data quality requirement per life-cycle stage. Exceptions to the requirements may be accepted, if justified in the EPD; such exceptions are subject to the approval by the verifier on a case-to-case basis.

4.7.3.1. Upstream processes

- Data referring to processes and activities upstream in a supply chain over which the EPD owner direct management control shall be specific and collected on site.
- Data referring to contractors that supply main parts, packaging, or main auxiliaries should be requested from the contractor as specific data, as well as infrastructure, where relevant. In particular, bauxite processing and scrap pre-treatment should refer to specific data. If not available, the use and choice of generic data should be justified.
- Data on transport of main parts and components along the supply chain to a distribution point (e.g. a stockroom or warehouse) where the final delivery to the manufacturer can take place, should be specific and based on the actual transportation mode, distance from the supplier, and vehicle load. In particular, the origin of bauxite and scraps (i.e. main countries of origin) should be declared, modelled and assessed reflecting the actual situation of the system under study. If scrap pre-treatment is carried out by third parties, an average distance (i.e. supplier to pre-treatment plant) of 500 km by lorry should be used, if specific data are not available.
- In case specific data is lacking, selected generic data may be used. If this is also lacking, proxy data may be used (see Section 4.7).
- For upstream processes modelled with specific data, generation of electricity used shall be accounted for in this priority:

    1. Specific electricity mix as generated, or purchased from an electricity supplier, demonstrated by a Guarantee of Origin or similar as provided by the electricity supplier.
    2. Residual electricity mix of the electricity supplier on the market.
    3. Residual electricity mix on the market.
    4. Electricity consumption mix on the market.

  The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total consumption mix.

  "The market" in the above hierarchy may correspond a national electricity market, if this can be justified.

  The mix of electricity used in upstream processes shall be documented in the EPD, where relevant.

4.7.3.2. Core processes

- Transport from the final delivery point of raw materials, chemicals, main parts, and components (see above regarding upstream processes) to the manufacturing plant/place of service provision should be based on the actual transportation mode, distance from the supplier, and vehicle load, if available.
- Goods: Specific data shall be used for the assembly of the product and for the manufacture of main parts as well as for on-site generation of steam, heat, electricity, etc., where relevant.
- Services: Specific data shall be used for the consumption of materials, chemicals, steam, heat, electricity, etc., necessary for execution of the service
- For electricity used in the core processes, generation of electricity used shall be accounted for in this priority:

    1. Specific electricity mix as generated, or purchased from an electricity supplier, demonstrated by a Guarantee of Origin or similar as provided by the electricity supplier.
    2. Residual electricity mix of the electricity supplier on the market.
    3. Residual electricity mix on the market.
    4. Electricity consumption mix on the market. This option shall not be used for electricity used in processes over which the manufacturer (EPD owner) has direct control[3].

  The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total consumption mix.

[3] For electricity markets without trade of Guarantees of Origin (or similar), the residual mix will, however, be identical to the consumption mix.

"The market" in the above hierarchy may correspond a national electricity market, if this can be justified.

The mix of electricity used in the core processes shall be documented in the EPD, where relevant.

- Pre-treatment (e.g. regeneration) processes of co-product that may be re-used by the same system should be based on specific data, even if carried out by a third party, if available.
- Waste treatment processes of manufacturing waste should be based on specific data, if available.

4.7.3.3. Downstream processes

Downstream processes are not included in the scope of this PCR (see Sections 4.3 and 4.4).

4.7.4 DATA QUALITY DECLARATION

EPDs may include a declaration of the quality of data used in the LCA calculations.

4.8 ENVIRONMENTAL PERFORMANCE INDICATORS

The EPD shall declare the default environmental performance indicators and their methods as described at the website www.environdec.com/impact-categories/indicators, which includes both inventory indicators and indicators of potential environmental impact. The source and version of the impact assessment methods and characterisations factors used shall be reported in the EPD. Alternative regional impact assessment methods and characterisation factors may be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

If the default list of environmental performance indicators and methods at the website is updated, the previous version of the list is valid in parallel to the new version during a transition period of 90 days, as described at the website.

Apart from the required inventory indicators, other inventory data may also be declared in the EPD, if relevant and useful for EPD users. Such data shall not be declared in the main body of the EPD, but in an annex.

Additional environmental performance indicators may be declared (see Section5.4.6).

4.9 INCLUDING MULTIPLE PRODUCTS IN THE SAME EPD

4.9.1 MULTIPLE PRODUCTS FROM THE SAME COMPANY

Similar products from a single or several manufacturing sites covered by the same PCR and manufactured by the same company with the same major steps in the core processes may be grouped and thereby included in the same EPD. For such an EPD, there are three options:

- For each indicator, declare the average results of the included products. This average shall be weighted according to the production volumes of the included products, if relevant. In this option, the average content shall be declared in the content declaration.
- Declare the results of one of the included products – a representative product. The choice of the representative product shall be justified in the EPD, using, where applicable, statistical parameters. For example, the choice may be based on production volumes. In this option, the content of the representative product shall be declared in the content declaration.
- For each indicator, declare the highest result of the included products (i.e., the results of a "worst-case product", which may be the results of one or several of the included products). In this option, the content declaration shall include the lowest amounts of recycled content of the included products and the information on environmental and hazardous properties of substances shall reflect the highest share and most hazardous such substances contained in any of the included products. The result for GWP-total and the content declaration of the "best-case product", defined as the product with lowest result for GWP-total, may be reported optionally in the additional environmental information (see par 5.4.6)

The first two options are only possible if none of the declared environmental impact indicator results differ by more than 10% between any of the included products. The third option is possible also if variations are larger than 10%.

The option chosen shall be clearly described in the EPD.

4.9.2 SECTOR EPDS

The International EPD® System allows for an industry association to develop an EPD in the form of a Sector EPD. A Sector EPD declares the average product of multiple companies in a clearly defined sector in a clearly defined geographical area. Products covered in a sector EPD shall follow the same PCR and the same declared/functional unit shall be applied.

Any communication of the results from a Sector EPD should contain the information that the results are based on averages obtained from the sector as defined in the EPD. The communication shall not claim that the sector EPD results are representative for a certain manufacturer or its product.

The following information shall also be included a Sector EPD:

- a list of the contributing manufacturers that the Sector EPD covers,
- a description of how the selection of the sites/products has been done and how the average has been determined, and
- a statement that the document covers average values for an entire or partial product category (specifying the percentage of representativeness) and, hence, the declared product is an average that is not available for purchase on the market.

5 CONTENT AND FORMAT OF EPD

EPDs based on this PCR shall contain the information described in this section. Flexibility is allowed in the formatting and layout provided that the EPD still includes the prescribed information. A generic template for EPDs is available at www.environdec.com.

The EPD content shall:

- be in line with the requirements and guidelines in ISO 14020 (Environmental labels and declarations – General principles),
- be verifiable, accurate, relevant and not misleading, and
- not include rating, judgements or direct comparison with other products[4].

An EPD should be made with a reasonable number of pages for the intended audience and use.

The content of EPDs published in machine-readable format shall correspond with the content of the underlying EPD.

5.1 EPD LANGUAGES

EPDs should be published in English but may also be published in additional languages. If the EPD is not available in English, it shall contain an executive summary in English including the main content of the EPD. This summary is part of the EPD and, thus, also subject to the verification process.

5.2 UNITS AND QUANTITIES

The following requirements apply for units and quantities:

- The International System of Units (SI units) shall be used where available, e.g., kilograms (kg), Joules (J) and metres (m). Reasonable multiples of SI units may be decided in the PCR to improve readability, e.g., grams (g) or megajoules (MJ). The following exceptions apply:
  - Resources used for energy input (primary energy) should be expressed as kilowatt-hours (kWh) or megajoules (MJ), including renewable energy sources, e.g., hydropower, wind power and geothermal power.
  - Water use should be expressed in cubic metres (m^3)
  - Temperature should be expressed in degrees Celsius (°C),
  - Time should be expressed in the units most practical, e.g., seconds, minutes, hours, days or years.
  - Results of the environmental performance indicators shall be expressed in the units prescribed by the impact assessment methods, e.g. kg CO_2 equivalents.
- Three significant figures[5] should be adopted for all results. The number of significant digits shall be appropriate and consistent.
- Scientific notation may be used, e.g. 1.2E+2 for 120, or 1.2E-2 for 0.012.
- The thousand separator and decimal mark in the EPD shall follow one of the following styles (a number with six significant figures shown for illustration):
  - SI style (French version): 1 234,56
  - SI style (English version): 1 234.56

  In case of potential confusion or intended use of the EPD in markets where different symbols are used, the EPD shall state what symbols are used for thousand separator and decimal mark.
- Dates and times presented in the EPD should follow the format in ISO 8601. For years, the prescribed format is YYYY-MM-DD, e.g., 2017-03-26 for March 26th, 2017.

[4] Therefore, results of normalization are not allowed to be reported in the EPD.

[5] Significant figures are those digits that carry meaning contributing to its precision. For example with two significant digits, the result of 123.45 shall be displayed as 120, and 0.12345 shall be displayed as 0.12. In scientific notation, these two examples would be displayed as $1.2*10^2$ and $1.2*10^{-2}$.

- The result tables shall:
  - Only contain values or the letters “ND” (Not Declared). It is not possible to specify ND for mandatory indicators. ND shall only be used for voluntary parameters that are not quantified because no data is available.[6]
  - Contain no blank cells, hyphens, less than or greater than signs or letters (except “ND”).
  - Use the value “0” only for parameters that have been calculated to be zero.
  - Footnotes shall be used to explain any limitation to the result value.

5.3 USE OF IMAGES IN EPD

Images used in the EPD, especially pictures featured on the cover page, may in themselves be interpreted as an environmental claim. Images such as trees, mountains, wildlife that are not related to the declared product shall therefore be used with caution and in compliance with national legislation and best available practices in the markets in which the EPD is intended to be used.

5.4 EPD REPORTING FORMAT

The reporting format of the EPD shall include the following sections:

- Cover page (see Section 5.4.1)
- Programme information (see Section 5.4.2)
- Product information (see Section 5.4.3)
- Content declaration (see Section 5.4.4)
- Environmental performance (see Section 5.4.5)
- Additional environmental information (see Section 5.4.6)
- Additional social and economic information (see Section 5.4.7)
- References (see Section 5.4.9)

The following sections shall be included, if relevant:

- Differences versus previous versions (see Section 5.4.8)
- Executive summary in English (see Section 5.4.10)

5.4.1 COVER PAGE

The cover page shall include:

- Product name and image
- Name and logotype of EPD owner
- The text “Environmental Product Declaration” and/or “EPD”
- Programme: The International EPD® System, www.environdec.com
- Programme operator: EPD International AB
- Logotype of the International EPD® System
- EPD registration number as issued by the programme operator[7]
- Date of publication (issue): 20XX-YY-ZZ

[6] This requirement does not intend to give guidance on what indicators are mandated (“shall”) or voluntary.

[7] The EPD shall not include a “registration number” if such is provided by the certification body, as this may be confused with the registration number issued by the programme operator.

- Date of revision: 20XX-YY-ZZ, when applicable
- Date of validity; 20XX-YY-ZZ
- A note that *"An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com."*
- A statement of conformity with ISO 14025.
- For EPDs covering multiple products: a statement that the EPD covers multiple products and a list of all products covered by the EPD.
- For Sector EPDs: a statement that the EPD is a Sector EPD.
- For construction product EPDs:

In the case of EPDs registered through a regional hub (a regional or national programme based on and fully aligned with the International EPD® System through an agreement with the programme operator), "Programme", "Programme operator", and "Logotype" shall be expanded to include a reference to the regional programme and the organisation responsible for it.

Where applicable, the cover page shall also include the following information:

- Information about dual registration of EPD in another programme, such as registration number and logotype.
- A statement of conformity with other standards and methodological guides.

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following statement on the requirements for comparability of EPDs, adapted from ISO 14025: *"EPDs within the same product category but from different programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison."*
- A statement that the EPD owner has the sole ownership, liability and responsibility of the EPD
- Information about verification[8] and the PCR in a table with the following format and contents:

Product category rules (PCR): *<name, registration number, version and UN CPC code(s)>*
PCR review was conducted by: *<name and organisation of the review chair, and information on how to contact the chair through the programme operator>*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☐ EPD verification ☐ Pre-verified tool
In case of certification bodies: Accredited by: *<name of the accreditation body and accreditation number, if applicable>.* *In case of individual verifiers:* *<Name, and organisation of the individual verifier. The signature may also be included>* Approved by: The International EPD® System

[8] If the EPD has been verified by an approved individual verifier who has received contractual assistance from a certification body that is not accredited, this certification body shall not be included in this table.

The procedure for follow-up during EPD validity, as defined in the GPI, involves third-party verifier: ☐ Yes ☐ No

5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

- address and contact information to EPD owner,
- description of the organisation. This may include information on products- or management system-related certifications (e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates and EMAS-registrations) and other relevant work the organisation wants to communicate (e.g. SA 8000, supply-chain management and social responsibility),
- name and location of production site,
- product identification by name, and an unambiguous identification of the product by standards, concessions or other means,
- identification of the product according to the UN CPC scheme system. Other relevant codes for product classification may also be included, e.g.
  - Common Procurement Vocabulary (CPV),
  - United Nations Standard Products and Services Code® (UNSPSC),
  - Classification of Products by Activity (NACE/CPA),
  - Australian and New Zealand Standard Industrial Classification (ANZSIC), or
  - Global Trade Item Number (GTIN).
- a description of the product,
- a description of the technical purpose of the product, including its application/intended use,
- a description of the background system, including the main technological aspects,
- for EPDs covering multiple products: a description of the selection of products/sites, a list of contributing manufacturers (if Sector EPD), etc. (see Section 4.9),
- geographical scope of the EPD, i.e., for which geographical location(s) of use and end-of-life the product's performance has been calculated,
- declared unit,
- reference service life (RSL) and/or technical/actual lifespan, if relevant,
- declaration of the year(s) covered by the data used for the LCA calculation and other relevant reference years,
- reference to the main database(s) for generic data and LCA software used, if relevant,
- system diagram of the processes included in the LCA, divided into the life cycle stages,
- description that the EPD system boundary is "cradle-to-gate",
- information on which life-cycle stages are not considered (if any), with a justification of the omission, and
- references to any relevant websites for more information or explanatory materials.

This section may also include:

- name and contact information of organisation carrying out the underlying LCA study,
- any additional information about the underlying LCA-based information, such as cut-off rules, data quality, allocation methods, and other methodological choices and assumptions,
- a description of the material properties of the product with a declaration of relevant physical or chemical product properties, such as density, etc., and

- if end-of-life treatment is not included, the EPD shall contain a statement that it shall not be used for communicating environmental information to consumers/end users of the product.

5.4.4 CONTENT DECLARATION

The content declaration section shall declare the weight of one unit of product, as purchased, and contain information about the content of the product in the form of a list of materials and chemical substances including information on their environmental and hazardous properties. The gross weight of each material/substance shall be declared, including a minimum of 99% of the materials/substances in one unit of product.

The content declaration does not apply to proprietary materials and substances covered by exclusive legal rights including patent and trademarks. General information of main constituents (e.g. aluminium, silicon), type (e.g. primary or from recycling) of materials should be given. The quantity should be indicated as percentage (e.g. 5%) or as a range of percentages (e.g. 5-10%). When the EPD is based on average or representative product , the percentage range should be reported. Table 3 shows a non-exhaustive list of materials.

Table.3 List of material contained in the product

MATERIAL	TYPE	QUANTITY (%)
Aluminium	Primary	%
Aluminium	Scraps from recycling	%
Alloying elements	Primary	%
Others	……	%

In general, an indication that a product is “free” of a specific hazardous material or substance should be done with caution and only when relevant, following the rules in ISO 14021 on self-declared environmental claims.

Information on the hazardous properties of materials and chemical substances should follow the requirements given in the latest revision of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS),[9] issued by the United Nations or national or regional applications of the GHS. As an example, the following regulations should be used for EPDs intended to be used in the European Union:

- Regulation (EC) No 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH); and
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling, and packaging of substances and mixtures.

5.4.4.1. Information about recycled materials

When an aluminium product is made in whole or in part with recycled materials, the type of the materials shall be presented in the EPD as part of the content declaration (i.e. a qualitative description of the macro-category of recycled material used e.g. cans, turnings, sheets, profiles).

To avoid any misunderstanding about which material that may be considered “recycled material”, the guidance given in ISO 14021 shall be considered. In brief, the standard states that:

- only pre-consumer or post-consumer materials (scraps) shall be considered in the accounting of the recycled materials, and
- materials coming from scrap reutilisation (such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it) shall not be considered as recycled content.

5.4.4.2. Information about packaging

The weight of the packaging per Declared Unit and the type and function of the packaging shall be reported in the EPD.

[9] The GHS document is available at www.unece.org.

A statement of the source of the materials (pre-consumer or post-consumer) shall be declared in the EPD when the packaging is made in whole or in part by recycled materials.

5.4.5 ENVIRONMENTAL PERFORMANCE

5.4.5.1. Environmental impacts

The EPD shall declare the environmental impact indicators, per declared unit, per life-cycle stage and in aggregated form, using the default impact categories, impact assessments methods and characterisation factors available at www.environdec.com/indicators. The source and version of the impact assessment methods and characterisation factors used shall be reported in the EPD.

Alternative regional life cycle impact assessment methods and characterisation factors may be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

5.4.5.2. Use of resources

The EPD shall declare the indicators for resource use listed at www.environdec.com/indicators per declared unit, per life-cycle stage and in aggregated form.

5.4.5.3. Waste production and output flows

Waste generated along the whole life cycle production chains shall be treated following the technical specifications described in the GPI. The EPD shall declare the indicators for waste production and output flows as listed at www.environdec.com/indicators per declared unit, per life-cycle stage and in aggregated form.

5.4.6 ADDITIONAL ENVIRONMENTAL INFORMATION

An EPD may declare additional environmentally relevant information, in addition to the LCA results of the section on environmental performance results. The additional environmental information may cover various aspects of specific relevance for the product, for example:

- GWP-total result and content declaration of the “best-case-product”, defined as the product with the lowest result for GWP-total indicator. This option is only available when the third option of par. 4.9.1 is applied,
- the release of dangerous substances into indoor air, soil, and water during the use stage,
- instructions for proper use of the product, e.g. to minimise energy or water consumption or to improve the durability of the product,
- instructions for proper maintenance and service of the product, e.g. to minimise energy or water consumption or to improve the durability of the product,
- information on key parts of the product that determine its durability,
- information on recycling including, e.g. suitable procedures for recycling the entire product or selected parts and the potential environmental benefits gained,
- information on a suitable method of reuse of the product (or parts of the products) and procedures for disposal as waste at the end of its life cycle,
- information regarding disposal of the product, or inherent materials, and any other information considered necessary to minimise the product’s end-of-life impacts,
- a more detailed description of an organisation’s overall environmental work, in addition to the information listed under Section 5.4.3, such as:
  - the existence of any type of organised environmental activity, and
  - information on where interested parties may find more details about the organisation’s environmental work,
- best practices implemented to mitigate impacts (e.g. recovered material/energy that can lead to environmental benefits)

Any additional environmental information declared shall be substantiated and verifiable, and be derived using appropriate methods and be specific, accurate, not misleading, and relevant to the specific product. Quantitative information is preferred over qualitative information.

5.4.7 ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

The EPD may also include other relevant social and economic information as additional and voluntary information. This may be product information or a description of an organisation's overall work on social or economic sustainability, such as activities related to supply chain management or social responsibility.

Any additional social and economic information declared shall be substantiated and verifiable, and be derived using appropriate methods and be specific, accurate, not misleading, and relevant to the specific product. Quantitative information is preferred over qualitative information.

5.4.8 DIFFERENCES VERSUS PREVIOUS VERSIONS

For EPDs that have been updated, the following information shall be included:

- a description of the differences versus previously published versions, and
- a revision date on the cover page.

5.4.9 REFERENCES

A reference section shall be included, including a list of all sources referred to in the EPD, including the GPI (including version number), and PCR (registration number, name, and version) used to develop the EPD.

5.4.10 EXECUTIVE SUMMARY IN ENGLISH

The executive summary, if included (see Section 5.1), shall contain relevant summarised information related to the programme, product, environmental performance, information related to pre-certified EPDs, and information related to sector EPDs. Besides this, further information may be added such as additional environmental, social or economic information, references as well as differences versus previous EPD versions.

6 LIST OF ABBREVIATIONS

ANZSIC	Australian and New Zealand Standard Industrial Classification
CPC	Central product classification
CPV	Common procurement vocabulary
EPD	Environmental product declaration
GPI	General Programme Instructions
GTIN	Global trade item number
ISO	International Organization for Standardization
LCA	Life cycle assessment
LCI	Life cycle inventory
NACE/CPA	Classification of products by activity
ND	Not declared
PCR	Product category rules
REACH	Restriction of chemicals
RSL	Reference service life
SI	The International System of Units
UN	United Nations
UNSPSC	United Nations standard products and services code

7 REFERENCES

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EPD International (2021) General Programme Instructions for the International EPD® System. Version 4.0, dated 2021-03-29. www.environdec.com.

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European Aluminium, 2018. Environmental Profile Report. Life-Cycle inventory data for aluminium production and transformation processes in Europe.

ISO (2000) ISO 14020:2000, Environmental labels and declarations – General principles.

ISO (2004) ISO 8601:2004 Data elements and interchange formats – Information interchange – Representation of dates and times.

ISO (2006a) ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO (2006b) ISO 14040:2006/AMD 1:2020, Environmental management – Life cycle assessment – Principles and framework.

ISO (2006c) ISO 14044: 2006/AMD 2:2020, Environmental management – Life cycle assessment – Requirements and guidelines.

ISO (2013) ISO/TS 14067:2013, Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification and communication.

ISO (2014) ISO 14046:2014, Environmental management – Water footprint – Principles, requirements and guidelines.

ISO (2015a) ISO 14001:2015, Environmental management systems – Requirements with guidance for use.

ISO (2015b) ISO 9001:2015, Quality management systems – Requirements.

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8 VERSION HISTORY OF PCR

VERSION 1.0, 2022-12-09

Original version of the PCR.

VERSION 1.0.1, 2025-03-05

- In Sections 2.2.1, 4.3.1.2 and 4.4, added clarifications for processes that use supplied ingot, as raw material, to produce the final product.
- Added paragraph in the introduction to Section 4.6, claryfying that there are two interpretations on the rules on scrap allocation in the PCR, and that the EPD shall clearly declare which allocation method has been applied. These rules will be clarified in the next large update of the PCR.

VERSION 1.0.2, 2026-02-23

- The validity period of the PCR was extended by 6 months, until 2027-06-09, due to the initiation of an updating process.

BASIC ALUMINIUM PRODUCTS AND SPECIAL ALLOYS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 4153 AND 4143