

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

2012:01
VERSION 2.2

VALID UNTIL: 2019-03-03



GENERAL INTRODUCTION TO PRODUCT CATEGORY RULES IN THE INTERNATIONAL EPD® SYSTEM

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD® System: a programme for type III environmental declarations according to ISO 14025:2006. Environmental Product Declarations (EPD®) are voluntary documents for a company or organisation to present transparent information about the life cycle environmental impact for their goods or services.

The rules for the overall administration and operation of the program are the General Programme Instructions, publically available at the website (www.environdec.com). In addition to ISO 14025, the International EPD® System adheres to the following international standards:

- ISO 9001, Quality management systems
- ISO 14001, Environmental management systems
- ISO 14040, LCA - Principles and procedures
- ISO 14044, LCA - Requirements and guidelines

For construction products, the International EPD® System also allows the use of EN 15804 (Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products) and ISO 21930 (Environmental declaration of building products) as the main underlying standards. The compliance with these and other standards shall be clearly stated in each PCR and EPD® where it is relevant.

A PCR is defined in ISO 14025 as a set of specific rules, requirements and guidelines for developing Type III environmental declarations for one or more product categories. The PCR document specifies the rules for the underlying life cycle assessment (LCA) and sets minimum requirements on EPDs for a specific product group that are more detailed than the standards and the General Programme Instructions.

PCRs in the International EPD® System are developed in English in accordance with the procedure described in the General Programme Instructions. All PCR documents have a maximum period of validity after which the document shall be revisited.

EPDs are developed and registered based on a valid PCR. An EPD® shall be based on the latest version of the PCR, and refer to the version number and date of the PCR used. The production of new PCR versions does not affect the certification period of EPDs that are already published.

This PCR document is publically available at www.environdec.com. The PCR document is a living document. If relevant changes in the LCA methodology or in the technology for the product category occur, the document will be revised and the new version will be published on the website.

Stakeholder feedback on PCRs is very much encouraged. Any comments to this PCR document may be given on the PCR Forum on www.environdec.com or directly to the PCR moderator during its development or during the period of validity.

TABLE OF CONTENTS

General Introduction to Product Category Rules in the International EPD® System.....	2
1 Options when using this document.....	4
1.1 List of available sub-PCRs	4
2 General information	5
2.1 Administrative information	5
2.2 Scope of PCR.....	6
2.3 Geographical region	7
2.4 EPD validity	7
2.5 Grouping manufacturing sites and/or a products group.....	7
3 PCR review and background information	8
3.1 PCR review	8
3.2 Open consultation	8
3.3 Existing PCRs for the product category.....	8
3.4 Reasoning for development of PCR	8
4 Declared or Functional unit.....	8
5 Content declaration.....	9
6 Units and quantities	10
7 General system boundaries.....	10
7.1 Upstream processes.....	13
7.2 Core processes	13
7.3 Downstream processes.....	13
7.4 Other environmental information	15
7.5 General Inventory methodology	16
7.6 Cut-off rules.....	17
7.7 Allocation rules	17
7.8 Data quality rules.....	21
8 Sub-PCR	22
8.1 An EPD based on a full LCA for comparison within defined function and application	23
9 Content of the EPD®.....	23
9.1 Declaration of general information.....	23
9.2 Environmental performance-related information.....	33
9.3 Additional environmental information.....	36
9.4 Programme related information and Mandatory statements.....	36
10 Special requirements compared to EN 15804	38
11 Changes in this PCR document.....	38
12 References	40
13 Annex A – Basis for allocation in combined heat and electricity production.....	42
14 Annex B – List of examples of construction products	43
15 Annex C – Reference service life (RSL)	49
16 Annex D – Definition on Use of net Fresh water consumption.....	51
16.1 Inventory indicator describing net use of fresh water.....	51
16.2 Terms	51

1 OPTIONS WHEN USING THIS DOCUMENT

This document is the main implementation of the European standard EN 15804:2012+A1:2013, Sustainability of construction works — Environmental product declarations, in the International EPD® System. Other stand-alone PCRs relevant to construction products and services available at www.environdec.com may or may not be aligned with EN 15804 due to their age, scope of product category or geographical area of applicability.

An EPD based on this PCR may be produced using a declared unit and having the system boundaries “cradle-to-gate” or “cradle-to-gate with options” as defined in EN 15804. This document may also be used to create a supplementary “sub-PCR” defined on a more detailed product category level. An EPD based on such a sub-PCR may use a functional unit and have a cradle-to-grave system boundary, and shall refer to both this document and the sub-PCR.

An EPD that is based on a LCA with a scope covering cradle-to-gate and with optional lifecycle stages are typically applicable for comparison within a limited product group, i.e. often a material group or defined product or service. In this case it isn’t needed to take a comparative in use function into account, and it does not have to be required to include all life cycle stages. These aspects can instead be handled outside the EPD if needed. In this case an EPD is based on a so-called *declared unit* (typically given per kg of product).

However, in order to cover a full life cycle and based on a *functional unit* – that makes a comparison across different materials and services on an equal way possible – a functional unit has to be developed in a sub-PCR. This unique extra work will guarantee a sound development of EPDs based on the intention outlined in the EPD standard ISO 14025. Therefore, if a full LCA based on a functional unit to be developed, then it has to be based on a sub-PCR to this generic PCR Basic Module, see Figure 1.

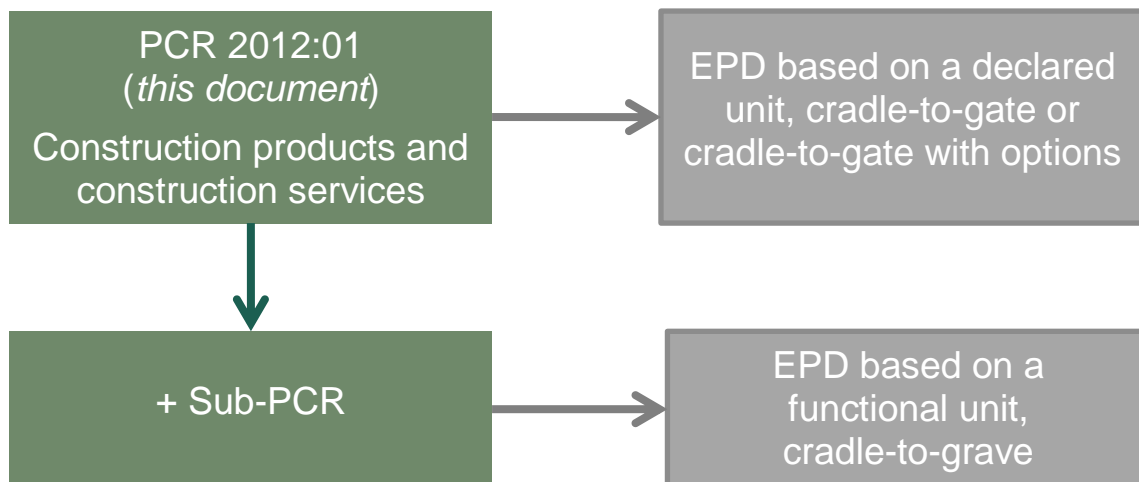


Figure 1 Overview of when this document may be used directly to develop and register an EPD and for which types of EPDs a supplementary sub-PCR is needed.

The scope of this additional supplementary sub-PCR will have to deal with definition of service life and how to define a functional unit relevant for the product system service. For more details on developing a sub-PCR see Section 8. The development of such a sub-PCR shall follow the PCR development procedure according to the General Programme Instructions. These sub-PCRs will be published as separate documents, available on www.environdec.com and listed in Section 1.1.

A sub-PCR may also be created to adopt a “PCR” developed by product-TCs within CEN standardisation.

1.1 LIST OF AVAILABLE SUB-PCRS

The following sub-PCRs currently exist, and shall be used in addition to this document for the relevant product categories:

- PCR 2012:01-Sub-PCR-A Mortars applied to a surface
- PCR 2012:01-Sub-PCR-B Synthetic carpet yarn used for construction purposes

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- PCR 2012:01-Sub-PCR-C Acoustical systems solutions (construction product)
- PCR 2012:01-Sub-PCR-D Bricks, blocks, tiles, flagstone of clay and siliceous earths

See www.environdec.com/PCR for sub-PCRs currently under development.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Construction products and construction services
Registration number:	2012:01, version 2.2
Programme operator:	The International EPD® System operated by EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
Appointed PCR moderator:	Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se
PCR Committee (includes version 1.0 and later versions):	IVL Swedish Environmental Research Institute, Swedish Environmental Protection Agency, SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB
Date of publication:	2017-05-30 (Version. 2.2) Version 1.0 was published 2012-01-09. A version history is available in Section 11
Date of expiration:	2019-03-03
Schedule for renewal:	When the validity time is about to expire the PCR moderator shall initiate a discussion with the programme operator how to proceed with updating the document and extending the period of validity. See General Programme Instructions.
Open consultation period:	2014-11-18 until 2015-01-13 (Version 2.0) 2011-06-10 until 2011-08-05 (Version 1.0)
Standards conformance:	General Programme Instruction of the International EPD® System, version 2.5, based on ISO 14025 and ISO 14040/14044 EN 15804:2012+A1:2013
PCR language:	This PCR was developed and is available in English, as is mandated by the General Programme Instructions. The English version takes precedence in case of any discrepancies in translated versions.
More information on this PCR's website:	http://environdec.com/en/PCR/Detail/?Pcr=8098
Comments on the PCR:	Any comments to this PCR document may be given on the PCR Forum on www.environdec.com or sent directly to the PCR moderator during the period of validity.

2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of the general product category "Construction products and construction services" and the declaration of this performance by an EPD, compliant with ISO 14025 and EN 15804. All efforts have been made to include the "shall" requirements from EN 15804 in this PCR. If any such requirements are missing in the PCR, they shall also be met.

The product category referred to in this PCR includes all construction products and construction services for buildings and other construction works (i.e. buildings or civil engineering works), with the same scope as the European standard EN 15804. As the standard EN 15804 provides limited guidance on the definition of a construction product, the best definition is found in the European construction product regulation:

"construction product" means any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works".

Non-permanent products in construction works or products that do not have any effect on the performance of the construction work are thus not included in this definition.

There is no exhaustive list of what products are covered by this definition. All products that are covered by a harmonized standard according to the construction product regulation (or the earlier construction product directive) could, however, be considered as construction products. See Annex B for a list of examples of products that are covered by a harmonized standard.

The International EPD® System uses the UN CPC classification for its PCRs. As this PCR covers a very generic product category, with the final use as the defining factor, it is difficult to classify it according to UN CPC code. A first attempt is that the following groups, and underlying classes and sub-classes for construction products are covered by this document. The UN CPC codes given below are a non-exhaustive list and other CPC codes may also be relevant for this PCR:

151	Monumental or building stone
153	Sands, pebbles, gravel, broken or crushed stone, natural bitumen and asphalt
154	Clays
311	Wood, sawn or chipped lengthwise, sliced or peeled, of a thickness exceeding 6 mm; railway or tramway sleepers (cross-ties) of wood, not impregnated
313	Wood in the rough, including those treated with paint, stains, creosote or other preservatives; railway or tramway sleepers (cross-ties) of wood, impregnated
314	Boards and panels
315	Veneer sheets; sheets for plywood; densified wood
316	Builders' joinery and carpentry of wood (including cellular wood panels, assembled parquet panels, shingles and shakes)
362	Other rubber products
363	Semi-manufactures of plastics
369	Other plastics products
371	Glass and glass products
373	Refractory products and structural non-refractory clay products
374	Plaster, lime and cement
375	Articles of concrete, cement and plaster
376	Monumental or building stone and articles thereof
379	Other non-metallic mineral products n.e.c.
412	Products of iron or steel

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- 415 Semi-finished products of copper, nickel, aluminium, lead, zinc and tin or their alloys
- 416 Other non-ferrous metals and articles thereof (including waste and scrap of some metals); cements and articles thereof
- 421 Structural metal products and parts thereof

For construction services, this document applies to the following groups and underlying classes and sub-classes:

- 541 General construction services of buildings
- 542 General construction services of civil engineering works
- 543 Site preparation services
- 544 Assembly and erection of prefabricated constructions
- 545 Special trade construction services
- 546 Installation services
- 547 Building completion and finishing services

2.3 GEOGRAPHICAL REGION

This PCR is applicable globally.

2.4 EPD VALIDITY

The validity of the EPD[®] is set at five years – in accordance with EN 15804 – after which the declaration shall necessarily be revised and reissued.

During the validity period surveillance follow up shall be agreed with the verifier in order to evaluate if the content are still consistent with the current situation. It is not necessary to perform a full LCA, only the monitoring of main parameters is requested. The surveillance verification could be organised as documental check aimed to the evaluation of the main environmental aspects relevant for the LCA calculation.

The EPD shall be updated if one of the environmental indicators has worsened for more than 10 % compared with the data currently published. See General program instruction under paragraph 4.10 for further information.

2.5 GROUPING MANUFACTURING SITES AND/OR A PRODUCTS GROUP

In case of inclusion of several similar products and/or if more than one manufacturing site is accounted for, the International EPD[®] System offers the possibility to report the environmental impact if following requirements are met (see General Programme Instructions):

- Similar products with differences between the mandatory impact indicators lower than $\pm 10\%$ (concerning A1-A3) could be presented using the impacts of a representative product. A variation range description shall be presented in the declaration;
- Similar products with differences between the mandatory impact indicators higher than $\pm 10\%$ (concerning A1-A3) could be presented in the same declaration documents but using separate columns or tables. An alternative is to select a product within the product group (product family or assortment) that will be a reference product based on representation and/or production volumes. It should then be stated in the EPD that the span between products within the product group is larger than 10% or the exact figure valid for the product group that the reference product is part of.

It is also possible to create a so-called Sector EPDs which enables the possibility to present average data for a whole industrial branch in a well-defined geographical area.

3 PCR REVIEW AND BACKGROUND INFORMATION

3.1 PCR REVIEW

3.1.1 VERSION 2.0

Version 2.0 of this PCR was reviewed by the Technical Committee of the International EPD[®] System.

3.2 OPEN CONSULTATION

3.2.1 VERSION 2.0

This PCR was available for open consultation from 2014-11-18 until 2015-01-13, during which any stakeholder was able to provide comments by posting on the PCR forum on www.environdec.com or by contacting the PCR moderator.

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

This PCR replaced multiple older PCRs for construction products in the International EPD[®] System.

3.4 REASONING FOR DEVELOPMENT OF PCR

This document was developed to function as the main implementation of EN 15804+A1 in the International EPD[®] System.

4 DECLARED OR FUNCTIONAL UNIT

The declared or functional unit provides a reference by means of which the material flows of the information module of a construction product are normalised (in a mathematical sense) to produce data, expressed on a common basis.

The EPD shall either be based on a declared unit or a functional unit. In the case that a functional unit is used, conversion factors shall be included in the EPD so that environmental performance on A1-A3 may be recalculated to a declared unit supporting the modularity of the EPD as data provider for any construction works.

The declared unit is used instead of the functional unit when the precise function of the product or scenarios at the building level is not stated, unknown or is not taken into account for in the EPD. The declared unit is applicable for an EPD that covers a “cradle to gate” and “cradle to gate with options”. The declared unit is defined and specified in the International System of Units (SI units), shall relate to the typical applications of products and shall preferably be one of the unit types listed below:

- An item (piece), an assemblage of items, e.g. 1 brick, 1 window (dimensions to be specified)
- Mass (kg), e.g. 1 kg of cement
- Length (m), e.g. 1 metre of pipe, 1 metre of a beam (dimensions shall be specified)
- Area (m²), e.g. 1 square metre of wall elements, 1 square metre of roof elements (dimensions shall be specified)
- Volume (m³), e.g. 1 cubic metre of timber

A different unit may be declared for reasons that shall be explained and in such cases information shall be provided on how to convert this unit to one or more of the unit types listed above.

Example: The declared unit is typically specified in terms of kg.

Note: When the building product is part of a range of products, the declared unit should make scaling between the different product's underlying articles as simple as possible.

Example: *For instance, a ventilation pipe should be reported in 'kg' rather than in 'm', since the environmental performance per metre will differ depending on the pipe's diameter. Performance that is reported per kg ventilation pipe is independent of the pipe's diameter.*

Note: *It should be noted that a declared unit per 'piece' is recommended when scaling between different products is not adequate, e.g., per specific refrigerator instead of cooled storage volume.*

To support comparability within a sub-product group a functional unit is required and other aspects that make a fair comparison possible. This requires a sub-PCR is development and an open consultation. A functional unit is therefore applicable when the EPD covers a full "cradle to grave" LCA for a comparative purpose. The functional unit of a construction product is based on:

- the quantified, relevant functional use or performance characteristics of the construction product *when integrated into a building*, taking into account the functional equivalent of the building
- the product's Reference Service Life (RSL) (see ISO 15686-1, -2, -7 and -8) or required service life of the building under defined in-use conditions.

If the scope for an EPD is to cover a full lifecycle, the functional unit may be defined in a sub-PCR based on a detailed CPC classification. If no such CPC class exist, also PCR without CPC codes may be developed. The functional unit shall be declared and explained in the EPD. Information shall also be provided in the EPD on how to convert this functional unit to one or more of the declared unit types listed above.

The development of a functional unit will require that a sub-PCR is developed. This PCR typically will have to define how to handle one or several in use and end of life scenarios. This sub-PCR will cover one or (most likely) several CPC codes.

5 CONTENT DECLARATION

According to the General Programme Instructions, paragraph 4.4 the EPD shall include a content declaration with a list of materials and chemical substances including information on their hazardous properties. No specific format is then given why the optional list below can be an illustrative example.

According to EN15804 declaration of material content of the product shall list as a minimum substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" when their content exceeds 0.1 % of the weight of the product. SVHC are listed by European Chemicals Agency¹ and includes the Candidate List of SVHC.

An optional detailed list of the product's substances, including CAS² number, environmental class and health class, may be included in the product content declaration. It is also recommended to include substances' functions in the product (e.g., pigment, preservative, etc.). An optional detailed content declaration is illustrated in Table 1.

Table 1 An example of an illustrative detailed product content declaration, (example written in italic).

All materials/ components, ¹⁾	Substances	Weight % ²⁾	CAS number	Environ- mental class	Health class
<i>Pigment</i>	<i>Titanium dioxide Iron oxides fume</i>	<i>6 +/-3 2</i>	<i>13463-67-7 1309-37-1</i>	<i>no Data lacking</i>	<i>R 37 Data lacking</i>
<i>Preservative</i>	<i>—³⁾</i>	<i>3</i>	<i>—</i>	<i>no</i>	<i>R 46</i>
<i>etc.</i>					
<i>...</i>					

¹ http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

² The reporting could also be given with use of EINEC number.

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

<i>Other, non-allergenic, health-sensitive or environmentally-sensitive substances</i>		<1%	—	<i>no</i>	<i>No</i>
Total		100			

- 1) Substance(s) do not need to be included if they may affect patent or company secrets.
- 2) Figures can alternative be given in e.g. g/kg.
- 3) The substance name is not given above for confidentiality reason.

The general recommendation is that the declaration of contents shall also report all substances' inherent properties that are regarded as hazardous. These hazardous substances may be reported with the applicable risk classification, as per the regulations for those markets where the product will be used (see Table 1). The following natural substances' inherent properties (i.e. risk classification) do not need to be specified in the content declaration for:

- metals including alloys that are fixed in the construction product during its utilisation in the construction, and that the composition (i.e. the entire product) are not classified as dangerous.
- minerals, ores, or other naturally-occurring substances and raw materials, provided that they have not been chemically modified under production, and that they are not classified as dangerous under the EU directive 67/548/EEG.

The content declaration does not apply to proprietary materials and substances such as those covered by exclusive legal rights including patent and trademarks.

6 UNITS AND QUANTITIES

The International System of Units (SI units) shall be used. For power and energy, the preferred units are kW and kWh or MJ. A maximum of three significant digits shall be used when reporting LCA results, but reported numbers should always be rounded in accordance with their scientific significance.

The thousands separator and decimal mark in the EPD shall follow one of the following styles (five significant digits only use for illustration):

- SI style (French version): 1 234,56
- SI style (English version): 1 234.56

In case of any potential confusion, the EPD shall state what symbols are used for thousand separator and decimal mark.

7 GENERAL SYSTEM BOUNDARIES

The International EPD[®] System has adopted an LCA calculations procedure which is separated into three different life cycle stages, see Figure 1:

- Upstream processes (from cradle-to-gate);
- Core processes (from gate-to-gate)
- Downstream processes (from gate-to-grave)

In the EPD[®], the environmental performance associated with each of the three life-cycle stages above shall be reported separately. In the European standard EN 15804, a different nomenclature is used based on "information modules" A1-C4 and D.

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

The general system boundary for a construction product or service is defined by its intended use. This PCR allows optional scope of the LCA reported in the EPD if the declared unit is applied. Then the following scopes are available using this document as a PCR:

- a “cradle-to-gate” EPD (declared unit): Modules A1 to A3
- a “cradle-to-gate with options” EPD (declared unit): Modules A1 to A3 plus other selected optional modules, e.g. end-of-life information modules C1 to C4
- a “cradle-to-grave” EPD (functional unit): All Modules A to C based on a sub-PCR including scenarios for handling the usage and end of life stage in order to meet comparability within the specific application of the product group. See Table 2 and Section 8 for further details.

For a “cradle-to-grave” EPD a sub-PCR shall be developed that e.g. defines the functional unit and scenarios for handling the usage and end of life stage in order to meet comparability within the specific application of the product group. See section 8 for further details.

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

Mandatory modules are required as follows (see also Table 2):

- Modules A1 to A3 are mandatory for all construction products.
- Modules A1 to A5 are mandatory for construction services.

This is a specification in addition to EN 15804, since this matter is not covered in that standard. In this case, life cycle module A5 describes the impact that appears for those parts of the service that are completed in relation to any construction work installed at the construction site. Life cycle module A4 includes the transportation needs arising from the product suppliers and construction workers that perform the service that is declared in life cycle module A5. In other words, life cycle modules A1 to A3 include the upstream impacts that are not emitted at the construction site (A5) or emitted during transport work accounted for in life cycle module A4. An EPD for a construction service is then typically used as a data input in life cycle modules B2 to B5, i.e. used as an input for scenarios for any of the information modules on the construction works level.

Table 2 The life cycle of a building product divided in three process modules according to the General Program Instructions and four information modules according to ISO 21930 and EN 15804 and supplemented by an optional information module on potential loads and benefits beyond the building life cycle.

Comparability basis:			Within the product group	Performance in a construction application
Life cycle stages in the International EPD® System	Asset life cycle stages (EN 15804)	Information module (EN 15804)	EPD type	
			Declared unit: Cradle-Gate, Cradle-Gate with options	Functional unit: Cradle-Grave
Upstream	A1) Raw material supply	A1-A3) Product stage	Mandatory	Mandatory
Core	A2) Transport			
	A3) Manufacturing			
Downstream	A4) Transport	A4-A5) Construction process stage	Optional for a product and mandatory for a service	Mandatory
	A5) Construction installation			
		B1) Use	B1-B5) Use stage	Optional

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

	B2) Maintenance			
	B3) Repair			
	B4) Replacement			
	B5) Refurbishment			
	B6) Operational energy use			
	B7) Operational water use;			
	C1) Deconstruction, demolition			
C2) Transport				
C3) Waste processing				
C4) Disposal				
Other environmental information	D) Future, reuse, recycling or energy recovery potentials	D) Recovery stage*	Optional	Optional
Inclusion of reference service life (RSL)	—	—	Mandatory if any module in B is included	Mandatory

* Referred to as "module D" in EN 15804.

7.1 UPSTREAM PROCESSES

The following upstream processes/life cycle stages are included:

- A1) Raw material supply
 - Extraction and processing of raw materials (e.g. mining processes), biomass production and processing (e.g. agricultural or forestry operations) and recycling processes of secondary materials from a previous product system (e.g. steel reinforcement), but not including those processes that are part of the waste processing in the previous product system, referring to the polluter pays principle.
 - Generation of electricity, steam and heat from primary energy resources, also including their extraction, refining and transport. This also includes energy needed for raw material supply and energy for manufacturing in core process.
 - Energy recovery and other recovery processes from secondary fuels, but not including those processes that are part of waste processing in the previous product system.
 - Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product.

7.2 CORE PROCESSES

The core processes include:

- A2) Transportation:
External transportation to the core processes and internal transport.
- A3) Manufacturing:
 - In case that the manufacturing incorporate (at the same site) recycling process of any purchased recycled material and the transport from the recycling process to where the material is used.
 - Manufacturing of the construction product and co-products, or in the case of a building service bought products and external services utilised.
 - Packing materials etc. used (if relevant).
 - Production of ancillary materials or pre-products;
 - Treatment of waste generated from the manufacturing processes. Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product

Please note that this is a general description and that not all processes relevant for every type of product included in this PCR are included in the listing.

7.3 DOWNSTREAM PROCESSES

In the case that any downstream process is used and part of the underlying LCA it shall be reported in the EPD in brief what precise activities are included.

The downstream processes include the B) Usage stage and the C) End-of-life stage. On a general level the B) Usage stage and the C) End-of-life stage step includes all relevant goods and services that in a life cycle perspective include an inventory taken into account e.g.:

- the production and transportation related to any service, component and ancillary products used
- transportation of any waste from these products or services processes and their related transportation;
- end-of-life processes related to these products or services processes including transportation following the “polluter pays principle”:

The here generally applied “polluter pays principle” means that processes of waste processing shall be assigned to the product system that generates the waste until a new user pays for it as a raw material.

The downstream life cycle stages are divided into a number of life cycle module steps as defined below:

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- A4) Transport:
 - Transportation from the production gate to the construction site
 - Storage of products, including the provision of heating, cooling, humidity control etc.
 - Transport of waste generated from the construction site.
- A5) Construction installation:
 - Installation of the product into the building including manufacture and transportation of ancillary materials and any energy or water required for installation or operation of the construction site. It also includes on-site operations to the product or service.
 - Wastage of construction products (additional production processes to compensate for the loss of wastage of products);
 - Waste processing of the waste from product packaging and product wastage during the construction processes up to the end-of-waste state or disposal of final residues.

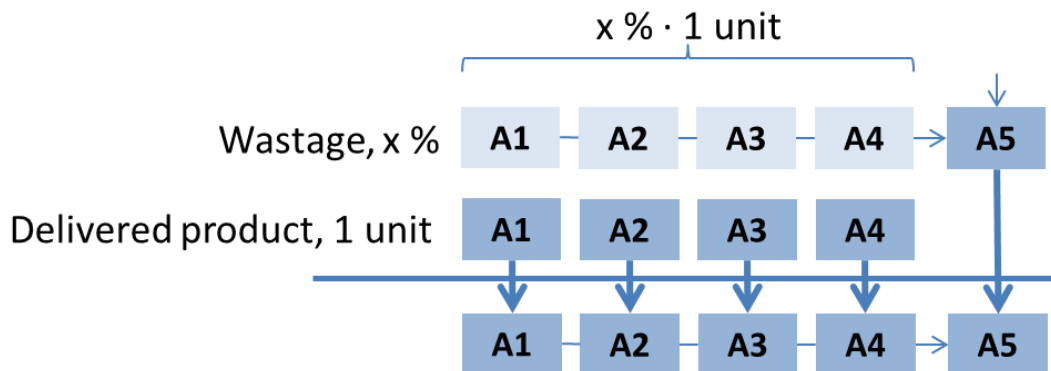


Figure 2 The wastage of construction products includes upstream environmental impact from the production and transportation. The environmental impact reported in A1 to A3, therefore, only accounts for the impact related to the installed product and the wastage is reported in A5. This supports the modularity principle where other wastage than the assumed one in the EPD may be used in practice on construction works level.

- B1) Use:

The module covers technical and associated administrative activities and actions during the service life related to the operation (use) of the installed product in a building and construction works during their normal use. Operational energy or water use that can be originated to the specific product, service or integrated technical systems” in the EPD by building, is included in the use module. This module includes e.g. cleaning, regularly changes of air filters and other service of devices and building systems and release of substances from the facade, roof, floor covering and other applications.
- B2) Maintenance:

Maintenance covers the combination of all *typically planned* technical and associated administrative activities and actions during the service life.
See refurbishment when repair is not possible.
- B3) Repair:

The module “repair” covers a combination of all technical and associated administrative actions during the service life associated with a *typically not planned* corrective, responsive or reactive treatment of a construction product when it is broken or out of order, so it will work again or meet required performance.
See replacement when repair is not possible.
- B4) Replacement:

Replacement of a broken component or part due to damage should be accounted for in the module “repair”. The module replacement is related to products that are typically repaired (but not limited to those).

- **B5) Refurbishment:**
These activities cover a concerted typically planned programme of maintenance that finally ends up with a restoration, that often includes across a significant part or whole section of the building.
- **B6) Energy use to operate building integrated technical systems:**
The boundary of the module “Energy use to operate building integrated technical systems” shall include energy use during the operation of the product (the integrated building technical system), together with its associated environmental aspects and impacts including processing and transportation of any waste arising on site from the use of energy. Integrated building technical systems are installed technical equipment supporting operation of a building or construction works. This includes technical building systems for heating, cooling, ventilation, lighting, domestic hot water and other systems for sanitation, security, fire safety, internal transport and building automation and control and IT communications. Aspects related to the production, transportation and installation of equipment required to supply energy to the building shall be assigned to Modules A1-A5. Energy use during maintenance, repair, replacement or refurbishment activities for the equipment shall be assigned to Modules B2-B5. Aspects related to the waste processing and final disposal of equipment shall be assigned to Modules C1-C4.
- **B7) Operational water use by building integrated technical systems:**
The module "Operational water use by building integrated technical systems" covers the period from the handover of the building or construction works to when the building is deconstructed or demolished. The boundary of the module “operational water use by building integrated technical systems“ shall include water use during the operation of the product (the building integrated technical system), together with its associated environmental aspects and impacts considering the life cycle of water including production and transportation and waste water treatment. Building integrated technical systems are installed technical equipment to support operation of building. This includes technical building systems for cooling, ventilation, humidification, domestic hot water and other systems for sanitation, security, fire safety, internal transport.
- **C1) Deconstruction, demolition:**
Deconstruction includes dismantling or demolition of the product from the construction, including initial on-site sorting of the materials.
- **C2) Transport:**
Transportation of the discarded product accounts for part of the waste processing, e.g. to a recycling site and transportation of waste e.g. to final sorting yard or disposal (see “polluter pays principle” in section 7.5.5).
- **C3) Waste processing:**
Waste processing includes collection of waste fractions from the deconstruction and waste processing of material flows intended for reuse, recycling and energy recovery. Materials for recycling or energy recovery processing shall be modelled as the elementary technosphere flows in the inventory, see section 7.5.5 and reported in the EPD. Materials for energy recovery are identified based on the efficiency of energy recovery with a rate higher than 60 % without prejudice to existing legislation. Materials from which energy is recovered with an efficiency rate below 60% are not considered materials for energy recovery (but incineration). This definition means that every so called waste that is used as fuel in a combustion process higher than 60% has to be accounted for the downstream user, i.e. the electricity or heat from a co-generation plant etc. This follows the polluter pays principle.
- **C4) Disposal:**
Waste disposal including physical pre-treatment and management of the disposal site. Emissions from waste disposal are considered part of the product system under study and therefore part of this module, according to the “polluter pays principle”. See also C3 concerning waste definition.

7.4 OTHER ENVIRONMENTAL INFORMATION

As one option for other environmental information it is possible to report on recyclability potentials.

- **D) Future, reuse, recycling or energy recovery potentials:**
The information in “Module D” may contain technical information as well as LCA result from post-consumer recycling, i.e. environmental benefits or loads resulting from reusable products, recyclable materials and/or useful energy carriers leaving a product system e.g. as secondary materials or fuels. Avoided impacts from co-products from module A to C shall not be included in Module D.

7.5 GENERAL INVENTORY METHODOLOGY

7.5.1 GEOGRAPHICAL BOUNDARIES

The data for the core module shall be representative for the actual production processes and representative for the site/region where the respective process is taking place.

7.5.2 TIME BOUNDARIES

Data shall be based on data that represent the current situation.

7.5.3 BOUNDARIES TO NATURE

System boundaries to and from nature are jointly described by so-called elementary flows. The inclusion of resource flows from nature to the technosphere corresponds to resource use and explorative impact, and on the output side emissions and resource consumption. In an ideal LCA, all flows studied shall be traceable to a natural recipient. A flow that cannot be traced back to a natural recipient is regulated by data quality requirements see section 7.6.

Waste to landfills is modelled to achieve elementary flows in a 100 year time perspective.

7.5.4 SYSTEM BOUNDARIES FOR MANUFACTURING OF EQUIPMENT AND FOR EMPLOYEES

The following system boundaries are applied on manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI.
- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI.

Note: The system boundaries on manufacturing of equipment and for employees are *not* regarded as limiting the scope of the inventory or as an incomplete inventory (i.e., a cut-off).

7.5.5 BOUNDARIES TO OTHER PRODUCT LIFE CYCLES

Allocation of recycled material, also known as open loop recycling, is reported in the inventory as an input or output technosphere flow when such materials leave or enter the specific product system. Therefore, a system boundary between the product's systems in a material recycling cascade has to be defined between individual sub-processes.

When a product is discarded and its original function is lost, it can be processed further in a waste management system. Those parts of the initial product system that are utilised in a new product will be accounted for as material recycling in the LCI (as a flow to technosphere). The secondary user of recycled material will account for the use of recycled material (as a flow from technosphere).

The exact boundary settings between the first and the next product systems are defined by the *willingness to pay* for the recycled material. This implies that from the moment the user of a secondary material pays for the material, this (secondary) product system will also be responsible for the environmental burden from that point on. This principle is referred to in the International EPD® System as the *Polluter Pays (PP) allocation method*.

Consequently, if there is an inflow of recycled material to the production system, the recycling process and the transportation from the recycling process to where the material is used shall be included. If there is an outflow of material to recycling, the transportation of the material to a sorting facility/recycling process shall be included. The material intended for recycling is then an outflow from the production system.

7.6 CUT-OFF RULES

Life Cycle Inventory data for a minimum of 95% of total inflows (mass and energy) to the upstream and core module shall be included. Inflows not included in the LCA shall be documented in the EPD. Data gap with an assumed potential importance in the included modules shall be reported in the EPD including an evaluation of its significance³.

7.7 ALLOCATION RULES

In a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes.

In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.

The following stepwise allocation principles shall be applied for multi-input/output allocations:

- the initial allocation step includes dividing up the system sub-processes and collecting the input and output data related to these sub-processes.
- the first (preferably) allocation procedure step for each sub-process is to partition the inputs and outputs of the system in to their different products in a way that reflects the underlying physical relationships between them.
- the second (worst case) allocation procedure step is needed when physical relationship alone cannot be established or used as the basis for allocation. In this case, the remaining environmental inputs and outputs from a sub-process shall be allocated between the products in a way that reflects other relationships between them, such as the economic value of the products.

These allocation principles are described below:

0) INITIAL ALLOCATION STEP

Before an allocation can be performed, the product system shall first be subdivided into sub-processes. To simplify the initial allocation step, we introduce system boundaries indicating where a further allocation is needed. This routine defines the different sub-processes needed in the product-related inventory. A sub-process system's boundary appears

- each time a product is generated and leaves the specific analysed product system,
- each time a waste flow appears and leaves the specific analysed product system,
- when product flows are treated in various ways in a process, or
- when a material recycling loop occurs outside the own process step.

In the last case, when a material recycling loop occurs outside the own sub-process step, such systems can be regarded in a steady state and thereafter allocated⁴. The product system is now subdivided into sub-processes, creating the base for the next allocation step.

1) FIRST ALLOCATION PROCEDURE

The first allocation procedure should be performed so that it reflects the way in which the inputs and outputs are changed by quantitative changes in the products (or functions) delivered by the system. This means that the allocation shall be based on the way in which resource consumption and emissions change, following quantitative modifications.

³ CD ISO 21930:2015 suggests a 100% data cover, but allows proxy data. This approach is recommended and when proxy data are used for data gaps, its influence of the overall result shall be mentioned in the EPD, if this contribution is assumed to be significant (where 10% to any impact category may be as thumb of rule).

⁴ See guidance in Erlandsson (1996).

Some common allocation cases and how these should be applied according to the general allocation procedure are described below. The following products or functional inputs/outputs from a sub-process have been identified: services, goods, and energy (subdivided into electricity and heat, where convenient).

Materials for energy recovery are identified based on the efficiency of energy recovery with a rate higher than 60 % without prejudice to existing legislation. Materials from which energy is recovered with an efficiency rate below 60% are not considered materials for energy recovery (but incineration). This definition means that every so called waste that is used as fuel in a combustion process higher than 60% has to be accounted for the downstream user, i.e. the electricity or heat from a co-generation plant etc.

The following allocation procedures shall be performed for sub-process allocations on goods, energy and services.

1.1) MULTI-OUTPUT

Products and functions are the outputs and/or services provided by the process, having a positive economic value.

Material flows carrying specific inherent properties, e.g. energy content, elementary composition (e.g. biogenic carbon), shall always be allocated reflecting the physical flows, irrespective of the allocation chosen for the process.

1.1.1) Goods

A multi-output sub-process delivering goods that are treated equally in the specific sub-process shall be allocated based on the inherent physical property of the different products, such as mass. If these goods are treated differently in the sub-process, the specific sub-process-related physical causality should be taken into account. For example, different products are covered by different amounts of paint, or different raw material fractions are dried differently.

1.1.2) ENERGY, INCLUDING CO-PRODUCTION OF HEAT AND ELECTRICITY

In a pure energy generation process where either heat or electricity is produced, allocation should be performed on the basis of the inherent energy contents of the produced energy-wares. In the case of combined heat and power production, a distribution based on the best efficiency for the (potential) separate generation of electricity or heat shall be accounted for⁵. For illustrative examples and generic allocation efficiency factors, see a copy in Annex A⁶ or check for a current update.

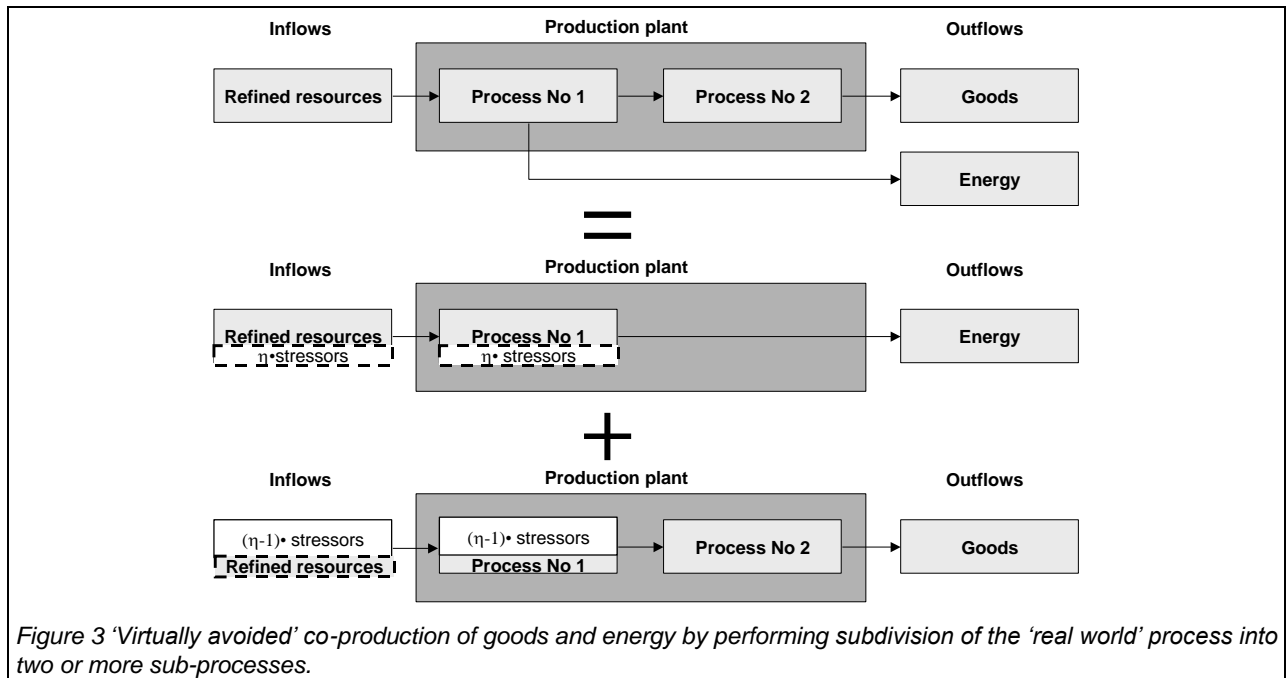
1.1.3) CO-PRODUCED GOODS AND/OR ENERGY

In the case of co-production of goods and energy, an allocation can be 'virtually avoided' by performing a subdivision of the 'real world' process into two or more processes. In order to do this, the real sub-process is divided in to two (or more) virtual sub-processes, where the environmental stressors (resource use, resource consumption and emissions) are distributed according to realistic efficiency factors, provided that the energy output was produced alone with the actual process inputs. For illustrative examples see Figure 3 and for generic allocation efficiency factors, see Annex A⁷ or check for a current update.

⁵ This allocation rule follows the PCR on "Electricity, Steam and Hot and Cold Water Generation and Distribution" (PCR 2007:08, available at www.environdec.com).

⁶ These generic defaults are accepted as specific data. However, actual site-specific data may be used if they can be verified.

⁷ These generic defaults are accepted as specific data. However, actual site-specific data may be used if they can be verified.



1.1.4) Co-produced goods, heat and electricity

The multi-output allocation of environmental stressors from a sub-process that delivers heat, electricity and goods at the same time can be handled via a stepwise allocation procedure based on the above-mentioned allocation procedures (see Figure 4).

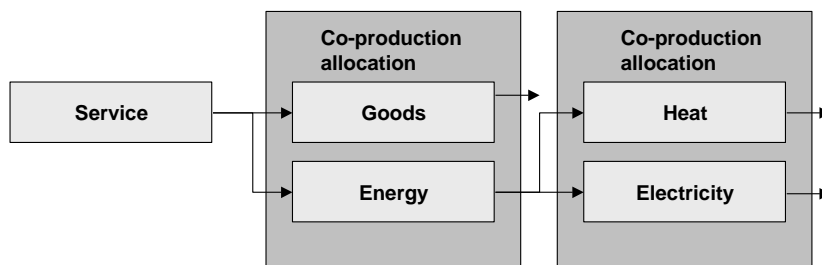


Figure 4 Elements of a stepwise allocation procedure for a service.

This stepwise procedure starts by partitioning the delivered goods and energy and then further partitioning between heat and electricity. It is then possible to allocate the environmental stressors to the individual functional outputs from the sub-process, i.e., goods, heat and electricity respectively.

1.1.5) Multi-output services

Services (e.g., transport) can in general be handled as a sub-process that requires both goods and energy resources. This implies that a multi-output service can be handled with the allocation procedures given above, once the physical relationships between the inputs are identified.

1.2) MULTI-INPUT SERVICES

A service with a multi-input sub-process generates no physical products. Instead, an allocation shall be performed for the upstream product systems that facilitate the service sub-process. For such multi-input services, the allocation shall be based on the physical relationships of the inputs (such as waste incineration or landfill) typically described by the stoichiometry of the reaction. If allocation based on the physical composition and stoichiometry of the inputs is not possible, another allocation principle based on physical and chemical properties should be applied.

1.3) MULTI-INPUT/OUTPUT SERVICES

The multi-input/output allocation of a sub-process service constitutes, by definition, a system boundary between two or more product systems, including open loop recycling. To follow the generic allocation rule by partition the inputs and outputs of the system in to their different products in a way that reflects the underlying physical relationships between them, in the case of material recycling, it means that the burden of the resource consumption will always be carried by the outputs. This means that the *resource consumption and emissions from for instance a waste incineration* are allocated to the *downstream* product systems (see Figure 5), since these products' characteristics are determined by the waste incineration sub-process step in which the product is generated from. All *other processes* will be allocated to the *upstream* product system (see Figure 5). The allocation specification here is applicable in combination with the multi-input/output allocation rules given above.

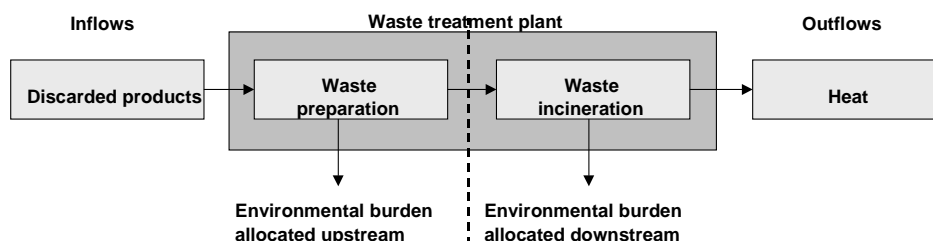


Figure 5 Multi-input/output allocation exemplified by a waste treatment plant with energy recovery, where both the inflows and outflows have positive market values.

Note: For this kind of allocation procedure, the recycling company pays for the discarded products that are used in the production of the outflows, which is sold on the market. Materials for energy recovery are identified based on the efficiency of energy recovery with a rate higher than 60 % without prejudice to existing legislation. These

specifications, therefore, specifies the *polluter pays* (PP) allocation principle, as described in section A.7.1 in the Supporting Annexes to the General Programme Instructions. This definition means that every so-called waste that is used as fuel has to be accounted for the downstream user, i.e. the electricity or heat from a co-generation plant etc according to the polluter pays principle.

Note: The consequence of this allocation rule is that no detailed future scenario has to be defined concerning the secondary user in the recycling cascade, in order to describe the environmental performance of the initial product, i.e. the building product.⁸

Example: This allocation rule is relevant for a waste combustion plant, see Figure 5. The distributions of the plant's emissions and resource consumption are allocated to the delivered heat and electricity. Meanwhile, the waste handling before it entered the combustion step will be allocated to the upstream product systems.

2) SECOND ALLOCATION PROCEDURE WHEN THE DIFFERENCE IN REVENUE FROM THE CO-PRODUCTS IS HIGH

Contributions to the overall revenue of the order of 1% or less is regarded as very low. A difference in revenue of more than 25 % is regarded as high. When these cases allocation shall be based on economic values;

3) THIRD ALLOCATION PROCEDURE (WORST CASE)

Another situation may occur where no information of the actual sub-process is available, often due to confidentiality issues. In such a case, the entire plant shall be regarded as a black box. For this reason, an allocation for the entire product system and the overall representative environmental data shall be made according to the following procedure:

Perform an allocation based on physical properties or aspects such as product content (for resource use), or specific melting energy by assuming generic energy losses (for energy use).

For the remaining environmental impacts that cannot be allocated to the products according to the above procedure, financial allocation parameters may be used for allocation.

This allocation procedure shall be used with caution and only for the main products from the plant.

7.8 DATA QUALITY RULES

7.8.1 SPECIFIC DATA

If possible, specific data (often called site specific data) gathered from the sites where specific processes are carried out, shall be used for the core module. The requirement for specific data also includes actual product weights, amounts of raw materials used and amounts of waste, etc.

If specific data are not available the general rule is to use other conservative data representative for the actual process and use the same methodology that is applied in this PCR.

For the electricity used in the process, there are two alternatives: the company buys the energy from the electricity mix on the actual market or from a specific supplier. While in the first case the national electricity mix shall be adopted, in the second case a specific energy mix could be used if available. Electricity production impacts should be accounted for in this priority:

- Renewable Energy Certificates (RECs) or Guarantee of origin from supplier
- Electricity supplier's residual energy mix
- National mix/electricity mix on the actual market (preferably residual mix), otherwise national mix

If the electricity in A3 accounts for more than 30% of the total energy in stage A1 to A3, the energy sources behind the electricity grid in module A3 shall be documented in the EPD and given in g CO_{2e}/kWh⁹.

⁸ Please note that the allocation procedure on waste incineration in as described in section A.7.1 in the Supporting Annexes to the General Programme Instructions, only is valid if the efficiency of energy recovery are lower than 60 %.

7.8.2 RULES FOR GENERIC DATA

For allowing the use of selected generic data, a number of pre-set characteristics shall be fulfilled and demonstrated:

- Representativeness of the geographical area should adhere to “Data deriving from areas with the same legislative framework and the same energy mix,”
- Technological equivalence adhere to “Data deriving from the same chemical and physical processes or at least the same technology coverage (nature of the technology mix, e.g. weighted average of the actual process mix, best available technology or worst operating unit),”
- Boundaries towards nature adhere to “Data shall report all the quantitative information (resources, solid, liquid, gaseous emissions; etc.) necessary for the EPD,” and
- Boundaries towards technical systems adhere to “The boundaries of the considered life cycle stage shall be equivalent.”

7.8.3 SELECTION OF DATA

Data shall be as current as possible. Data sets used for calculations shall have been updated within the last 10 years for generic data and within the last 5 years for producer specific data; Data sets shall be based on 1 year averaged data; deviations shall be justified

An EPD describing a specific product shall be calculated using specific data for at least the processes the producer of the specific product has influence over. Generic data may be used for the processes the producer cannot influence e.g. processes dealing with the production of input commodities, e.g. raw material extraction or electricity generation, often referred to as upstream data (see Table 3);

Table 3 Application of generic and specific data

Modules	A1-A3		A4 and A5	B1-B7	C1-C4
	Production of commodities, raw materials	Product manufacture	Installation processes	Use processes	End-of-life processes
Process type	Upstream processes	Processes the manufacturer has influence over	Downstream processes		
Data type	Generic data	Manufacturer's average or specific data	Generic data		

8 SUB-PCR

A sub-PCR is most cases only needed for an EPD for a specific product group based on a full life cycle and a functional unit. However, a sub-PCR may also develop for a specific product group or a common matter between different specific product groups (e.g. co-product allocation of steel manufacturing co-products used for cement replacements in concrete). Developing a sub-PCR that not include a definition of functional unit shall be motivated. Please, consult with the Secretariat of the International EPD® System before developing such sub-PCR.

A sub-PCR not including a functional unit shall include the following statement:

⁹ This as an example of important assumptions made that shall be reported according to mandatory statements in the EPD, see Section 9.4.

“This sub-PCR is valid for an EPD covering, cradle-to-gate or cradle-to-gate with options (declared unit). If an EPD based on a full life cycle and a functional unit is aimed for the product group handled here, an elaborated PCR based on this sub-PCR has to be developed.”

8.1 AN EPD BASED ON A FULL LCA FOR COMPARISON WITHIN DEFINED FUNCTION AND APPLICATION

This document is not directly applicable if the EPD scope is to cover a full lifecycle and a functional unit. A sub-PCR shall then be developed. Such sub-PCR includes necessary specification compare to this basic PCR to support comparison between competing alternatives.

The functional unit shall be defined and explained in the each developed sub-PCR. Information shall also be provided in the EPD on how to convert this functional unit to one or more declared units. This PCR will typically have to define;

- A definition of a functional unit and supporting information how it shall be interpreted.
- Mandatory life cycle stages to be included concerning stage B to C in the LCA and comments and interpretation of any stage A to C.
- How to handle one or several in use aspects including the reference service life (RSL) and end of life scenarios (stage C).
- Other aspects related to the LCA scope and settings in order to achieve comparability within the product group and intended use.
- Other environmental information that is relevant for the specific product group that might be included mandatory in the sub-PCR.

The procedure to develop such a sub-PCR is described in Section 1.

9 CONTENT OF THE EPD®

The communication format of the EPD shall be in accordance with EN 15942, Sustainability of construction works — Environmental product declarations — Communication formats: business to business. An EPD template may be available on www.environdec.com.

As a general rule the EPD® content:

- shall be verifiable;
- shall not include rating, judgements or direct comparison with other products.

EPD®s can be published on several languages, but if the EPD® document is not available in English, the organisation shall provide a summary in English including the main content of the EPD® to be available on www.environdec.com.

The EPD® cover page (if existent) shall as a minimum include relevant information about the product, such as name and an image, the EPD® logotype and date of publication and validity.

9.1 DECLARATION OF GENERAL INFORMATION

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

- a) the name and address of the manufacturer(s);
- b) the description of the construction product's use and the functional or declared unit of the construction product to which the data relates;
- c) construction product identification by name (including any product code) and a simple visual representation of the construction product to which the data relates;
- d) a description of the main product components and or materials;
- e) name of the programme used and the programme operator's name and address and, if relevant logo and website;

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- f) the date the declaration was issued and the 5 year period of validity;
- g) information on which stages are not considered, if the declaration is not based on an LCA covering all life cycle stages;
- h) a statement that EPD of construction products may not be comparable if they do not comply with EN 15804;
- i) in the case where an EPD is declared as an average environmental performance for a number of products a statement to that effect shall be included in the declaration if the span is more than +/-10% for any impact category together with a description of the range/variability of the LCIA results if significant, see paragraph 2.5
- j) the site(s), manufacturer or group of manufacturers or those representing them for whom the EPD is representative;
- k) the declaration of material content of the product shall list as a minimum substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern for authorisation" when their content exceeds the limits for registration with the European Chemicals Agency;
- l) information on where explanatory material may be obtained.

It is voluntary to include other information about the manufacturing company, such as:

- Specific aspects regarding the production
- Environmental policy and management system

Manufacturer's logotype

- m) Issuer and contacts;

9.1.1 SPECIFICATION OF THE PRODUCT

The EPD shall include a description of the product, its intended use and its classification number according to the UN CPC classification system (see <http://unstats.un.org>), if defined.

Relevant functional properties of the product may be included as part of the specification of the product or in relation to the declared and/or functional unit.

9.1.2 FUNCTIONAL OR DECLARED UNIT

The used declared or functional unit shall be reported and explained if relevant, see section 0.

9.1.3 CONTENT DECLARATION

A content declaration shall be included, see section 4. The content declaration shall at minimum include the identification of substances of very high concern (SVHC) in a publicly available "Candidate List of Substances of Very High Concern for Authorisation of the European Chemicals Agency". This list is the result of a continuous assessment and evaluation scheme, which is part of the REACH regulation.

9.1.4 FLOW DIAGRAM

The Table 4 below or likewise shall be included in the EPD to describe the scope of the inventory performed in the LCA (see 7.2.1 in EN15804). This flow diagram may be complemented or combined with a more detailed process chart or figure typically covering A1 to A3.

Table 4 To illustrate the product system studied, the EPD shall contain a simple flow diagram of the processes included in the LCA. They shall be sub-divided at least into the life cycle stages of the product: production, and if applicable construction, use and end-of-life (see Table 2). The stages may be further sub-divided.

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage	
Raw materials	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
																	A1

The following alternatives are valid:

- When a module is accounted for the box in the last row is then marked with an “X”.
- When a module is not accounted for the box in the last row is then market with “MND”, not declared.
- In some cases, certain modules may not be relevant to the environmental performance of a product, meaning that its environmental contribution is assumed negligible. In such cases the irrelevant module shall be declared as “NR”, not relevant. Such a declaration shall not be regarded as an indicator result of zero. “NR” is only used when a functional unit is declared and a full life cycle is supposed to be accounted for.

The EPD shall specify which EPD-type is declared (see Table 2):

- A “Cradle-to gate” EPD
- A “Cradle-to-gate with options” EPD
- A “Cradle-to-grave” EPD.

For a “Cradle-to-gate with options” EPD the declaration of the RSL is possible only if all scenarios for the modules A1-A3 and B1-B5 are given. For a “Cradle to Grave” EPD that is covering all modules in the stages A to C, a declaration of the RSL is required.

9.1.5 TECHNICAL INFORMATION

The following information given in the tables below covering life cycle stage A4 to C shall be provided in the background LCA report if these modules are included.

Table A4 Transport to the construction site

Additional technical information			
Scenario title	Parameter*	Units (expressed per functional unit or per declared unit)	Value
A4 Transport to site	<i>Vehicle type used for transport</i>	e.g. long distance truck, boat	
	<i>Vehicle load capacity</i>	kg or m ³ per vehicle	
	Fuel type and consumption	Litre of fuel type per distance	
	<i>Distance to central warehouse or storage, if relevant</i>	km	
	Distance to construction site	km	
	Capacity utilisation (including empty returns)	%	
	Bulk density of transported products	kg/m ³	
	Volume capacity utilisation factor (factor: = 1 or < 1 or ≥ 1 for compressed or nested packaged products)	Not applicable	

* Text given in italic comes from CD ISO 21930:2014

- NOTE 1 As an alternative to the bulk density the weight and volume of transported products may be specified.
- NOTE 2 With the bulk density and the volume capacity utilisation factor, (complex) logistic scenarios (e.g. taking into account the type of vehicle, transport distance, empty returns) at the building level can be considered.
- NOTE 3 Transport distance shall be as specific as possible. If the market varies, the distance to the construction site can be estimated based on weighted average distance to the market of the product.
- NOTE 4 For the assessment at the building level more complex logistics may have to be considered.

Table A5 Installation of the product

Additional technical information for all scenarios			
Module	Parameter*	Unit (expressed per functional unit or per declared unit)	Value
A5 Installation of the product	Ancillary materials for installation (specified by material);	kg or other units as appropriate	
	Water use	m ³	
	Other resource use	kg	
	Quantitative description of energy type and consumption during the preparation and installation process	kWh or MJ	
	Direct emissions to ambient air, soil and water	kg	
	Waste materials on the building site, generated by the product's installation; specified by type	kg	
	Output materials (specified by type) as result of waste processing at the construction site e.g. of collection for recycling, for energy recovery, disposal; specified by route	kg	
	<i>Vehicle type used for transport specified for all waste and output material types</i>	e.g. long distance truck, boat	
	<i>Vehicle load capacity</i>	kg or m ³ per vehicle	
	<i>Fuel type and consumption</i>	Litre of fuel type per distance	
	<i>Distance to central warehouse or storage, if relevant</i>	km	
	<i>Distance to construction site</i>	km	
	<i>Capacity utilisation (including empty returns)</i>	%	
	<i>Bulk density of transported products</i>	kg/m ³	
	<i>Volume capacity utilisation factor (factor: = 1 or < 1 or ≥ 1 for compressed or nested packaged products)</i>	Not applicable	

* Text given in italic comes from CD ISO 21930:2014

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

The description of the reference service life (see also Annex A for more details) may be based on data collected as average data or at the beginning or end of the service life. The reference conditions for achieving the declared technical and functional performance and the declared reference service life shall include the reference service life data as described in Table B-RCL, where relevant:

Table B-RCL — Reference Service Life

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

Table B2 Maintenance

Additional technical information for all scenarios			
Module	Parameter*	Unit (expressed per functional unit or per declared unit)	Value
B2 Maintenance	Maintenance process	Description or source where description can be found	
	Maintenance cycle	Number per RSL or year*	
	Ancillary materials for maintenance (e.g. cleaning agent, specify materials)	kg / cycle	
	Quantitative description of energy type and use during maintenance (e.g. vacuum cleaning), energy carrier type e.g. electricity, and amount, if applicable and relevant	kWh or MJ	
	Net fresh water consumption	m ³	
	<i>Direct emissions to ambient air, soil and water</i>	kg	
	Waste material resulting from maintenance; specified by type	kg	
	<i>Output materials (specified by type) as result of waste resulting from maintenance e.g. of collection for recycling, for energy recovery, disposal; specified by route</i>	kg	
	<i>Vehicle type used for transport specified for all waste and output material types</i>	e.g. long distance truck, boat	
	<i>Vehicle load capacity</i>	kg or m ³ per vehicle	
	<i>Fuel type and consumption</i>	Litre of fuel type per distance	
	<i>Distance to construction site</i>	km	
	<i>Capacity utilisation (including empty returns)</i>	%	
	<i>Bulk density of transported products</i>	kg/m ³	
<i>Volume capacity utilisation factor (factor: = 1 or < 1 or ≥ 1 for compressed or nested packaged products)</i>	Not applicable		

* Text given in italic comes from CD ISO 21930:2014

Table B3 Repair

Additional technical information for all scenarios			
Module	Parameter*	Unit (expressed per functional unit or per declared unit)	Value
B3 Repair	Inspection process	Description or source where description can be found	
	Repair process		
	Repair cycle	Number per RSL or year	
	Ancillary materials for repair; specify materials	kg / cycle	
	Quantitative description of energy type and use during repair (e.g. crane activity), energy carrier type e.g. electricity, and amount, if applicable and relevant	kWh or MJ	
	Net fresh water consumption	m ³	
	<i>Direct emissions to ambient air, soil and water</i>	kg	
	Waste material resulting from repair; specified by type	kg	
	<i>Output materials (specified by type) as result of waste resulting from repair e.g. of collection for recycling, for energy recovery, disposal; specified by route</i>	kg	
	<i>Vehicle type used for transport specified for all waste and output material types</i>	e.g. long distance truck, boat	
	<i>Vehicle load capacity</i>	kg or m ³ per vehicle	
	<i>Fuel type and consumption</i>	Litre of fuel type per distance	
	<i>Distance to construction site</i>	km	
	<i>Capacity utilisation (including empty returns)</i>	%	
	<i>Bulk density of transported products</i>	kg/m ³	
<i>Volume capacity utilisation factor (factor: = 1 or < 1 or ≥ 1 for compressed or nested packaged products)</i>	Not applicable		

* Text given in italic comes from CD ISO 21930:2014

Table B4 Replacement

Additional technical information for all scenarios			
Module	Parameter*	Unit (expressed per functional unit or per declared unit)	Value
B4 Replacement	Replacement cycle	Number per RSL or year	
	Exchange of worn parts during the product's life cycle, (e.g. zinc galvanised steel sheet), specify materials	kg	
	Quantitative description of energy type and use during replacement (e.g. crane activity), energy carrier type e.g. electricity, and amount, if applicable and relevant	kWh or MJ	
	<i>Net fresh water consumption</i>	m ³	
	<i>Direct emissions to ambient air, soil and water</i>	kg	
	<i>Waste material resulting from repair; specified by type</i>	kg	
	<i>Output materials (specified by type) as result of waste resulting from repair e.g. of collection for recycling, for energy recovery, disposal; specified by route</i>	kg	
	<i>Vehicle type used for transport specified for all waste and output material types</i>	e.g. long distance truck, boat	
	<i>Vehicle load capacity</i>	kg or m ³ per vehicle	
	<i>Fuel type and consumption</i>	Litre of fuel type per distance	
	<i>Distance to construction site</i>	km	
	<i>Capacity utilisation (including empty returns)</i>	%	
	<i>Bulk density of transported products</i>	kg/m ³	
<i>Volume capacity utilisation factor (factor: = 1 or < 1 or ≥ 1 for compressed or nested packaged products)</i>	Not applicable		

* Text given in italic comes from CD ISO 21930:2014

Table B5 Refurbishment

Additional technical information for all scenarios			
Module	Parameter*	Unit (expressed per functional unit or per declared unit)	Value
B5 Refurbishment	Refurbishment process	Description or source where description can be found	
	Refurbishment cycle	Number per RSL or year	
	Material input for refurbishment (e.g. bricks), including ancillary materials for the refurbishment process (e.g. lubricant, specify materials)	kg or kg / cycle	
	Quantitative description of energy type and use during refurbishment (e.g. crane activity), energy carrier type e.g. electricity, and amount, if applicable and relevant	kWh or MJ	
	<i>Net fresh water consumption</i>	m ³	
	<i>Direct emissions to ambient air, soil and water</i>	kg	
	Waste material resulting from refurbishment; specified by type	kg	
	<i>Output materials (specified by type) as result of waste resulting from refurbishment e.g. of collection for recycling, for energy recovery, disposal; specified by route)</i>	kg	
	<i>Vehicle type used for transport specified for all waste and output material types</i>	e.g. long distance truck, boat	
	<i>Vehicle load capacity</i>	kg or m ³ per vehicle	
	<i>Fuel type and consumption</i>	Litre of fuel type per distance	
	<i>Distance to construction site</i>	km	
	<i>Capacity utilisation (including empty returns)</i>	%	
	<i>Bulk density of transported products</i>	kg/m ³	
<i>Volume capacity utilisation factor (factor: = 1 or < 1 or ≥ 1 for compressed or nested packaged products)</i>	Not applicable		
Further assumptions for scenario development, e.g. frequency and time period of use, number of occupants.	units as appropriate		

* Text given in italic comes from CD ISO 21930:2014

Table B6 Use of energy and B 7 Use of water

Additional technical information			
Scenario title	Parameter	Unit (expressed per functional unit or per declared unit)	Results
B6 and B7 Use of energy and use of water	Ancillary materials specified by material	kg or units as appropriate	
	Net fresh water consumption	m ³	
	Type of energy carrier (e.g. electricity, natural gas, district heating)	kWh	
	Power output of equipment	kW	
	Characteristic performance (e.g. energy efficiency, emissions, variation of performance with capacity utilisation)	units as appropriate	
	Further assumptions for scenario development, (e.g. frequency and time period of use, number of occupants)	units as appropriate	

Table C End-of-life

Additional technical information for all scenarios			
Module	Parameter	Unit (expressed per functional unit or per declared unit)	Value
C1 Deconstruction	Collection process specified by type	kg collected separately	
		kg collected with mixed construction waste	
C2 Transport	Assumptions for scenario development	units as appropriate	
C3 Waste processing	Recovery system specified by type	kg for re-use	
		kg for recycling	
		kg for energy recovery	
C4 Disposal	Disposal specified by type	kg product or material for final deposition	

9.2 ENVIRONMENTAL PERFORMANCE-RELATED INFORMATION

9.2.1 RULES FOR DECLARING INFORMATION PER MODULE DERIVED FROM LCA

In order to support the application of the modular information of an EPD in an environmental building assessment, it is necessary to provide information in a modular way. The EPD shall include a simplified picture describing the scope of the reported LCA including the mandatory modular structure and naming. The EPD shall specify which EPD-type is declared (see Table 2):

- “Cradle to Gate” EPD, i.e. a declaration of the RSL is not possible. The RSL shall be declared as: “not specified”

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- “Cradle to Gate with Options” EPD, i.e. a declaration of the RSL is possible only if all scenarios for the modules A1-A3 and B1-B5 are given
- “Cradle to Grave” EPD, i.e. a declaration covering all modules in the stages A to C and reported in relation to a functional unit and a declaration of the RSL is required.

Module D may be addressed in any type of EPD and shall be reported under the EPD heading ‘Module D - Recyclability potentials’ as a sub-heading in “Other environmental information”.

If it is found that there is no contribution to one or several impact categories or life cycle inventory indicator result, this is indicated with a zero “0” in the tables given below. However, if there is a small contribution this has to be reported with an exponent X.X E-X or <0,001 etc.

In some cases certain modules may not be relevant to the environmental performance of a product. In such cases the irrelevant module shall be declared as “not relevant” or impossible to include if not construction context is given. Such a declaration shall not be regarded as an indicator result of zero.

9.2.2 AGGREGATION OF INFORMATION MODULES

The indicators declared in the individual information modules of a product life cycle A1 to A5, B1 to B7, C1 to C4 and module D as described in Figure 2 shall not be added up in any combination of the individual information modules into a total or sub-total of the life cycle stages A, B, C or D. As an exception information modules A1, A2, and A3 may be aggregated. In conclusion according to EN 15804 all life cycle stages modules shall be reported separately as information modules. i.e. except module A1-3, that may be aggregated. However, as supplement information it is acceptable to give a figure for the total impact across all phases.

9.2.3 POTENTIAL ENVIRONMENTAL IMPACT

The environmental impact per declared unit for the following environmental impact categories shall be reported in the EPD, divided into the stages A to C and D if relevant according to EN 15804;

- global warming, kg CO₂e equivalents (GWP₁₀₀)
- biogenic carbon stored in products, kg CO₂e equivalents (optional)
- ozone depletion, kg CFC 11 equivalents
- acidification of land and water, SO₂ equivalents
- eutrophication, PO₄³⁻ equivalents
- photochemical ozone creation, C₂H₄ equivalents
- depletion of abiotic resources (elements), kg Sb equivalents
- depletion of abiotic resources (fossil), MJ net calorific value

Always check for latest amendment to EN 15804 to be sure that you use the correct characterisation factors. The impact categories shall be calculated using characterisation factors recommended in regionally accepted impact assessment methods. In Europe, the characterisation factors outlined in EN 15804 (CML baseline) shall be used, or improves ones if these factors are updated in a forthcoming revision of EN 15804. The characterisation factors for ADP-fossil fuels are the net calorific values at the point of extraction of the fossil fuels. Abiotic depletion of elements includes all non-renewable, abiotic material resources (i.e. excepting fossil resources). CML characterisation factors can be downloaded at <http://cml.leiden.edu/software/data-cmlia.html> or are available in many commercial LCA soft wares.

The US Environment Protection Agency (EPA) recommends methods used in TRACI while in Australia, the Building Products Innovation Council (BPIC) has published applicable impact assessment methods for that region. However, the impact categories reported in the EPD is not limited to this list and other impact categories may be used as supplements or parallel to the impact categories listed above. In this cases the impact assessment method shall be public available and the reference shall reported in the EPD.

When biogenic carbon stored in products is accounted for the principles specified in the General Programme Instructions shall be used. If biogenic carbon is reported in stage A it is then also mandatory to account for the biogenic carbon in module C. It is here not allowed to sum up the stored products CO₂e with GHG (reported in kg CO₂e with

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

characterisation factors origin from IPCC), i.e. to be in line with ISO 14067. GHG from land use is reported as CO_{2e} as specified in General Programme Instructions.

9.2.4 USE OF RESOURCES

The following environmental parameters apply data based on the LCI. They describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water. They are required and shall be included in the EPD divided into the stages A to C and D if relevant according to EN 15804 as follows:

Parameter	Parameter unit expressed per functional/declared unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value
Use of renewable primary energy resources used as raw materials	MJ, net calorific value
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value
Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value
Use of secondary material	kg
Use of renewable secondary fuels	MJ, net calorific value
Use of non-renewable secondary fuels	MJ, net calorific value
Use of net fresh water (see Appendix 4 for definition)	m ³

EN 15804 accepts that only one figure is given for each parameter given in the table above.

9.2.5 OTHER INDICATORS DESCRIBING WASTE CATEGORIES

The following indicators shall also be reported in the EPD per functional/declared unit divided into the stages A to C and D if relevant according to EN 15804:

Parameter	Unit (expressed per functional unit or per declared unit)
Hazardous waste disposed	kg
Non-hazardous waste disposed	kg
Radioactive waste disposed	kg

NOTE The characteristics that render waste hazardous are described in existing applicable legislation, e.g. in the European Waste Framework Directive.

EN 15804 accepts that one figure is given for each parameter given in the table above.

9.2.6 RELEASE OF DANGEROUS SUBSTANCES DURING THE USE STAGE'

Information shall be provided for products release of dangerous substances to indoor air, soil and water during the use stage according to standards on measurement of release of regulated dangerous substances from construction products using harmonised testing methods (e.g. according to the provisions of the respective Technical Committees for European product standards, when available). If such standards on measurement of release of regulated

dangerous substances are not available, the EPD can lack this information. In the case that the product is subject for classification of emission realise this information and classification result should also be given see B1 under section 7.3.

9.3 ADDITIONAL ENVIRONMENTAL INFORMATION

Result from life cycle stages beyond the initial product's LCA i.e. reuse, recycle or recovery shall, if it is included in the EPD be reported under the sub-heading 'Module D - Recyclability potentials'. Supplementary information that describes scenarios etc. shall be given in the EPD.

An EPD may include additional environmental information not derived from the LCA-based calculations. In general, this part of the EPD describing additional environmental information may include various issues e.g. on specific information about the use and end-of-life, which has a special value covering e.g.:

- instruction for a proper use of the product, e.g. to minimise the energy or water consumption or to improve the durability of the product
- instructions for a proper maintenance and service of the product
- information on key parts of the product determining 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, and
- information regarding disposal of the product or inherent materials, and any other information considered necessary to minimise the product's end-of-life impacts.

Additional environmental information can also include a more detailed description of an organisation's overall environmental work such as:

- the existence of a quality or environmental management system or any type of organised environmental activity,
- any activity related to supply chain management, social responsibility (SR) etc., and
- information on where interested parties may find more details about the organisation's environmental work.

9.4 PROGRAMME RELATED INFORMATION AND MANDATORY STATEMENTS

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

- a) The name and address of the manufacturer(s);
- b) The description of the construction product's use and the declared unit of the construction product to which the data relates;
- c) Construction product identification by name (including any product code) and optionally, a simple visual representation of the construction product to which the data relates;
- d) A description of the main product components and or materials;

Guidance: This description is intended to enable the user of the EPD to understand the composition of the product represented in the EPD as delivered and also support safe and effective installation, use and disposal of the product.

A content declaration of the product covering relevant materials and substances. The gross weight of material shall be declared in the EPD at a minimum of 99%. The declaration of material content of the product shall list as a minimum substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" when their content exceeds 0.1 weight-% of the product. SVHC are listed by European Chemicals Agency and includes the Candidate List of SVHC (see http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp). An optional detailed list of the product's substances, including CAS number, environmental class and health class, may be included in the product

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

content declaration. It is also recommended to include substances' functions in the product (e.g., pigment, preservative, etc.).

Guidance: The source location of any safety data sheet can be provided.

- e) Reference to the International EPD[®] System as the programme operator, link to www.environdec.com and the logotype of the International EPD[®] System,
- f) EPD registration number,
- g) geographical scope of the EPD,
- h) The date the declaration was issued and the 5 year period of validity;
- i) A statement that the EPD only covers the Cradle to Gate stage, or the Cradle to Gate plus construction stage, because other stages are very dependent on particular scenarios and are better developed for specific building or construction works.
- j) Statements that:
 - a. "EPD of construction products may not be comparable if they do not comply with EN 15804",
 - b. "Environmental product declarations within the same product category from different programs may not be comparable"
- k) In the case where an EPD is declared as an average environmental performance for a number of products, a statement to that effect shall be included in the declaration together with a description of the range/ variability of the LCIA results if significant;
- l) The site(s), manufacturer or group of manufacturers or those representing them for whom the EPD is representative;
- m) Information on where explanatory material may be obtained
- n) Indication of the key assumptions and estimates for interpretation which are not depicted elsewhere in the EPD

Guidance on safe and effective installation, use and disposal of the product can be supplied.

In addition to the above-mentioned general information, the table given in paragraph 9.4.2 shall be completed and reproduced in the EPD.

9.4.1 DIFFERENCES VERSUS PREVIOUS VERSIONS OF THE EPD

If relevant, specify the main causes of changes in the environmental performance in the EPD compared with previous EPD versions (described changes in brief if significant).

9.4.2 VERIFICATION AND REGISTRATION

The EPD shall reproduce the following table with information about the verification process:

CEN standard EN 15804 served as the core PCR	
PCR:	PCR 2012:01 Construction products and construction services, Version 2.2 <name and date of sub-PCR, if applicable>
PCR review was conducted by:	The Technical Committee of the International EPD [®] System. Chair: Massimo Marino. Contact via info@environdec.com
Independent verification of the declaration and data, according to ISO 14025:	<input type="checkbox"/> EPD process certification <input type="checkbox"/> EPD verification
Third party verifier:	<Name and contact information>

Accredited or approved by:	<Name of the accreditation body. > <i>For individual verifiers: "The International EPD® System"</i>
----------------------------	--------------------------------------------------------------------------------------------------------

9.4.3 REFERENCES

The EPD shall, if relevant, refer to:

- The underlying LCA
- The name, CPC code and version number of the PCR used
- Other documents that verify and complement the EPD
- Instruction for recycling, if relevant
- Sources of additional information
- The General Programme instructions of the International EPD® System

10 SPECIAL REQUIREMENTS COMPARED TO EN 15804

The following requirement is not found in EN15804:

- An EPD based on a functional unit require an sub-PCR that at least define the functional unit
- EPD shall specify UN CPC classification code (if it exist)
- Data quality requirements on grouping of several similar products and or if EPD is found on data from more than one manufacturing site.
- Increased information in the EPD if the electricity accounts for more than 30% of the total energy in stage A1 to A3. The energy sources behind the electricity grid shall then be documented in the EPD and given in g CO_{2e}/MJ
- Updated text on Accepted variance when grouping manufacturing sites and/or a products group is harder to meet compared to EN15804, since quantitative information on span larger than 10% is required here
- Biogenic carbon stored in products may if included reported as an additional indicator in the LCIA result where appropriate, and reported as complement to greenhouse gases according to IPCC in order to be in line with ISO14067.
- If electricity contributes to more than 30 % of the total energy use in module A1-3, the energy sources behind the electricity grid used shall be documented in the EPD. This requirement is however in line with Eco Platform review protocol (part b §3.5).

11 CHANGES IN THIS PCR DOCUMENT

VERSION 1.0 2012-01-09

Original version, replacing PCR 2006:02 Building products, 2006-02-22.

VERSION 1.1 2013-02-21

- Update, in particular sections 11.2.4, 11.2.5, 11.2.6 and 11.4.
- Document in new PCR format.

VERSION 1.2 2013-03-15

Changes in section 1.1 and 10.

VERSION 2.0 2015-03-03

- Compliance with General Programme Instructions version 2.01:
 - Updated general introduction
 - Updated Section “General information”
 - Updated text on EPD validity concerning changed process data
 - Updated choice of electricity mix for the Core processes
 - Updated text on biogenic carbon dioxide sequestration and emission
- Clarification on the use of this document as a PCR and as a PCR Basic Module
 - Name on front page changed
 - Clarifications in Section 1 and 1.1
 - New possibility to developing a sub-PCR that not include a definition of functional unit
- Compliance with EN15804:
 - Additional second allocation procedure when the difference in revenue from the co-products is high
 - Extension of the validity period from 3 to 5 year
 - Revised value on data gap (easier to meet than General Programme Instructions)
 - Mandatory statement on comparison
 - Data quality is revised concerning age of data used (easier to meet than General Programme Instructions)
 - Cut off rules (easier to meet than General Programme Instructions)
 - Time boundary for landfill (decreased to 100 years compared to foreseeable time before)
 - The text on reference service life (RSL) is moved to a separate annex and the technical documentation table according to EN15804 is introduced
 - General information in the EPD
 - Updated text on accepted variance when grouping manufacturing sites and/or a products group (the requirement given here is harder to meet compared to EN15804, since quantitative information on span not larger than 10% is required here)
- Updated procedure for development of sub-PCRs
- Added definition of “construction product”, and list of examples as an annex
- Requirement that Indication of the key assumptions and estimates for interpretation which are not depicted elsewhere in the EPD.
- Explanation of reporting on wastage in A4
- Module D may be addressed in any type of EPD and shall be reported under the EPD heading ‘Module D - Recyclability potentials’ as a sub-heading in “Other environmental information”.
- Minor editorial changes.

VERSION 2.01, 2016-03-09

Editorial update of the PCR without changes to the rules and requirements:

- Editorial changes to cover page and elsewhere
- Updated General Introduction to latest version.

- Added information in Section 1 General information
- Photochemical ozone creation corrected to “C₂H₄ equivalents” instead of the incorrect “C₂H₂ equivalents”

VERSION 2.1, 2017-01-04

Update during validity:

- Corrected PCR validity in Section 1 to match cover page: the PCR is valid until 2019-03-03
- Added clarification that all shall requirements in EN 15804 shall be met, even if missing from this PCR
- Added list of current sub-oriented PCRs to Section 1.1
- Added requirement from EN 15804 in Section 3 that the declared unit shall relate to the typical applications of products
- Added clarifications on mandatory life cycle stages for Construction services in Section 6
- Added requirement from EN 15804 in Section 9 that communication format shall be in accordance with EN 15942 (requirement from EN 15804), and reference that an EPD template may be made available at www.environdec.com
- Editorial updates and minor clarifications

VERSION 2.2, 2017-05-30

Updated PCR during its validity initiated by the Secretariat. No changes to methodological requirements:

- Updated and clarified nomenclature for “sub-PCRs” (instead of sub-oriented PCRs)
- Updated registration numbers for sub-PCRs
- Added clarification that sub-PCRs may also be used to adopt “PCR” developed by product TCs in CEN into the International EPD[®] System
- Restructuring of document to highlight role of document and sub-PCRs, and for part-alignment with the latest PCR template
- Updated reference to latest General Programme Instructions
- Added information about PCR review and open consultation for transparency
- Changed all instances of “must” into “shall”
- Other editorial clarifications for readability

12 REFERENCES

Erlandsson M (1996): Methodology for Environmental Assessment of Wood-Based Products. General and specific questions related to the live cycle inventory. I 9608070. Tråtek, Stockholm.

Erlandsson M, Lindfors L-G, Ryding S-O (2006): Product-Category Rules (PCR) for preparing an environmental product declarations (EPD) for Building products. PCR No 2006:02 Version 1.0. The Swedish Environmental Management Council 2006-02-22. Also available as: IVL report B 1617, revised December 2005

Erlandsson M: Product category rules and PCR basic module: Construction products and Construction services. The International EPD System, version 1.0, Dated 2012-01-09.

EN 15804:2012+A1:2013 (Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products)

ISO 21930 Environmental declaration of building products

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

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

ISO/TS 14067:2013 Greenhouse gases -- Carbon footprint of products -- Requirements and guidelines for quantification and communication

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

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

13 ANNEX A – BASIS FOR ALLOCATION IN COMBINED HEAT AND ELECTRICITY PRODUCTION

The table below shows the facility parameters to be used in allocation for a number of different combined heat and power generation methods if new general accepted updated data is found.

Table A1 Facility parameters to be used in allocation for a number of different combined heat and power generation methods

Combined heat and power		Alternative heat	Alternative electricity
Fuel type	Technology	Efficiency, heat η_h (%)	Efficiency, electricity η_e (%)
Biofuel	Steam cycle, heat and power	90 %	38 %
	Steam cycle, heat and power, flue gas condensation	110 %	38 %
Waste	Steam cycle, heat and power,	90 %	35 %
	Steam cycle, heat and power, flue gas condensation	100 %	35 %
Black coal	Steam cycle, heat and power	90 %	46 %
Natural gas	Steam cycle, heat and power	90 %	47 %
	Steam cycle, heat and power flue gas condensation	105 %	47 %
	Combined cycle, heat and power	90 %	58 %
Oil	Steam cycle, heat and power	90 %	46 %

14 ANNEX B – LIST OF EXAMPLES OF CONSTRUCTION PRODUCTS

The recent focus on PCRs for construction products in Europe has led to the problem of defining the scope of what constitutes a "construction product". This poses a problem for PCR and EPD product categories as the UN CPC classification is material-centric instead of focusing on the sector in which the product is used.

As the standard EN 15804 provides limited guidance, the best definition is found in the European construction product regulation:

"construction product" means any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works"

Non-permanent products in construction works or products that do not have any effect on the performance of the construction work are thus not included.

There is no exhaustive list of what products are covered by this definition. All products that are covered by a harmonized standard according to the construction product regulation (or the earlier construction product directive) are, however, considered as construction products.

- Adhesives for non-pressure thermoplastic piping systems
- Adhesives for thermoplastic piping systems for fluids under pressure
- Adhesives for tiles
- Admixtures for concrete, mortar and grout
- Agglomerated stone
- Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas
- Aggregates for concrete
- Aggregates for mortar
- Aggregates for railway ballast
- Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
- Air admittance valves for drainage systems
- Aluminium and aluminium alloys
- Anti-flooding devices for buildings
- Anti-glare systems for roads
- Anti-seismic devices
- Armourstone
- Baths for domestic purposes
- Bidets
- Binders for magnesite screeds
- Binders, composite binders and factory made mixtures for floor screeds based on calcium
- Bitumen and bituminous binders
- Bitumen shingles with mineral and/or synthetic reinforcements
- Bituminous mixtures
- Building hardware
- Building lime
- Calcium aluminate cement

- Cast iron pipes and fittings, their joints and accessories for the evacuation of water from buildings
- Ceiling mounted radiant panels supplied with water at temperature below 120 °C
- Cement
- Ceramic tiles
- Chimneys
- Clay pavers
- Clay roofing tiles and fittings
- Cold rolled products of structural steels
- Cold formed welded structural hollow sections of non-alloy and fine grain steels
- Concrete kerb units
- Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced
- Concrete paving blocks
- Concrete pipes and fittings, unreinforced, steel fibre and reinforced
- Concrete roofing tiles and fittings for roof covering and wall cladding
- Copper and copper alloys
- Corrugated bitumen sheets
- Curtain walling
- Decorative wall coverings
- Domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 70 kW, without a fan to assist transportation of combustion air and/or combustion products
- Domestic gas-fired forced convection air heaters for space heating, with fan-assisted burners not exceeding a net heat input of 70 kW
- Drainage channels for vehicular and pedestrian areas
- Ductile iron pipes, fittings, accessories and their joints for gas pipelines
- Ductile iron pipes, fittings, accessories and their joints for sewerage applications
- Elastomeric seals
- Execution of steel structures and aluminium structures
- External blinds
- Fibre cement pipes for drains and sewers
- Fibre-cement flat sheets
- Fibre-cement slates and fittings
- Fibres for concrete
- Fibrous gypsum plaster casts
- Fire detection and fire alarm systems
- Fixed firefighting systems
- Fixed ladders for manholes
- Fixed, vertical road traffic signs
- Flexible sheets for waterproofing
- Flexible sheets for waterproofing - Reinforced bitumen sheets for waterproofing of concrete bridge decks and other trafficked areas of concrete

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- Flued oil stoves with vaporizing burners
- Fly ash for concrete
- Free-standing chimneys
- Fully supported metal sheet and strip for roofing, external cladding and internal lining
- General purpose adhesives for structural assembly
- Geosynthetic barriers
- Geotextiles and geotextile-related products
- Glass in building
- Grease separators
- Ground granulated blast furnace slag for use in concrete, mortar and grout
- Gypsum based adhesives for gypsum blocks
- Gypsum binders and gypsum plasters
- Gypsum blocks
- Gypsum boards with fibrous reinforcement
- Gypsum elements for suspended ceilings
- Gypsum plasterboards
- High-pressure decorative laminates
- High-strength structural bolting assemblies for preloading
- Hot finished structural hollow sections of non-alloy and fine grain steels
- Hot rolled products of structural steels
- Hydraulic binder for non-structural applications
- Hydraulic road binders
- Industrial, commercial and garage doors and gates
- Inset appliances including open fires fired by solid fuels
- Joint fillers and sealants
- Jointing materials for gypsum plasterboards
- Joints for the connection of steel tubes and fittings for the conveyance of water and other aqueous liquids
- Kerbs of natural stone for external paving
- Kitchen sinks
- Leak detection systems
- Light transmitting flat multiwall polycarbonate (PC) sheets for internal and external use in roofs, walls and ceilings
- Light transmitting single skin profiled plastics sheets for internal and external roofs, walls and ceilings
- Light weight fill and thermal insulation products for civil engineering applications
- Lighting columns
- Lightweight aggregates
- Liquid-applied water impermeable products for use beneath ceramic tiling bonded with adhesives
- Manually operated ball valves and closed bottom taper plug valves for gas installations for buildings
- Masonry cement
- Mechanical fasteners for gypsum plasterboard systems

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- Metal beads and feature profiles for use with gypsum plasterboards
- Metal framing components for gypsum plasterboard systems
- Metal lath and beads
- Multi-burner gas-fired overhead radiant tube heater systems for non-domestic use
- Multi-firing sauna stoves fired by natural wood logs
- Natural stone products
- Non-alloy steel tubes and fittings for the conveyance of aqueous liquids including water for human consumption
- Non-Alloy steel tubes suitable for welding and threading
- Non-domestic gas-fired forced convection air heaters for space heating
- Optical fibre distribution systems
- Pigments for the colouring of building materials based on cement and/or lime
- Pillar fire hydrants
- Pipes and fittings of longitudinally welded hot-dip galvanized steel pipes with spigot and socket for waste water systems
- Plastics
- Polymer modified bituminous thick coatings for waterproofing
- Precast concrete products
- Prefabricated accessories for roofing
- Prefabricated gypsum plasterboard panels with a cellular paperboard core
- Prefabricated reinforced components of lightweight aggregate concrete with open structure with structural or non-structural reinforcement
- Preformed plasterboard cornices
- Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity
- Radiators and convectors
- Residential cookers fired by solid fuel
- Residential independent boilers fired by solid fuel
- Residential space heating appliances fired by wood pellets
- Resilient, textile and laminate floor coverings
- Rigid underlays for discontinuous roofing
- Road marking materials
- Road restraint systems
- Road traffic noise reducing devices
- Road vertical signs
- Roof coverings
- Room heaters fired by solid fuel
- Safety gas connection valves for metal hose assemblies used for the connection of domestic appliances using gaseous fuel
- Sanitary appliances
- Screed material and floor screeds

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- Sealants for non-structural use in joints in buildings and pedestrian walkways
- Self-supporting double skin metal faced insulating panels
- Self-supporting metal sheet for roofing, external cladding and internal lining
- Setts of natural stone for external paving
- Shower enclosures
- Shower trays for domestic purposes
- Shutters
- Silica fume for concrete
- Single burner gas-fired overhead radiant tube heaters for non-domestic use
- Slabs of natural stone for external paving
- Slate and stone products for discontinuous roofing and cladding
- Slow heat release appliances fired by solid fuel
- Smoke alarm devices
- Smoke and heat control systems
- Solid wood panelling and cladding
- Specification for ancillary components for masonry
- Specification for masonry units
- Specification for mortar for masonry
- Specifications for external renders and internal plasters based on organic binders
- Stainless steels
- Static thermoplastic tanks for above ground storage of domestic heating oils, kerosene and diesel fuels
- Steel castings for structural uses
- Steel strip sheaths for prestressing tendons
- Steels for quenching and tempering for construction purposes
- Steps for underground man entry chambers
- Stretched ceilings
- Structural adhesives
- Structural bearings
- Structural timber
- Supersulfated cement
- Surface dressing
- Surfaces for sports areas
- Suspended ceilings
- Telecom connectors
- Terrazzo tiles
- Thermal insulation and light weight fill products for civil engineering applications
- Thermal insulation products for building equipment and industrial installations
- Thermal insulation products for buildings
- Timber structures

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- Traffic control equipment
- Underground fire hydrants
- Ventilation for buildings
- Vitrified clay pipe systems for drains and sewers
- Wall-hung urinals
- Wastewater lifting plants for buildings and site
- WC and urinal flushing cisterns
- WC pans and WC suites with integral trap
- Welded stainless steel tubes for the conveyance of aqueous liquids including water for human consumption - Technical delivery conditions
- Welding consumables
- Windows and doors
- Window films
- Wood flooring
- Wood-based panels for use in construction
- Workshop fabricated steel tanks

15 ANNEX C – REFERENCE SERVICE LIFE (RSL)

A reference service life (RSL) may be used, where relevant, for the usage stage and is mandatory if a full life cycle is covered (see Table 2). The basis for handling of durability aspects is found in standard ISO 15686-8. This standard is part of a family of standards applicable for service life planning (ISO 15686-1 to -10). ISO/DTR 15686-4 deals with reporting of service life planning results by using IFC as specification (that is not fulfilled here).

The RSL or the estimated service life (ESL) is understood as the period of time after (typically planned) maintenance when the building product is replaced or the building element or the construction it is part of will be rebuild/renovated/restored. The replacement is here limited to cover service life caused by damage such as a break down or performance failure occurs (typically not planned) that requires a reparation activity to meet its required functions. Repair activities are typically related to building products that have an error frequency. The nomenclature utilised in relation to the RSL and the related life cycle steps in ISO 21930 and EN 15804 are listed below:

ISO 21930

<i>Maintenance</i>	<i>includes typically planned activities and typically results in a refurbishment</i>
<i>Refurbishment</i>	<i>also include rebuilding when the desired performance cannot be met (by maintenance)</i>
<i>Repair</i>	<i>repair is based on errors that are typically not planned or foreseen</i>
<i>Replacement</i>	<i>a replacement is related to a repair cycle or a total break down</i>

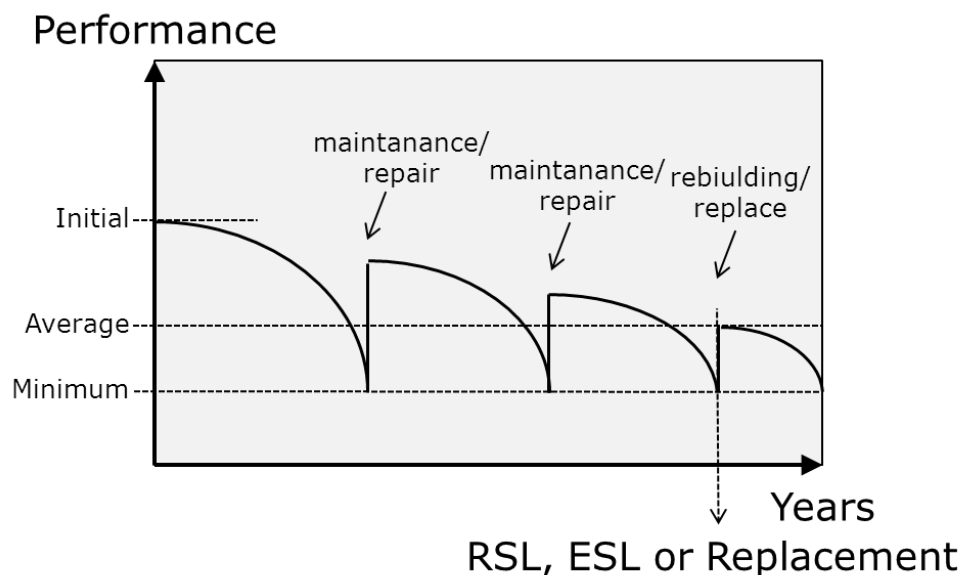


Figure 6 Relation between different service life categories, performance and maintenance respectively replace.

The relation between the service life categories RSL or ESL respective replacement is outlined in Figure 6. Besides the life cycle steps listed under the 'Use stage' (see Figure 2), ISO 21930 also includes a step named 'Use' as a subset. This subset, however, only handles environmental aspects and impacts arising from the building products or components as such during their normal usage, e.g. material emission of VOC to the indoor air etc.

A declared RSL shall be related to the declared functional technical performance and to any maintenance or repair necessary to provide the declared performance during the declared RSL or provided Estimated Service Life (ESL). The description of the RSL may be based on data collected as average data or at the beginning or end of the service life. The reference conditions for achieving the declared technical and functional performance and the declared RSL shall include the reference service life data as described below, where such parameters are expressed per functional or declared unit, further explained in ISO 15686-1, -2, -7 and -8:

- Declared product properties (at the gate) and finishes, etc., units as appropriate
- Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices, units as appropriate
- An assumed quality of work, when installed in accordance with the manufacturer's instructions, units as appropriate

CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES

- Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature, units as appropriate
- Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure, units as appropriate
- Usage conditions, e.g. frequency of use, mechanical exposure, units as appropriate
- Maintenance e.g. required frequency, type and quality and replacement of replaceable components, units as appropriate

If additional technical information is provided in the EPD for products requiring maintenance, repair, replacement, refurbishment, the following information (but not limited to), shall be provided to specify the product's usage LCA scenarios, or to support development of such scenarios describing the product's usage at the level of the building assessment. Such parameters are expressed per functional or declared unit (B1-7):

16 ANNEX D – DEFINITION ON USE OF NET FRESH WATER CONSUMPTION

Since “Net fresh water consumption” is not defined in EN15804 the following definition is valid. If EN15804 or ISO21930 defines this LCI indicator differently in forthcoming updates, it is accepted to use such updated definition instead and shall then be explained by a note in the relevant table in the EPD.

16.1 INVENTORY INDICATOR DESCRIBING NET USE OF FRESH WATER

Net use of fresh water shall be calculated and reported.

The term ‘net’ (as opposed to gross) in relation to freshwater use, is used to show both:

- The intention that use of water, which it is not consumed (e.g. water used for river transport, used to power hydroelectric turbines or used as coolant and returned to the original source) should not be considered within the indicator.
- That water which would have been lost from the original, natural system, e.g. from evaporation of rainwater or from a body of water is not considered within the losses from the studied technical system.
- Evaporated fresh water is considered consumption unless it is demonstrated otherwise.
- For each process, the water flows should be identified, in terms of volume extracted, volumes discharged and the source or the destination, e.g. surface water, ground water, seawater.

Where tap water (water from the public grid) is used, the water treatment and distribution system should be considered as an upstream process, which will have its own resource use and discharges. Similarly, where water is discharged to the sewer, then the sewer and water treatment system should be considered as a downstream process with its own resource use and discharges. Other water flows, for example water which evaporates or water, which is incorporated into the product, should ideally be itemised in the process inventory so that a full water balance can be made.

For each process, the water consumed is the sum of the water, which is lost from a drainage basin. This may be more easily calculated as the sum of water, which evaporates, transpires from biomass, is incorporated into products or is discharged to a different drainage basin. This also, as mentioned, does not need to account for water, which would have been lost from the drainage basin in the natural system before the technical system was implemented.

Example 1 Rainwater would normally be expected to drain to surface or ground water. If a factory or building is placed on the site, then water may instead be directed to the sewer and may be discharged, after treatment, to the sea, surface or ground water. Water, which is diverted through the water treatment system from its original drainage basin, is consumed. If rainwater is used in the building before discharging it into the sewer then this will be considered no differently than if the water was discharged directly to the sewer. However, if rainwater is used for cleaning and evaporates, then this water is consumed.

Example 2 For an agricultural process, water that evaporates or transpires from the plants as a result of human activity (irrigation) is considered as consumption. Water such as rainwater, which evaporates or goes to the drainage basin in the same way it would if there was no agricultural process is not consumption. The assumption is that natural vegetation would have the same effect.

Example 3 Additional water evaporation from reservoirs and as a result of the hydrogeneration process downstream which occurs in addition to that from the original natural system will be considered water consumption.

Example 4 For a quarry, where dewatering takes place, if this water is returned to the same drainage basin it would naturally have drained to, then it is not consumption. If however, it is used in a process and evaporates, then it is consumption.

16.2 TERMS

net fresh water consumption (defined here)

net fresh water entering the system being studied that is not returned to the same drainage basin that it origin from, or returned to the same drainage basin with lower quality will be regarded as consumed.

drainage basin

area from which direct surface runoff from precipitation drains by gravity into a stream or other *water body*

Note 1 to entry: The terms “watershed”, “drainage area”, “catchment”, “catchment area” or “river basin” are sometimes used for the concept of “drainage basin”.

Note 2 to entry: Groundwater drainage basin does not necessarily correspond in area to surface drainage basin.

Note 3 to entry: The geographical resolution of a

[SOURCE: ISO 14046:2014, 3.1.8]

fresh water (based on 3.1.1 ISO14046)

fresh water contains low concentration of dissolved solids and is generally accepted as suitable for withdrawal and treatment to produce potable water.

Note 1 to entry: Freshwater typically contains less than 1000 milligrams per litre of dissolved solids and is generally accepted as suitable for withdrawal and treatment to produce potable water.

Added Note 2 to entry: Moisture and crystal water in natural materials (like wood, clay, soil, etc.) is not fresh water.

water use

use of water by human activity

Note 1 to entry: Use includes, but is not limited to, any *water withdrawal* (3.2.2), water release or other human activities within the *drainage basin* (3.1.8) impacting water flows and/or quality, including in-stream uses such as fishing, recreation, transportation.

Note 2 to entry: The term “water consumption” is often used to describe water removed from, but not returned to, the same drainage basin. Water consumption can be because of evaporation, transpiration, integration into a product, or release into a different drainage basin or the sea.

[SOURCE: ISO 14046:2014, 3.2.1]

water quality

physical (e.g. thermal), chemical and biological characteristics of water with respect to its suitability for an intended use by humans or ecosystems

[SOURCE: ISO 14046:2014, 3.2.4]

© 2017 THE INTERNATIONAL EPD® SYSTEM

COVER IMAGE © ISTOCKPHOTO.COM / ERIC BLECKERT

