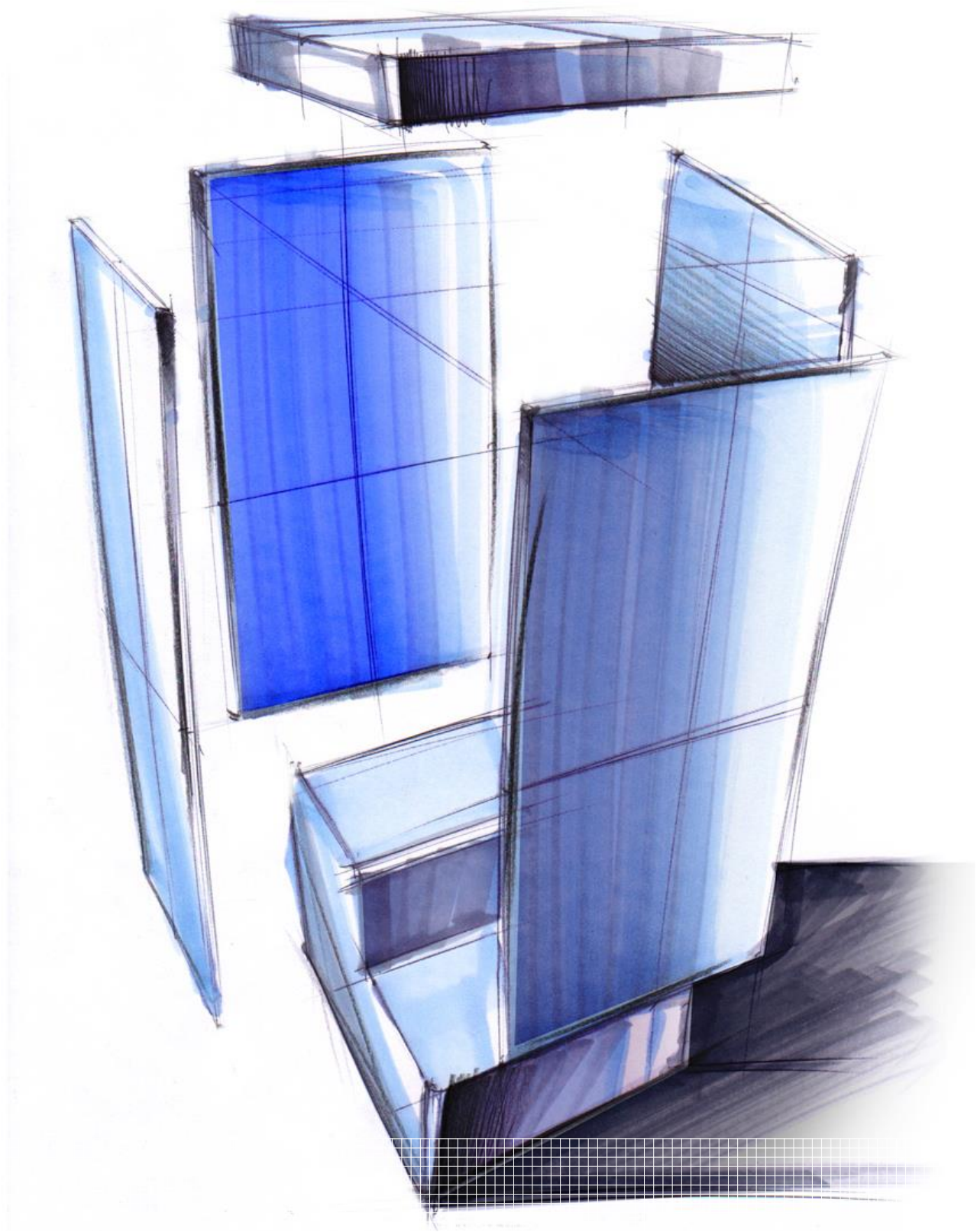
PREFABRICATED BUILDINGS

PRODUCT CATEGORY CLASSIFICATION: UN CPC 387

2013:01
VERSION 2.01

VALID UNTIL: 2022-07-26



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1 INTRODUCTION

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD® System: a programme for type III environmental declarations[1] according to ISO 14025:2006. 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 programme are the General Programme Instructions, publicly available at www.environdec.com. A PCR complements the General Programme Instructions and the standards by providing specific rules, requirements and guidelines for developing an EPD for one or more specific product categories (see Figure 1). A PCR should enable different practitioners using the PCR to generate consistent results when assessing products of the same product category.

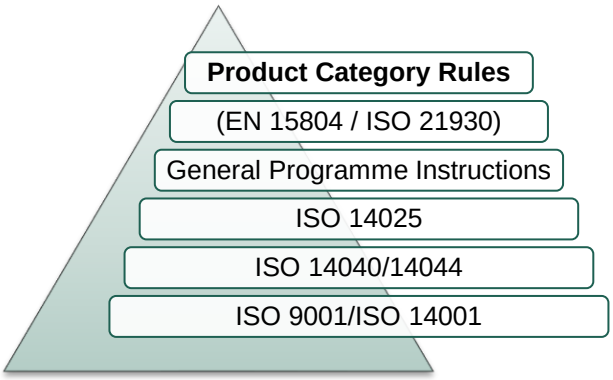

Figure 1 Illustration PCR in relation to the hierarchy of standards and other documents.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory.
- The term “should” is used to indicate a recommendation, rather than a requirement.
- The term “may” or “can” is used to indicate an option that is permissible

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

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

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

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

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

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2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Prefabricated buildings
Registration number and version:	2013:01, version 2.01
Programme:	The International EPD® System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
PCR moderator:	Maurizio Fieschi, Studio Fieschi & s. s.r.l., fieschi@studiofieschi.it
PCR Committee:	Studio Fieschi*, "Bagni Mobili Italia" working* group composed by companies producing, renting, and providing full service for mobile non-sewer-connected toilet cabins.
Date of publication and last revision:	2019-09-06 (version 2.01)
Valid until:	2022-07-26
Schedule for renewal:	A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. When the PCR is about to expire the PCR moderator shall initiate a discussion with the Secretariat how to proceed with updating the document and renewing its validity. A PCR document may be revised during its period of validity provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for up-to-date information and the latest version.
Standards conformance:	▪ General Programme Instructions of the International EPD® System, version 3.0, based on ISO 14025 and ISO 14040/14044 ▪ PCR Basic Module, CPC Division 38 Furniture and other transportable goods, version 2.5, dated 2015-12-22 ▪ PCR Construction Products and Construction Services, version 2.2, dated 2017-05-30 ▪ EN 15804:2012 - Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products + A1:2013 ▪ EN 16194:2012 - Mobile non-sewer-connected toilet cabins. Requirements of services and products relating to the deployment of cabins and sanitary products
PCR language(s):	This PCR was developed and is available in English. In case of translated versions the English version takes precedence in case of any discrepancies.

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2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of Prefabricated Buildings and the declaration of this performance by an EPD. The product category corresponds to UN CPC 387 Prefabricated buildings and underlying classes and sub-classes:

- **Group: 387 – Prefabricated Buildings**
  - **Class: 3870 – Prefabricated Buildings**
    - **Subclass: 38701 - Prefabricated Buildings, of wood**
    - **Subclass: 38702 - Prefabricated Buildings, of metal**
    - **Subclass: 38703 - Prefabricated Buildings, of plastics**
    - **Subclass: 38704 - Prefabricated Buildings, of concrete**

More information: http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=25&Lg=1&Co=387

This class includes:

- prefabricated buildings, either unassembled or fully assembled and ready to use
- incomplete buildings, whether or not assembled, having the essential character of prefabricated buildings

The buildings can be designed for housing, worksite accommodation, shops, sheds, garages, greenhouses and other purposes and can be made of different materials.

As an example, products such as mobile non-sewer-connected toilet cabins (as defined by EN 16194:2012) fall within the scope of this PCR.

Compliance with EN 15804 is relevant in order to cover those products that are prefabricated and fulfil the definition of construction works (as defined by EN 15804).

2.2.2 GEOGRAPHICAL REGION

This PCR is applicable to be used globally.

2.2.3 EPD VALIDITY

An EPD based on this PCR shall be valid from its registration and publication at www.environdec.com and for a five year period starting from the date of the verification report (“approval date”), or until the EPD has been de-registered from the International EPD® System.

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

- an increase of 10% or more of any of the indicators listed in Section 5.4.5.1,
- errors in the declared information,
- significant changes to the declared product information, content declaration, or additional environmental information.

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

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3 PCR REVIEW AND BACKGROUND INFORMATION

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

3.1 PCR REVIEW

3.1.1 VERSION 2.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee, and were excused from the review.
Chair of the PCR review:	Barbara Nebel
Review dates:	2017-10-10 until 2017-12-05

3.2 OPEN CONSULTATION

3.2.1 VERSION 2.0

This PCR was available for open consultation from 2017-10-10 until 2017-12-10, 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.

Stakeholders were invited via e-mail or other means to take part in the open consultation, and were encouraged to forward the invitation to other relevant stakeholders.

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

No PCRs with overlaps in scope have been found in other programmes,

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed in order to enable publication of Environmental Product Declarations (EPD) for this product category based on ISO 14025, ISO 14040/14044 and other relevant standards to be used in different applications and target audiences.

3.5 UNDERLYING STUDIES

No public LCA study regarding the object of this PCR has been found.

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

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

4.1 FUNCTIONAL UNIT/DECLARED UNIT

The EPD® may follow a “cradle to gate” or a “cradle to grave” approach. The functional units that shall be used in the EPD® are defined in the following table, based on the selected approach. The approach shall be declared in the EPD.

Approach	**Life cycle stages (see §6)**	**Functional units**
Cradle-to-gate	A1-A5	One unit of product
Cradle to grave	A1-A5, B1-B7, C1-C4	10 years of use of a prefabricated building
		One day of effective usage** of a prefabricated building

* E.g. if the RSL of a prefabricated building is 2 years, 5 prefabricated buildings shall be considered in the EPD.
** Effective usage is the number of days when the prefabricated building is accessible for use.

4.2 REFERENCE SERVICE LIFE (RSL)

Ten years.

4.3 SYSTEM BOUNDARY

The International EPD® System uses an approach where all attributional processes from “cradle to grave” should be included using the principle of “limited loss of information at the final product”. This is especially important in the case of business-to-consumer communication.

The scope of this PCR and EPDs based on it is either cradle-to-gate with options or cradle-to-grave with options.

4.3.1 LIFE CYCLE STAGES

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

- 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. The processes included in the scope of the PCR and belonging to each life cycle stage are described in Sections 4.3.1.1–4.3.1.3.

Table 1: The life cycle of a prefabricated building divided in three stages according to the General Program Instructions (GPI) and four information modules according to ISO 21930 and supplemented by an optional information module on potential loads and benefits beyond the building life cycle (EN ISO 15804).

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GPI module	Information stage	Asset life cycle module	Cradle to gate	Cradle to grave
UPSTREAM	MANUFACTURING STAGE 1	A1) Raw material supply	Mandatory	Mandatory
CORE		A2) Transport		
		A3) Manufacturing		
DOWN-STREAM	MANUFACTURING STAGE 2	A4) Transport	Mandatory	Mandatory
		A5) Installation process		
	USE	B1) Material emission from usage*	Excluded	Mandatory
		B2) Maintenance		
		B3) Repair		
		B4) Replacement		
		B5) Refurbishment		
		B6) Use of energy		
		B7) Use of water		
	END OF LIFE	C1) Deconstruction, demolition	Excluded	Mandatory
		C2) Transport		
		C3) Waste processing		
		C4) Disposal		
OTHER ENVIRONMENTAL INFORMATION	RECYCLABILITY POTENTIALS	D) Reuse, recycle or recovery	Optional	Optional

4.3.1.1. Upstream processes

The following attributional processes are part of the product system and classified as upstream processes:

- **A1) Raw material supply**
  - Extraction and production of raw material for all main parts and components
  - Transportation of raw material.
  - Manufacturing process for main parts.
  - Impacts due to the production of electricity and fuels used in the upstream module
  - Production of auxiliary products used such as detergents for cleaning, etc.
  - Manufacturing of primary and secondary packaging
  - Reuse of products or materials from a previous product system

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

4.3.1.2. Core processes

The following attributional processes are part of the product system and classified as core processes:

- **A2) Transportation:**
  - External transportation to the core processes
- **A3) Manufacturing:**
  - Assembly/manufacturing of the final product.

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- Maintenance (e.g. of the machines)
- Waste treatment of waste generated during manufacturing;
- Impacts due to the production of electricity and fuels used in the core module
- Production of ancillary materials or pre-products

Manufacturing processes not listed may also be included. The production of the raw materials used for production of all product parts shall be included. A minimum of 99% of the total weight of the declared product including packaging shall be included.

The technical system shall not include:

- Manufacturing of production equipment, buildings and other capital goods
- Business travel of personnel
- Travel to and from work by personnel.
- Research and development activities

4.3.1.3. Downstream processes

The EPD shall report the downstream processes included.

The downstream processes include the B) Usage stage and the C) End-of-life stage.
These stages are divided into a number of life cycle module steps as defined below:

- **A4) Transport:**
  - Transportation from the production gate to the construction or installation site
  - Storage of products, including the provision of heating, cooling, humidity control etc.
  - Wastage of 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 installation processes up to the end-of-waste state or disposal of final residues.
- **A5) Installation process:**
  - Installation of the product at the site, manufacturing and transportation of ancillary materials and any energy or water required for installation or operation of the site. It also includes on-site operations to the product.
  - Wastage of 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 installation processes up to the end-of-waste state or disposal of final residues.
- **B1) Use:**
  The module covers environmental aspects and impacts arising from components of the building and construction works during their normal (i.e. anticipated) use, which are assigned to module B1. This module includes e.g. release of substances from the facade, roof, floor covering and other surfaces (interior or exterior) to indoor air, soil or water.
- **B2) Maintenance:**
  Maintenance covers the combination of all typically planned technical and associated administrative activities and actions during the service life to maintain the prefabricated building or its parts in a state in which it can perform its required functional and technical performance, as well as preserve the aesthetic qualities of the product. This will include preventative and regular maintenance activity such as cleaning and the planned servicing, replacement or mending of worn, damaged or degraded parts. Water and energy usage required for cleaning, as part of maintenance, shall be included in this module and not in modules B6 and B7. This module includes, in addition:
  - The production and transportation of any component and ancillary products used for maintenance, including cleaning
  - Transportation of any waste from maintenance processes or from maintenance related transportation

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- The end-of-life processes of any waste from transportation and the maintenance process, including any part of the component and ancillary materials removed
- Transport of the prefabricated building to the installation site and its transport back from the installation site to another site (storage or new installation site)

- **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 part of the building to return it to an acceptable condition in which it can perform its required functional and technical performance. It also covers the preservation of the aesthetic qualities of the product. Replacement of a broken component or part due to damage should be assigned to “repair”, whereas replacement of a whole element due to damage should be assigned to the module “replacement”. The module includes:
  - Repair process of the repaired part of a component, including
    - Production of the repaired part of a component and of ancillary materials;
    - Use of related energy and water;
    - The production and transport aspects and impacts of any wastage of materials during the repair process;
  - The transportation of the repaired part of component and ancillary materials, including production aspects and impacts of any waste of materials during the repair related transportation
  - The end-of-life processes of any waste from transportation and the repair process, including any part of the component and ancillary materials removed

  See replacement when repair is not possible.

- **B4) Replacement:**
  The module “replacement” covers the combination of all technical and associated administrative actions during the service life associated with the return of the prefabricated building to a condition in which it can perform its required functional or technical performance, by replacement of a whole construction element.

  Replacement of a broken component or part due to damage should be accounted for in the module “repair”. Replacement of a whole construction element as part of a concerted replacement programme for the building should be considered as “refurbishment”.

  The module includes:
  - The production of the components and of ancillary materials used for replacement;
  - Replacement process, including related water and energy use and the production aspects and impacts of any waste of materials used during the replacement process;
  - The transportation of the component and ancillary materials used for replacement, including production aspects and impacts of any losses of materials damaged during transportation;
  - The end-of-life processes of any waste from transportation and the replacement process, including any part of the component and ancillary materials removed

- **B5) Refurbishment:**
  The module “refurbishment” covers a concerted typically planed programme of maintenance that finally ends up with a restoration that often includes across a significant part or whole section of the prefabricated building.
  The module includes:
  - The production of the components and of ancillary materials used for refurbishment;
  - Refurbishment process, including related water and energy use and the production aspects and impacts of any waste of materials used during the refurbishment process;

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- The transportation of the component and ancillary materials used for refurbishment, including production aspects and impacts of any losses of materials damaged during transportation;
- The end-of-life processes of any waste from transportation and the refurbishment process, including any part of the component and ancillary materials removed

- **B6) Energy use to operate building integrated technical systems:**
  The boundary of this module 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. This includes technical buildings 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.[2]

  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 covers the period from the handover of the building to when the building is deconstructed or demolished.
  The boundary of this module shall include water use during the operation of the product (the integrated building technical system), together with its associated environmental aspects and impacts considering the life cycle of water including production and transportation and waste water treatment.

  Integrated building technical systems are installed technical equipment supporting operation of a building. This includes technical buildings systems for heating, 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 4.6 **)**

- **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 4.6 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).

- **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”.

[2] Guidance on the selection of standards to calculate operational energy use of technical building systems can be obtained from CEN/TR 15615, *Explanation of the general relationship between various European standards and the Energy Performance of Buildings Directive (EPBD) – Umbrella Document.*

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4.3.2 OTHER ENVIRONMENTAL INFORMATION

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

- **D) Recyclability 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

  In module D the net impacts are calculated as follows:

  - By adding all output flows of a secondary material or fuel and subtracting all input flows of this secondary material or fuel from each sub-module first (e.g. B1-B5, C1-C4, etc.), then from the modules (e.g. B, C), and finally from the total product system thus arriving at net output flows of secondary material or fuel from the product system;
  - By adding the impacts connected to the recycling or recovery processes from beyond the system boundary (after the end-of-waste state) up to the point of functional equivalence; where the secondary material or energy substitutes primary production and subtracting the impacts resulting from the substituted production of the product or substituted generation of energy from primary sources;
  - By applying a justified value-correction factor to reflect the difference in functional equivalence where the output flow does not reach the functional equivalence of the substituting process.

In module D, substitution effects are calculated only for the resulting net output flow.

The amount of secondary material output, which is for all practical purposes able to replace one to one the input of secondary material as closed loop, is allocated to the product system under study and not to module D

4.3.3 OTHER BOUNDARY SETTING

4.3.3.1. Boundary towards nature

Boundaries to nature are defined as flows of material and energy resources from nature into the system. Emissions to air, water and soil cross the system boundary when they are emitted from or leaving the product system.

4.3.3.2. Boundaries in the life cycle

See Section 4.3.1. The EPD may present the information divided into additional sub-divisions.

4.3.3.3. Boundaries towards other technical systems

See Section 4.6.2.

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4.4 SYSTEM DIAGRAM

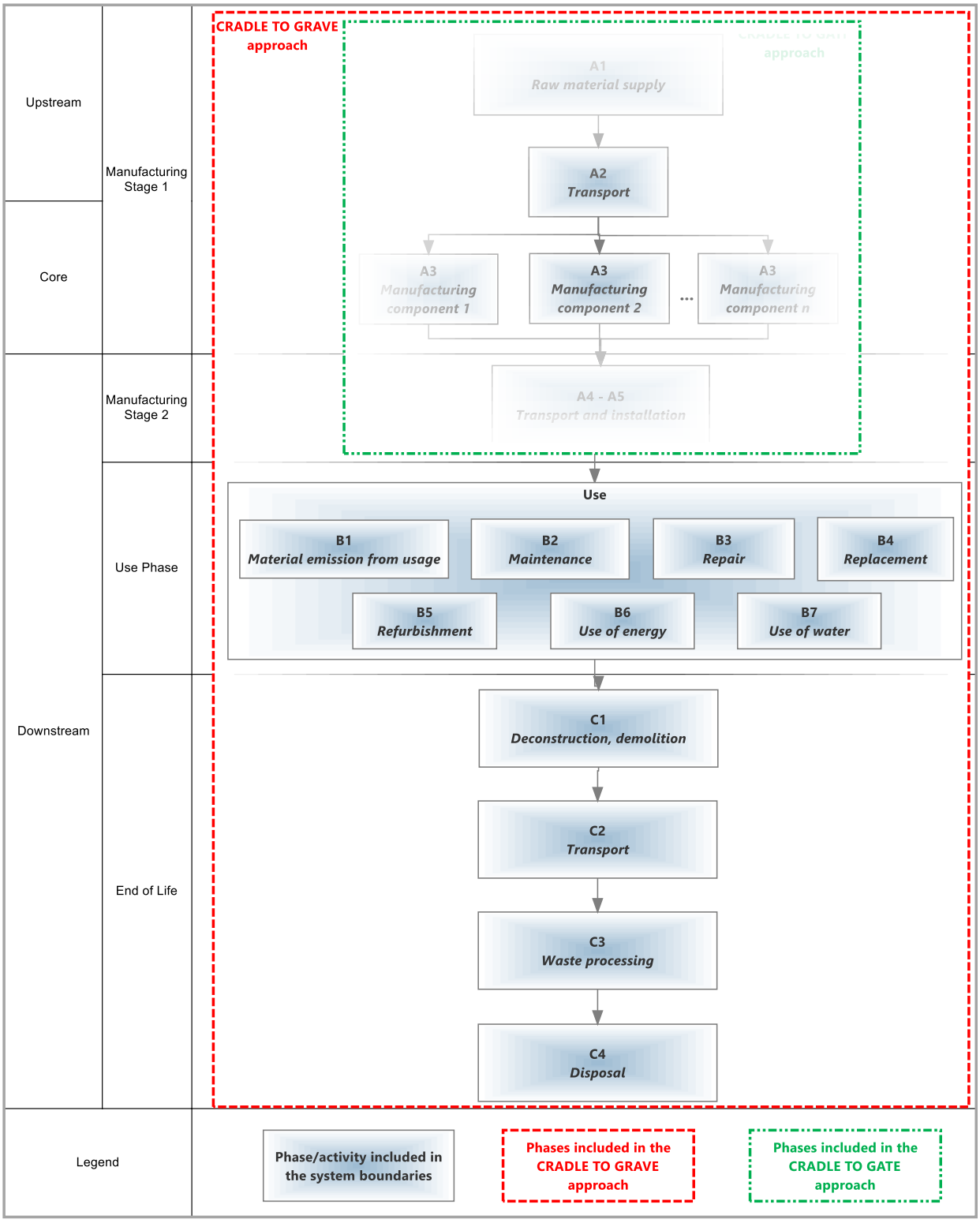

Figure 2 *System diagram illustrating the processes that are included in the product system, divided into upstream, core and downstream processes.*

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4.5 CUT-OFF RULES

Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary as described in Section 4.3).

The check for cut-off rules in a satisfactory way is through the combination of expert judgment based on experience of similar product systems and a sensitivity analysis in which it is possible to understand how the un-investigated input or output could affect the final results.

4.6 ALLOCATION RULES

4.6.1 CO-PRODUCT ALLOCATION

The following step-wise procedure shall be applied for multifunctional products and multiproduct processes:

1. Allocation shall be avoided, if possible, by dividing the unit process into two or more sub-processes and collecting the environmental data related to these sub-processes.
2. If allocation cannot be avoided, the inputs and outputs of the system shall be partitioned between its different products or functions in a way that reflects the underlying physical relationships between them; i.e. they should reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system.
3. If not possible, allocation problems shall be solved in a way that reflects other relationships between the sub-processes, 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 must 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 allocated3. The product system is now subdivided into sub-processes, creating the base for the next allocation step.

2) 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.

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

1.1) MULTI-OUTPUT

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

[3] See guidance in Erlandsson (1996).

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 for[4]. For illustrative examples and generic allocation efficiency factors, see a copy in Annex A[5] or if check for a current update.

1.1.3) Co-produced goods and energy

In the case of co-production of goods and energy, an allocation can be 'virtually avoided' by performing a limited system expansion around the sub-process. 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, and for generic allocation efficiency factors, see Annex A[6] or if check for a current update.

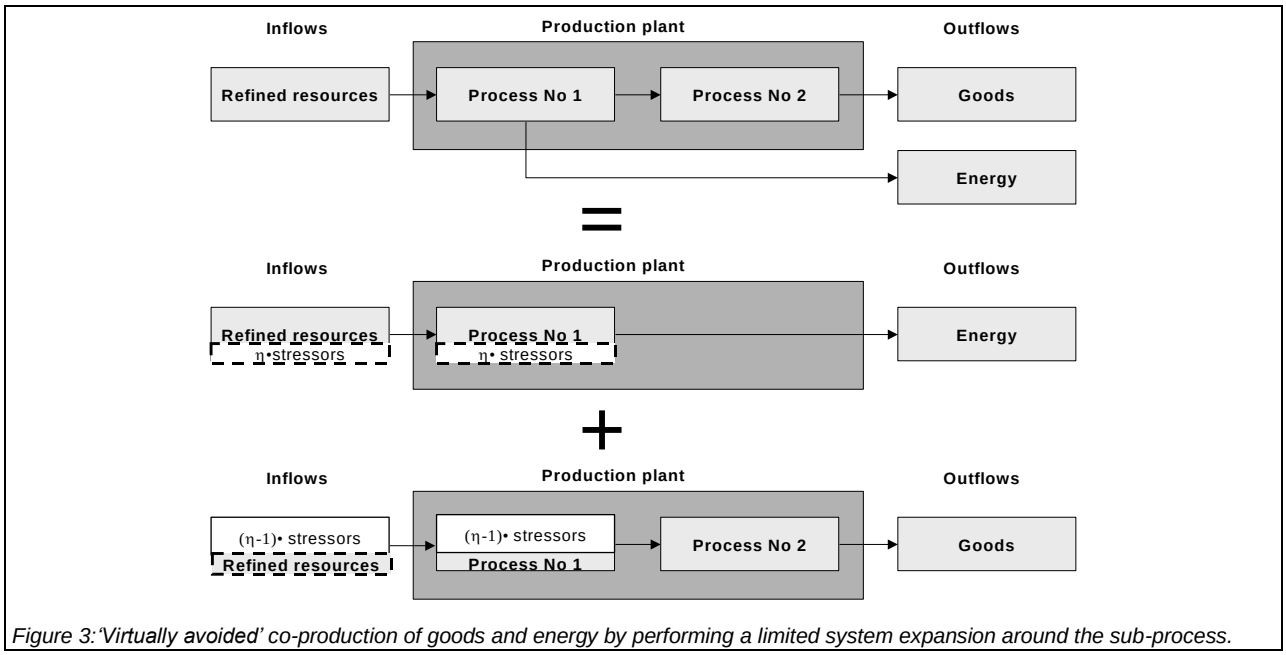

Figure 3:'Virtually avoided' co-production of goods and energy by performing a limited system expansion around the sub-process.

[4] This allocation rule follows the global PCR on "Electricity, Steam and Hot and Cold Water Generation and Distribution" (PCR CPC 17, 2007-10-31).

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

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

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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).

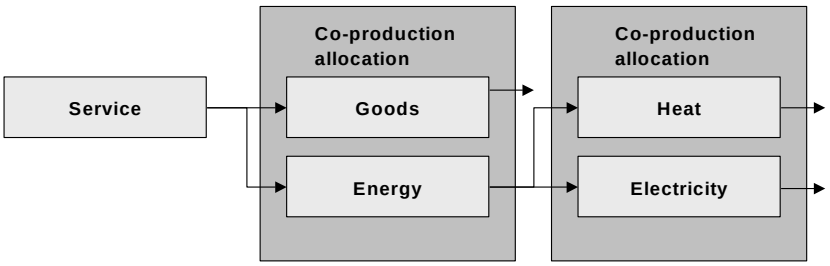

Figure 4: Elements of a stepwise allocation procedure for a service.

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 must 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), 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). The allocation specification here is applicable in combination with the multi-input/output allocation rules given above.

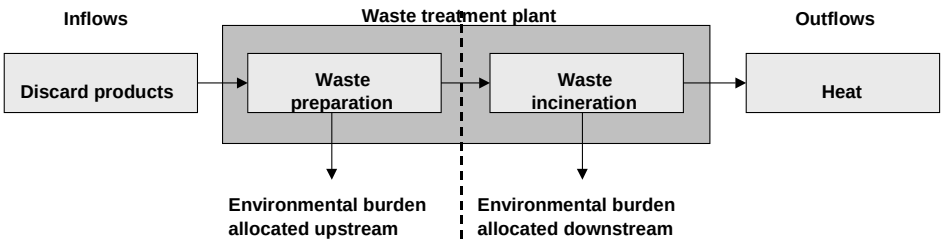

Figure 5 Multi-input/output allocation exemplified by a waste treatment plant with energy recovery, where both the inflows and outflows have positive market values.

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

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recovery with a rate higher than 60 % without prejudice to existing legislation. These specifications, therefore, specifies the *polluters pay* (PP) allocation principle, as described in section A.7.1 in the Supporting Annexes to the GPI.

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.[7]

Example: This allocation rule is relevant for a waste combustion plant, see Figure. 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 (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 must 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, economically-based allocation parameters may be used for allocation.

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

4.6.2 REUSE, RECYCLING, AND RECOVERY

In the framework of the International EPD® System, the methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP). This means that the generator of the waste shall carry the full environmental impact until the point in the product's life cycle at which the waste is transported to a scrapyard or the gate of a waste processing plant (collection site). The subsequent user of the waste shall carry the environmental impact from the processing and refinement of the waste but not the environmental impact caused in the "earlier" life cycles. See General Programme Instruction for further information and examples.

4.7 DATA QUALITY REQUIREMENTS

An LCA calculation requires two different kinds of information:

- data related to the **environmental aspects** of the considered system (such materials or energy flows that enter the production system). These data usually come from the company that is performing the LCA calculation.
- data related to the **life cycle impacts** of the material or energy flows that enter the production system. These data usually come from databases.

Data on environmental aspects shall be as specific as possible and shall be representative of the studied process.

Data on the life cycle of materials or energy inputs are classified into three categories – specific data, selected generic data, and proxy data, defined as follows:

- **specific data** (also referred to as "primary data" or "site-specific data") – data gathered from the actual manufacturing plant where product-specific processes are carried out, and data from other parts of the life cycle traced to the specific product system under study, e.g. materials or electricity provided by a contracted supplier that is able to provide data for the actual delivered services, transportation that takes place based on actual fuel consumption, and related emissions, etc.,
- **generic data** (sometimes referred to as "secondary data"), divided into**:**
  - **selected generic data** – data from commonly available data sources (e.g. commercial databases and free databases) that fulfil prescribed data quality characteristics for precision, completeness, and,

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

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- **proxy data** – data from commonly available data sources (e.g. commercial databases and free databases) that do not fulfil all of the data quality characteristics of "selected generic data".

As a general rule, specific data shall always be used, if available, after performing a data quality assessment. It is mandatory to use specific data for the core processes as defined above. For the upstream processes, downstream processes, and infrastructure, generic data may also be used if specific data are not available.

Table 2: Summary of data quality that shall be used for the EPD.

GPI module	Information stage	Asset life cycle module	Type of data to be used	
			Cradle to gate	Cradle to grave
UPSTREAM	MANUFACTURING STAGE 1	A1) Raw material supply	Specific	Specific
CORE		A2) Transport		
		A3) Manufacturing		
DOWN-STREAM	MANUFACTURING STAGE 2	A4) Transport	Specific	Specific
		A5) Installation process		
	USE	B1) Material emission from usage*	N/A (excluded)	Specific
		B2) Maintenance		
		B3) Repair		
		B4) Replacement		
		B5) Refurbishment		
		B6) Use of energy		
		B7) Use of water		
	END OF LIFE	C1) Deconstruction, demolition	N/A (excluded)	Generic
		C2) Transport		
		C3) Waste processing		
		C4) Disposal		
OTHER ENVIRONMENTAL INFORMATION	RECYCLABILITY POTENTIALS	D) Reuse, recycle or recovery	Generic	Generic

Any data used should preferably represent average values for a specific reference year. However, the way these data are generated could vary, e.g. over time, and in such cases they should have the form of a representative annual average value for a specified reference period. Such deviations should be declared.

4.7.1 RULES FOR USING GENERIC DATA

The attributional LCA approach in the International EPD® System forms the basic prerequisites for selecting generic data. To allow the classification of generic data as "selected generic data", they shall fulfil selected prescribed characteristics for precision, completeness, and representativeness (temporal, geographical, and technological), such as:

- the reference year must be as current as possible and preferably assessed to be representative for at least the validity period of the EPD,
- the cut-off criteria to be met on the level of the modelled product system are the qualitative coverage of at least 99% of energy, mass, and overall environmental relevance of the flows,
- completeness in which the inventory data set should, in principle, cover all elementary flows that contribute to a relevant degree of the impact categories, and
- the representativeness of the resulting inventory in the given temporal, technological, and geographical reference should, as a general principle, be better than ±5% of the environmental impact of fully representative data.

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If selected generic data that meets the requirements of the International EPD® System are not available as the necessary input data, proxy data may be used and documented. The environmental impacts associated with proxy data shall not exceed 10% of the overall environmental impact from the product system.

The EPD may include a data quality declaration to demonstrate the share of specific data, selected generic data and proxy data for the environmental impacts.

4.8 IMPACT CATEGORIES AND IMPACT ASSESSMENT

The EPD shall declare the default impact categories as described in EN 15804.

4.9 OTHER CALCULATION RULES AND SCENARIOS

4.9.1 UPSTREAM PROCESSES

The following requirements apply to the upstream processes:

- Data referring to processes and activities upstream in a supply chain over which an organisation has direct management control shall be specific and collected on site.
- Data referring to contractors that supply main parts, packaging, or main auxiliaries should be requested from the contractor as specific data, as well as infrastructure, where relevant.
- The transport of main parts and components along the supply chain to a distribution point (e.g. a stockroom or warehouse) where the final delivery to the manufacturer can take place based on the actual transportation mode, distance from the supplier, and vehicle load.
- In case specific data is lacking, selected generic data may be used. If this is also lacking, proxy data may be used.
- For the electricity used in the upstream processes, electricity production impacts shall be accounted for in this priority when specific data are used in the upstream processes:

    1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.[8]
    2. National residual electricity mix or residual electricity mix on the market
    3. National electricity production mix or electricity mix on the market.

    The mix of electricity used in upstream processes shall be documented in the EPD, where relevant.
- Packaging: specific data shall be used for the consumer packaging production if it is under the direct control of the organization or if the environmental impact related to the consumer packaging production is more than 10% of the total product environmental indicators. In other cases, generic data may be used. When consumer packaging shows the organization's logo, the LCA report should report the exerted/non exerted direct control on the production of consumer packaging by the organization.

4.9.2 CORE PROCESSES

The following requirements apply to the core processes:

- Specific data shall be used for the assembly of the product and for the manufacture of main parts as well as for on-site generation of steam, heat, electricity, etc., where relevant.
- For the electricity used in the core processes, electricity production impacts shall be accounted for in this priority:

[8] The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.

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1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.9
2. National residual electricity mix or residual electricity mix on the market
3. National electricity production mix or electricity mix on the market.

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

- Transport from the final delivery point of raw materials, chemicals, main parts, and components (see above regarding upstream processes) to the manufacturing plant/place of service provision should be based on the actual transportation mode, distance from the supplier, and vehicle load, if available.
- Waste treatment processes of manufacturing waste should be based on specific data, if available.

4.9.3 DOWNSTREAM PROCESSES

STAGE A4 – TRANSPORTATION

If the EPD® shall include the transport from manufacture to an average converter, merchant or distribution platform, the type of transport and transport distance should be representative to actual conditions on the market for which the EPD® is valid. The assigned markets for the transportation figures shall be declared in the EPD. If relevant, several transportation data sets may be used and reported.

STAGE A5 – INSTALLATION

If additional technical information is provided in the EPD® for installation of the prefabricated building, the following information (but not limited to) shall be provided to specify the product's installation LCA scenarios, or to support development of such scenarios describing the product's installation at the level of the building assessment. Such parameters are expressed per functional unit:

- 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 installation process [kWh or MJ]
- Wastage of materials on the building site before waste processing, generated by the product's installation, specified by type [kg]
- Output materials, specified by type, as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route) [kg]
- Direct emissions from installation to ambient air, soil and water [kg].

STAGE B1 - 5 – USAGE

The usage stage covers Maintenance – B2, Repair – B3, Replacement – B4, Refurbishment – B4, and moreover if relevant (in a cradle-to-grave EDP); Operational energy use – B6, and Operational water use – B7. It is recognised that it may be difficult to separate all use stage processes and the connected aspects and impacts into these separate modules. However any deviation from the categorisation of aspects and impacts into modules B1-B5 and B6-B7 shall be transparently reported and justified.

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 maintenance (typically planned), when the prefabricated building, the building element or the construction of which it is part, 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

[9] The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.

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requires a reparation activity to meet its required functions. Repair activities are typically related to parts of the building that have an error frequency. The nomenclature utilised in relation to the RSL and the related life cycle steps in ISO 21930 are listed below:

ISO 21930

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

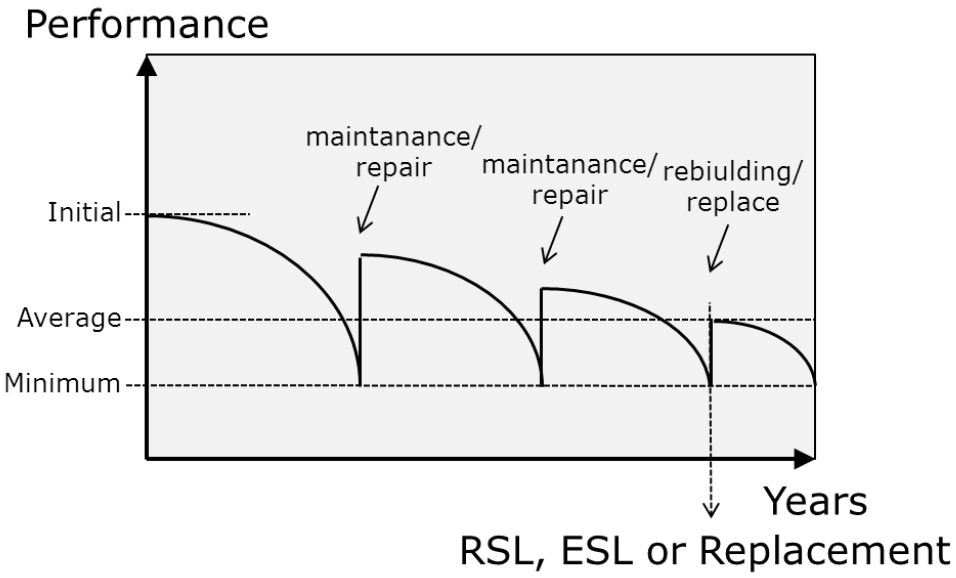

Figure 3: Relation between different service life categories, performance and maintenance respectively replace.

The relation between the service life categories RSL or ESL respective replacement is outlined in Figure 3. 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 or its 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
- 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

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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):

B1 Material emission from usage

Module B1 accounts for material emission from normal use of the installed product in terms of any emissions to the environment (not covered by B2-B7). The module "Material emission from usage" covers environmental aspects and impacts arising from components of the building and installation works during the service life covering release of substances such as from the facade, roof, floor covering and other surfaces (interior or exterior) to indoor air, soil or water. This kind of information can be reported as part of the LCA and also reported as emissions under the EPD® additional information heading on 'Release of dangerous substances during the use stage'. In this case information could also be given in relation to predefined emission realise classes[10]. In this cases information shall include

- Name of the classification system and the emission span and if appropriate the exact emission figure
- A statement if this emission is applicable for risk assessment, and if not what additional information or transformation that is required.

In the case that material emission is used and accounted for in the LCA, the following information shall be provided in the EPD:

- Essential information on material properties and information from leaching or emission test or likewise
- A description of the scenario used for calculation of emissions (mass flow to recipients)

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]
- Wastage material during maintenance, specify materials [kg]
- Net fresh water consumption during maintenance [m^3]
- Energy input during maintenance, e.g. vacuum cleaning and energy carrier type e.g. electricity, and amount, if applicable and relevant [kWh]

B3 Repair

- Repair process, description or source where description can be found
- Inspection process, description or source where description can be found
- Repair cycle [number per RSL or year]
- Ancillary materials, e.g. lubricant, specify materials [m^3 or kg/cycle]
- Wastage material during repair, specify materials [kg]
- Net fresh water consumption during repair [m3]
- Energy input during repair, e.g. crane activity and energy carrier type e.g. electricity, and amount [kWh/RSL, kWh/cycle]

B4 Replacement

- Replacement cycle [number per RSL or year]
- Energy input during replacement, e.g. machineries activity and energy carrier type e.g. electricity and amount if applicable and relevant [kWh]
- Exchange of worn parts during the product's life cycle, e.g. zinc galvanised steel sheet, specify materials [kg]

[10] In EC a number of such classes are supposed to be defined in relation to the forthcoming CE labelling according to the Construction Product Regulation (CPR), but are not limited to this system.

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B5 Refurbishment

- Refurbishment process, description or source where description can be found
- Refurbishment cycle [number per RSL or year]
- Energy input during refurbishment, e.g. machineries activity and energy carrier type e.g. electricity, and amount if applicable and relevant [kWh]
- Material input for refurbishment, e.g. lubricant, specify materials [m^3 or kg/cycle]
- Wastage material during refurbishment, specify materials [kg]
- Further assumptions for scenario development, e.g. frequency and time period of use, number of occupants, units as appropriate.

B6 – Operational energy use and B7 – Operational water use

The information about the life cycle stages operational energy use or water use shall be referred to as information module B6 respectively B7.

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

- 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 etc., units as appropriate
- Further assumptions for scenario development, e.g. frequency and time period of use, number or occupants, units as appropriate.

STAGE C1 - 4 – END OF LIFE

The usage stage covers Deconstruction, demolition – C1, Transport – C2, Waste processing– C3, Disposal – C4

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

- Collection process related to deconstruction/demolition, specified by type;
  - kg collected separately
  - kg collected with mixed construction waste
- Recovery system related to waste processing, specified by type;
  - kg for re-use
  - kg for recycling
  - kg for energy recovery
- Disposal related to waste processing, specified by type;
  - kg product or material for final deposition
- Other significant assumptions for scenario development e.g., transportation, units as appropriate

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STAGE D – REUSE, RECYCLE OR RECOVERY

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

  In module D the net impacts are calculated as follows:

  - By adding all output flows of a secondary material or fuel and subtracting all input flows of this secondary material or fuel from each sub-module first (e.g. B1-B5, C1-C4, etc.), then from the modules (e.g. B, C), and finally from the total product system thus arriving at net output flows of secondary material or fuel from the product system;
  - By adding the impacts connected to the recycling or recovery processes from beyond the system boundary (after the end-of-waste state) up to the point of functional equivalence where the secondary material or energy substitutes primary production and subtracting the impacts resulting from the substituted production of the product or substituted generation of energy from primary sources;
  - By applying a justified value-correction factor to reflect the difference in functional equivalence where the output flow does not reach the functional equivalence of the substituting process.

In module D, substitution effects are calculated only for the resulting net output flow.

The amount of secondary material output, which is for all practical purposes able to replace one to one the input of secondary material as closed loop, is allocated to the product system under study and not to module D.

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5 CONTENT AND FORMAT OF EPD

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

As a general rule the EPD content:

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

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

5.1 EPD LANGUAGES

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

5.2 UNITS AND QUANTITIES

The following requirements apply for units and quantities:

- The International System of Units (SI units) shall be used, e.g., kilograms (kg), Joules (J) and metres (m). Reasonable multiples of SI units may be decided in the PCR to improve readability, e.g., grams (g) or megajoules (MJ). The following exceptions apply:
  - Resources used for energy input (primary energy) should be expressed as kilowatt-hours (kWh) or megajoules (MJ), including renewable energy sources, e.g., hydropower, wind power and geothermal power.
  - Water use should be expressed in cubic metres (m^3)
  - Temperature should be expressed in degrees Celsius (°C),
  - Time should be expressed in the units most practical, e.g., seconds, minutes, hours, days or years.
- Three significant figures[11] should be adopted for all results, The number of significant digits shall be appropriate and consistent.
- The thousand separator and decimal mark in the EPD shall follow one of the following styles (a number with six significant figures shown for illustration):
  - SI style (French version): 1 234,56
  - SI style (English version): 1 234.56

  In case of potential confusion or intended use of the EPD in markets where different symbols are used, the EPD shall state what symbols are used for thousand separator and decimal mark.
- Dates and times presented in the EPD should follow the format in ISO 8601. For years, the prescribed format is YYYY-MM-DD, e.g., 2017-03-26 for March 26th, 2017.
- The result tables shall:
  - Only contain values or the letters “INA” (Indicator Not Assessed). It is not possible to specify INA for mandatory indicators. INA shall only be used for voluntary parameters that are not quantified because no data is available.[12]
  - Contain no blank cells, hyphens, less than or greater than signs or letters (except “INA”).

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

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

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- Use the value 0 only for parameters that have been calculated to be zero.
- Footnotes shall be used to explain any limitation to the result value.

5.3 USE OF IMAGES IN EPD

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

5.4 EPD REPORTING FORMAT

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

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

The following information shall be included, when applicable:

- Information related to Sector EPDs (see Section 5.4.7)
- Differences versus previous versions (see Section 5.4.8)
- Executive summary in English (see Section 5.4.10)

5.4.1 COVER PAGE

The cover page shall include:

- Product name and image,
- Name and logotype of EPD owner,
- The text “Environmental Product Declaration” and/or “EPD”
- *Programme: The International EPD® System, www.environdec.com,*
- *Programme operator: EPD International AB*
- Logotype of the International EPD® System,
- EPD registration number as issued by the programme operator[13],
- *Date of publication (issue): 20XX-YY-ZZ,*
- *Date of revision: 20XX-YY-ZZ*, when applicable,
- *Date of validity; 20XX-YY-ZZ*
- A note that “*An EPD should provide current information, and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*.”

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

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- A statement of conformity with ISO 14025,

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following mandatory statement from ISO 14025: "*EPDs within the same product category but from different programmes may not be comparable*."
- A statement that the EPD owner has the sole ownership, liability and responsibility of the EPD
- Information about verification[14] and reference PCR in a table with the following format and contents:

Product category rules (PCR): *<name, registration number, version and UN CPC code(s)>*
PCR review was conducted by: *<name and organisation of the review chair, and information on how to contact the chair through the programme operator>*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☐ EPD verification
Third party verifier: *<name, organisation and signature of the third party verifier>* *In case of certification bodies:* Accredited by: *<name of the accreditation body and accreditation number, if applicable>.* *In case of individual verifiers:* Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☐ No

5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

- Address and contact information to EPD owner,
- Description of the organisation. This may include information on products- or management system-related certifications (e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates and EMAS-registrations) and other relevant work the organisation wants to communicate (e.g. SA 8000, supply-chain management and social responsibility),
- Name and location of production site,
- Product identification by name, and an unambiguous identification of the product by standards, concessions or other means,
- Identification of the product according to the UN CPC scheme system. Other relevant codes for product classification may also be included, e.g.
  - Common Procurement Vocabulary (CPV),
  - United Nations Standard Products and Services Code® (UNSPSC),

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

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- Classification of Products by Activity (NACE/CPA) or
- Australian and New Zealand Standard Industrial Classification (ANZSIC),

- Description of the product, its application/intended use and technical functions, e.g. expected service life time,
- Geographical scope of the EPD, i.e., for which geographical location(s) of use and end-of-life the product's performance has been calculated,
- Functional unit or declared unit,
- Reference service life (RSL), if applicable,
- Declaration of the year(s) covered by the data used for the LCA calculation and other relevant reference years,
- Reference to the main database(s) for generic data and LCA software used, if relevant,
- System diagram of the processes included in the LCA, divided into the life cycle stages,
- Description if the EPD system boundary is "cradle-to-gate", "cradle-to-gate with options" or "cradle-to-grave",
- Information on which life cycle stages are not considered (if any), with a justification of the omission,
- Relevant websites for more information or explanatory materials.

This section may also include:

- Name and contact information of organisation carrying out the underlying LCA study,
- Additional information about the underlying LCA-based information, such as assumptions, cut-off rules, data quality and allocation.

5.4.4 CONTENT DECLARATION

The content declaration shall have the form of a list of materials and chemical substances including information on their environmental and hazardous properties. The gross weight of material shall be declared in the EPD at a minimum of 99 % of one unit of product.

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[15] and includes the Candidate List of SVHC.

An optional detailed list of the product's substances, including CAS[16] 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 .

Table 5 An example of an illustrative detailed product content declaration, (example written in italic).

All materials/ components, A)	**Substances**	**Weight % B)**	**CAS number**	**Environ-mental class**	**Health class**
Structure	*Polyethylene*	*90%*			
Pigment	*Titanium dioxide* *Iron oxides fume*	*6 +/-3* *2*	*13463-67-7* *1309-37-1*	*no* *Data lacking*	*R 37* *Data lacking*
Preservative	*—C)*	*3*	*—*	*no*	*R 46*
Etc.					
…					

[15] http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

[16] The reporting could also be given with use of EINEC number.

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

a) Substance(s) do not need to be included if they may affect patent or company secrets.

b) Figures can alternative be given in e.g. g/kg.

c) The product content declaration shall report if the substance is confidential.

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). 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 building during its utilisation in the construction, and that the composition (i.e. the entire product) is 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 trade marks (see General Programme Instructions).

Only if the EPD® follows a cradle to grave approach, the composition of the products needed for the use phase (e.g. cleaning agents) of the prefabricated building shall be declared.

An optional detailed list of the product's substances, including CAS 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 6.

Table 6 An example of an illustrative detailed product content declaration, (example written in italic).

All materials/ components, A)	**Substances**	**Weight % B)**	**CAS number**	**Environ-mental class**	**Health class**
Surfactant	*___(C)*	*5-10%*			
Etc.					
…					
Other, non-allergenic, health-sensitive or environmentally-sensitive substances		*<1%*	—	*No*	*No*
Total		**100**			

a) Substance(s) do not need to be included if they may affect patent or company secrets.

b) Figures can alternative be given in e.g. g/kg.

The product content declaration shall report if the substance is confidential.

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5.4.4.1. Information about packaging

As packaging is strongly connected with the product, the producer shall provide information about packaging in the EPD, when applicable. Packaging may be classified as:

- Distribution Packaging: packaging designed to contain one or more articles or packages, or bulk materials, for the purposes of transport, handling and/or distribution (ISO 21067-1:2016, Par. 2.2.6)
- Consumer Packaging: packaging constituting, with its content, a sales unit for the final user or consumer at the point of retail (ISO 21067-1:2016, Par. 2.2.7).

Consumer packaging is generally the outcome of eco-design processes, or other activities, under direct control of the organisation. Many critical categories with strict legal requirements belong to consumer packaging category like food contact packaging and pharmaceutical packaging.

The type and function of packaging shall be reported in the EPD.

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

5.4.5 ENVIRONMENTAL PERFORMANCE

5.4.5.1. Environmental impacts

The indicators related to potential environmental impact listed in Table 1 shall be declared per functional unit or declared unit, and per life cycle module. A1, A2 and A3 may be aggregated. No other aggregation is allowed.

PARAMETER		UNIT	A1	A2	Etc.	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.				
	Biogenic	kg CO_2 eq.				
	Land use and land transformation	kg CO_2 eq.				
	TOTAL	kg CO_2 eq.				
Acidification potential (AP)		kg SO_2 eq.				
Eutrophication potential (EP)		kg PO_4^{3-} eq.				
Formation potential of tropospheric ozone (POCP)		kg C_2H_4 eq.				
Abiotic depletion potential – Elements		kg Sb eq.				
Abiotic depletion potential – Fossil fuels		MJ, net calorific value				
Ozone depletion		Kg CFC 11 eq.				

Table 1 Indicators describing potential environmental impacts[17].

Notes:

- The total shall not include module D
- The Global Warming Potential calculation shall comply with Annex A.9 of General Programme Instructions 3.0

[17] Please check www.environdec.com for the latest list of default impact categories, units and characterisation factors as they may have been updated compared to this table.

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- Abiotic depletion potential is calculated and displayed as two separate indicators. ADP-fossil fuels include all fossil resources, while ADP-elements include all non-renewable material resources.

5.4.5.2. Use of resources

The indicators for resource use based on the life cycle inventory (LCI) listed in Table 2 shall be declared per functional unit or declared unit, and per life cycle stage.

PARAMETER		UNIT	A1	A2	Etc.	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value				
	Used as raw materials	MJ, net calorific value				
	TOTAL	MJ, net calorific value				
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value				
	Used as raw materials	MJ, net calorific value				
	TOTAL	MJ, net calorific value				
Secondary material		kg				
Renewable secondary fuels		MJ, net calorific value				
Non-renewable secondary fuels		MJ, net calorific value				
Net use of fresh water		m^3				

Table 2 Indicators describing use of primary and secondary resources.

Notes:

- In order to identify the primary energy used as an energy carrier (and not used as raw materials), the parameter may be calculated as the difference between the total input of primary energy and the input of energy resources used as raw materials.
- Energy content of biomass used for feed or food purposes shall not be considered.
- The net use of fresh water does not constitute a “water footprint” as potential environmental impacts due to the water use in different geographical locations is not captured. For this indicator:
  - Evaporation, transpiration, product integration, release into different drainage basins or the sea, displacement of water from one water resource type to another water resource type within a drainage basin (e.g. from groundwater to surface water) is included.
  - In-stream water use is not included.
  - For water used in closed loop processes (such as cooling system) and in power generation only the net water consumption (such as reintegration of water losses) should be considered.
  - Seawater shall not be included
  - Tap water or treated water (e.g. from a water treatment plant), or wastewater that is not directly released in the environment (e.g. sent to a wastewater treatment plant) are not elementary water flows, but intermediate flows from a process within the technosphere.

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- Additional transparency in terms of geographical location, type of water resource (e.g. groundwater, surface water), water quality and temporal aspects may be included as additional information.

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5.4.5.3. Waste production and output flows

Waste generated along the whole life cycle production chains shall be treated following the technical specifications described in the Genera. When the amount of waste or the output flows is from the life cycle inventory (LCI) are declared, the indicators in Table 3 and Table 4 shall be reported per functional unit or declared unit, and per life cycle stage.

PARAMETER	UNIT	A1	A2	Etc.	TOTAL
Hazardous waste disposed	kg				
Non-hazardous waste disposed	kg				
Radioactive waste disposed	kg				

Table 3 Indicators describing waste production.

PARAMETER	UNIT	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Components for reuse	kg				
Material for recycling	kg				
Materials for energy recovery	kg				
Exported energy, electricity	MJ				
Exported energy, thermal	MJ				

Table 4 Indicators describing output flows.

Notes:

- The parameters are calculated on the gross amounts leaving the system boundary of the product system in the LCI. If e.g. there is no gross amount of “exported energy, electricity” leaving the system boundary, this indicator is set to zero,
- The parameter “Materials for energy recovery” does not include materials for waste incineration. Waste incineration is a method of waste processing, when R1<60% (European Guideline on R1 energy interpretation), and is allocated within the system boundary.
- In case there are never any flows of these types leaving the system boundary for a product category, the indicators may be removed by the PCR.

5.4.5.4. Other environmental indicators

The following indicators per declared unit shall be reported in the EPD, divided per life cycle stage:

- Toxic emissions.
- Components for re-use
- Materials for recycling
- Materials for energy recovery
- Exported energy [expressed as MJ per energy carrier]
- Hazardous waste (as defined by regional directives) disposed
- Non-hazardous waste disposed
- Radioactive waste disposed/stored

The reference PCR may add other environmental indicators to include for the product category from the inventory or impact assessment. Such indicators should be based on international standards or similar methodologies developed in a transparent procedure. Reference to the chosen indictors and methodologies shall be reported.

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5.4.6 ADDITIONAL INFORMATION

It is required to include the following information in the EPD® if the specific life cycle stage is included in the EPD:

- Module A4-5
  - See listed information requirements to include in the EPD® in section 4.3.3.
- Module B1-B5
  - See listed information requirements to include in the EPD® in section 4.3.3.
- Module C1-C4
  - See listed information requirements to include in the EPD® in section 4.3.3.
- Module D
  - 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,
- 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

5.4.7 INFORMATION RELATED TO SECTOR EPDS

For sector EPDs, the following information shall also be included:

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

5.4.8 DIFFERENCES VERSUS PREVIOUS VERSIONS

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

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- a description of the differences versus previously published versions, e.g. a description of the percentage change in results and the main reason for the change;
- a revision date on the cover page

5.4.9 REFERENCES

This section shall include a list of references, including the General Programme Instructions (including version number), standards and PCR (registration number, name and version).

5.4.10 EXECUTIVE SUMMARY IN ENGLISH

For EPDs published in another language than English, an executive summary in English shall be included.

The executive summary should contain relevant summarised information related to the programme, product, environmental performance, additional information, information related to sector EPDs, references and differences versus previous versions.

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6 GLOSSARY

CO_2	Carbon dioxide
CPC	Central product classification
EPD	Environmental product declaration
ISO	International Organization for Standardization
kg	kilogram
LCA	Life cycle assessment
PCR	Product Category Rules
SI	The International System of Units
SO_2	Sulphur dioxide
UN	United Nations

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7 REFERENCES

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

EPD International (2017) General Programme Instructions for the International EPD® System. Version 3.0, dated 2017-12-11. www.environdec.com

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

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

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

ISO (2006b), ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework

ISO (2006c), ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines

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

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

ISO (2017), ISO 21930:2017, Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services

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8 VERSION HISTORY OF PCR

VERSION 1.0, 2013-01-24

Original version.

VERSION 1.1, 2014-02-10

- Updated to comply with the latest General Programme Instructions (Version 2.01)
  - General introduction updated to latest version
  - Updated text of the possibility to include similar products in the same EPD®
  - Validity of the EPD® (Section 11)
- Added link to UN CPC website
- Formatted Section 10 to comply for consistency with the latest template
- Minor editorial changes

VERSION 1.2, 2017-12-18

Validity extended with 6 months based on Section 5.5.2.1 in the General Programme Instructions version 3. The extension is done due to an urgent market need, and to allow the PCR to be aligned with the latest programme instructions.

VERSION 2.0, 2018-07-26

- Compliance with to the General Programme Instructions, Version 3.0.
- Major editorial changes and use of PCR template by the Guidance for PCR development

VERSION 2.01, 2019-09-06

- Clarified terms of use
- Editorial changes

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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 ηh (%)**	**Efficiency, electricity ηe (%)**
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 %

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