EPD促进中心

PCR

EPDCN-PCR-202204

PCR FOR CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES TO EN 15804

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Participating parties:

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Public feedbacks and update records of the PCR

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Catalog

1. INTRODUCTION 2
1.1 GENERAL INFORMATION 2
1.2 ADMINISTRATIVE INFORMATION 4
1.3 PCR REVIEWS 4
2. SCOPE 5
2.1 TECHNICAL SCOPE 5
2.2 GEOGRAPHICAL SCOPE 5
2.3 EPD VALIDITY 5
3. TERMS, DEFINITIONS, AND ABBREVIATIONS 5
3.1 TERMS AND DEFINITIONS 5
3.2 ABBREVIATIONS 6
4. RODUCT CATEGORY RULES AND METHODOLOGY FOR LCA 7
4.1 GOAL AND SCOPE 7
4.2 FUNCTIONAL UNIT (FU) / DECLARED UNIT (DU) 7
4.3 REFERENCE SERVICE LIFE (RSL) 8
4.4 SYSTEM BOUNDARY AND LIFE CYCLE STAGES 9
4.5 CUT-OFF RULES 12
4.6 ALLOCATION RULES 12
4.7 DATA QUALITY REQUIREMENTS 14
5. IMPACT CATEGORIES AND IMPACT ASSESSMENT 17
5.1 ENVIRONMENTAL IMPACTS 17
5.2 ADDITIONAL ENVIRONMENTAL IMPACT CATEGORY 18
5.3 USE OF RESOURCES 18
5.4 WASTE PRODUCTION AND OUTFLOWS 19
5.5 BIOGENIC CARBON CONTENT 20
5.5 ADDITIONAL ENVIRONMENTAL INFORMATION 20
6. CONTENT OF EPD BASED ON THIS PCR 20
6.1 PRINCIPLES OF INCLUDING MULTIPLE PRODUCTS IN THE SAME EPD 20
6.2 MANDATORY INFORMATION AND FORMAT OF THE EPD 20
6.3 GENERAL INFORMATION 21
6.4 LCIA INFORMATION 22
6.5 ABOUT CARBON FOOTPRINT DECLARATION 22
6.6 SUPPLEMENTARY DECLARATION ON PRODUCT CARBON REDUCTION (Optional) 23
7. REFERENCES 25

1. INTRODUCTION

1.1 GENERAL INFORMATION

EN-PCR-202204: PCR for construction products and construction services to EN 15804 is the main PCR for constructions products and construction services serves as the implementation of the European standard EN 15804:2012+A2:2019 Sustainability of construction works — Environmental product declarations – Core rules for the product category of construction products. It is a general product category rules for construction products and construction services according to ISO14025 and EN15804. This PCR was developed in accordance with the requirements of the EPD China Programme Technical Committee, General Programme Instructions (GPI) and relevant international standards. EPD China Programme Operator is an EPD project operation organization based on ISO 14025: Environmental labels and declarations – Type III environmental declarations – Principles and procedures. The EPD Technical Committee is responsible for developing the GPI for EPD China Programme (including CFP), developing and implementing PCR standards, and supervising enterprises and relevant institutions to make EPD and/or CFP declarations in accordance with GPI and PCR requirements, as well as registering and publishing relevant compliant EPD and/or CFP reports.

The aim of this PCR is to provide specific rules, requirements, and guidelines for enterprises to declare the environmental impact of construction products in the same product category when performing LCA and EPD. This version PCR is the final version and has been publicly discussed and verified by representatives of the EPD China Programme Technical Committee.

This PCR is valid for 5 years from the date of approval. The EPD development of corresponding products within the validity period of PCR must comply with the requirements of this PCR. For those who discover PCR errors or issues within the validity period of PCR, they can directly contact the EPD China Secretariat (email: secretary@epdchina.cn) to propose PCR modification opinions and suggestions, which will be reviewed by the EPD Promotion Center Committee and updated and reissued as necessary.

This PCR will be invalid in the following situations:

- An updated version is issued on the EPD China website;
- This PCR is not officially available on the EPD China website;

This PCR was developed based on a series of international standards and literature to ensure that different LCA practitioners produce consistent results when developing EPD or carbon footprint (CFP) reports.

Table 1: References and standards

Standards and references	Description
GB/T51366-2019	Standard for building carbon emission calculation
EN 15804:2012+A1:2013 EN 15804:2012+A2:2019	Sustainability of construction works — Environmental product declarations – Core rules for the product category of construction products
EPD China GPI v1.0	EPD China Programme General Programme Instructions v1.0
ISO14040:2006	Environmental management — Life cycle assessment — Principles and framework
ISO 14044:2006/Amd2:2020	Environmental management — Life cycle assessment — Requirements and guidelines — Amendment 2
ISO14020:2006	Environmental labels and declarations – General principles
ISO 14025:2006	Environmental labels and declarations – Type III environmental declarations – Principles and procedures
ISO 21930:2017	Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services
ISO 14067:2018	Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification

Version history of this PCR

First draft version	2022/07/25
Revised version	2023/05/13

1.2 ADMINISTRATIVE INFORMATION

Table 2: Administrative information

PCR Name	PCR for Construction Products and construction services to EN 15804
Registration Number	EPDEN-PCR-202204
Version Number	V2.0
Programme Operator	
Programme Operator Information	EPD China Programme Website：www.epdchina.cn E-mail：secretary@epdchina.cn
Participation Organizations	Ecovane Environmental Co., Ltd. TÜV SÜD Certification and Testing (China) Co., Ltd.
Date of publication:	2022/07/25
Valid until:	2027/07/25
PCR update plan	Once a PCR is developed and published, it will become effective and used to carry out environmental impact assessment statements for products and services, including carbon footprint statements. In order to ensure the cycle stability of the statement, the drafter of the PCR needs to contact the Secretariat to apply for renewal within 3-6 months before the expiration of the PCR.
Conformity	All EPDs based on this PCR are compliant with EN 15804:2012+A2:2019 General Programme Instructions for the EPD China V1.0 EPD China Technical Committee GPI General Template, Release Date November 30, 2021
PCR language(s)	The PCR will be developed and published in Chinese and in English. For related links, please refer to www.epdchina.cn

1.3 PCR REVIEWS

Table 3: PCR reviews

PCR review panel	The Technical Committee of the EPD China System. A full list of members is available at www.EPDChina.cn. The review panel may be contacted via secretary@epdchina.cn

	*Members of the Technical Committee were requested to state any potential conflict of interest with the EPD China Secretariat, and if there were conflicts of interest they were excused from the review.
Moderator of the PCR review panel	Bill Kung bill4@1mi1.cn
Review dates	May 26, 2022

2. SCOPE

2.1 TECHNICAL SCOPE

The product groups and/or services covered by this PCR include:

- construction product: item manufactured or processed for incorporation in construction works
- construction service: activity that supports the construction process or subsequent maintenance

2.2 GEOGRAPHICAL SCOPE

Global.

2.3 EPD VALIDITY

An EPD based on this PCR is valid from its registration and publication at www.EPDChina.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 EPD China.

The EPD based on this PCR shall be reviewed by EPD owners at least once a year after initial registration, and updated and revalidated if the following circumstances occur:

- Any environmental impact indicators of the product changes by 10%;
- Errors are found in the EPD declaration information, or
- Changes in product information, content claims or additional environmental information declared by the EPD.

3. TERMS, DEFINITIONS, AND ABBREVIATIONS

3.1 TERMS AND DEFINITIONS

Environmental Product Declaration (EPD)

Environmental Product Declaration provide quantified environmental data using pre-determined parameters and, where relevant, additional environmental information.

[EN 15804:2012]

Life cycle assessment (LCA)

Calculate and evaluate the inputs, outputs and potential environmental impacts of a product throughout its life cycle stages.

[ISO 14044: 2006]

Declared unit

Quantity of a construction product for use as a reference unit in an EPD for an environmental declaration based on one or more information modules.

[EN 15804:2012]

Functional unit

Quantified performance of a product system for use as a reference unit.

[EN 15804:2012]

Construction product

Item manufactured or processed for incorporation in construction works.

[EN 15804:2012]

Construction service

Activity that supports the construction process or subsequent maintenance.

[EN 15804:2012]

3.2 ABBREVIATIONS

Abbreviations	Names
EPD	Environmental product declaration
DU	Declared unit
FU	Functional unit
PCR	Product category rules
LCA	Life cycle assessment
LCI	Life cycle inventory
LCIA	Life cycle impact assessment
RSL	Reference service life
ESL	Estimated service life

4. RODUCT CATEGORY RULES AND METHODOLOGY FOR LCA

4.1 GOAL AND SCOPE

The objectives and significance of this PCR are as follows:

1. To support construction industry as well as downstream sectors such as construction and energy sectors to conduct EPD and/or CFP evaluation, ensure a consistent quality of the LCA results for construction products and construction services, including carbon footprint (CFP) and other environmental impact factors;
2. To serve as a basis for the construction industry to set science-based targets in reducing the environmental impact of construction products and construction services;
3. To enable the establishment of China's construction industry life cycle database through the PCR-based evaluation and the verification supervised by EPD China;
4. To ensure scientific product comparison and reduction declaration for the same kind of product produced with different periods or different technology. Whereas the comparison between different products by the different companies is not recommended, unless the requirements below can be met and clearly disclaimed:
    a. The products being compared have the same technological and functional similarities;
    b. All the requirements specified in this PCR are followed;
    c. All the assumptions and uncertainties are analysed and the variations are within 5%;

Disclaimers shall be made when comparing: it must be noted that comparisons between EPDs using this PCR can only be made in products with significantly similar technology and functionality, and ensure that the above terms are fully met.

4.2 FUNCTIONAL UNIT (FU) / DECLARED UNIT (DU)

The functional unit defines the way in which the identified functions or performance characteristics of the product are quantified. The primary purpose of the functional unit in LCA studies according to ISO 14044 is to provide a reference by which material flows, LCA results and any other information are normalized to produce data expressed on a common basis. This allows comparison with other product systems which have been assessed to fulfil the same functional unit.

The functional unit of a construction product shall specify:

—the application of a product or product groups covered by the functional unit;

—the reference quantity for the functional unit when integrated in the construction works;

—the quantified key properties, when integrated into a building, for the functional use, quantified performance characteristics or minimum performance of the construction product, taking into account the functional equivalent of the building;

—the minimum performance characteristics under defined conditions shall be fulfilled over the defined time period of the functional unit;

a specified period of time under reference in-use conditions considering the RSL. If the functional unit uses a different time period than the RSL, the RSL shall be given as technical information in the EPD

The declared unit shall be applied if a functional unit cannot be defined, e.g. since a function of the product cannot unequivocally be described because it can be used in many different ways in the context of construction works, or when the precise function of the product or scenarios at the building level is not stated or is unknown. The declared unit may also be used as an alternative to the functional unit.

An EPD based on a declared unit may cover all modules of the life cycle (i.e. cradle to grave) and module D. The declared unit shall relate to the typical applications of products and their RSL. The declared unit in the EPD shall be declared applying one of the unit types listed below. A different unit may be declared for reasons that shall be explained. In such case, information shall be provided on how to convert this unit to one or more of the required unit types.

—An item (piece), an assemblage of items, e.g. 1 brick, 1 window (dimensions shall be specified);

—Mass (kg), e.g. 1 kg of cement;

—Length (m), e.g. 1 m of pipe, 1 m of a beam (dimensions shall be specified);

—Area (m^2), e.g. 1 m^2 of wall elements, 1 m^2 of roof elements (dimensions shall be specified);

—Volume (m^3), e.g. 1 m^3 of timber, 1 m3 of ready-mixed concrete (concrete grade is suggested to be included).

4.3 REFERENCE SERVICE LIFE (RSL)

RSL information to be declared in an EPD covering the use stage shall be provided by the manufacturer. The RSL shall be specified under defined reference in-use conditions. The RSL shall refer to the

declared technical and functional performance of the product within construction works. The RSL shall be established in accordance with any specific rules given in European product standards or, if not available, a c-PCR, and shall consider ISO 15686-1, -2, -7 and -8. Where European product standards or a c-PCR provide guidance on deriving the RSL, such guidance shall have priority.

Information on the product's RSL requires specification of compatible scenarios for the product stage, construction process stage and use stage. RSL is dependent on the properties of the product and reference in-use conditions. The RSL shall be declared together with the reference in-use conditions and it shall be stated that the RSL applies for the reference in-use conditions only.

The reference in-use conditions for achieving the declared technical and functional performance and the declared RSL shall include the following, where relevant:

—declared product properties (at the gate) and those of any finishes, etc.;

—design application parameters (if instructed by the manufacturer), including references to any appropriate requirements and application codes;

—an assumed quality of work;

—external environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature;

—internal environment (for indoor applications), e.g. temperature, moisture, chemical exposure;

—usage conditions, e.g. frequency of use, mechanical exposure;

—maintenance, e.g. required frequency, type and quality and replacement of replaceable components. The RSL shall be justified and verifiable.

4.4 SYSTEM BOUNDARY AND LIFE CYCLE STAGES

4.4.1 LIFE CYCLE STAGES

The system boundary defines the unit processes that should be considered in the production system when conducting an LCA analysis. To better declare product environmental impact results, this PCR defines different life cycle stages. The life cycle of a product can be divided into the following stages according to EN15804:

- Product stage (A1-A3)

- Distribution stage (A4)
- Construction/Installation stage (A5)
- Use stage (B1-B7)
- End-of-life stage (C1-C4)
- Recovery and Reuse Benefit (D)

Table 4: life cycle stages

EN15804	Life cycle stages
Product stage (A1-A3)	A1 Raw material extraction and processing, processing of secondary material input (e.g. recycling processes)
	A2 Transport to the manufacturer
	A3 Manufacturing
Construction process stage(A1-A5)	A4 Transport to the building site
	A5 Installation into the building
Use stage related to the building fabric (B1-B5)	B1 Use or application of the installed product
	B2 Maintenance
	B3 Repair
	B4 Replacement
	B5 Refurbishment
Use stage related to the operation of the building (B6-B7)	B6 Operational energy use
	B7 Operational water use
End-of-life stage (C1-C4)	C1 De-construction, demolition
	C2 Transport to waste processing
	C3 Waste processing for reuse, recovery and/or recycling
	C4 Disposal
D Benefits and loads beyond the system boundary	D Reuse, recovery and/or recycling potentials, expressed as net impacts and benefits

In the EPD/CFP report, it is necessary to disclose the life cycle stages considered and corresponding life cycle results in a summary table corresponding to this PCR. Any undeclared life cycle stage must be marked with the abbreviation "MND" (Module Not Declared).

The environmental information of an EPD covering all life cycle stages and module D (cradle to grave and module D) shall be subdivided into the modules A1–A3, A4–A5, B1–B7, C1–C4 and module D.

A1-A3, Product stage, information modules

The product stage includes:

- A1, raw material extraction and processing, processing of secondary material input (e.g. recycling processes),
- A2, transport to the manufacturer,
- A3, manufacturing

It includes provision of all materials, products and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage.

Module A1, A2 and A3 may be declared as one aggregated module A1-3.

A4-A5, Construction process stage, information modules

The construction process stage includes:

- A4, transport to the building site
- A5, installation into the building

It includes provision of all materials, products and energy, as well as waste processing up to the end-of-waste state or disposal of final residues during the construction process stage. These information modules also include all impacts and aspects related to any losses during this construction process stage (i.e. production, transport, and waste processing and disposal of the lost products and materials).

B1-B5, Use stage, information modules related to the building fabric

The use stage, related to the building fabric includes:

- B1, use or application of the installed product
- B2, maintenance
- B3, repair
- B4, replacement
- B5, refurbishment

It includes provision and transport of all materials, products and related energy and water use, as well as waste processing up to the end-of-waste state or disposal of final residues during this part of the use stage. These information modules also include all impacts and aspects related to the losses during this part of the use stage (i.e. production, transport, and waste processing and disposal of the lost products and materials).

B6-B7, Use stage, information modules related to the operation of the building

The use stage related to the operation of the building includes:

- B6, operational energy use (e.g. operation of heating system and other building related installed services)
- B7, operational water use

These information modules include provision and transport of all materials, products, as well as energy

and water provisions, waste processing up to the end-of-waste state or disposal of final residues during this part of the use stage.

C1-C4, End-of-life stage, information modules

The end-of-life stage includes:

- C1, de-construction, demolition:
- C2, transport to waste processing;
- C3, waste processing for reuse, recovery and/or recycling;
- C4, disposal;

These information modules include provision and all transport, provision of all materials, products and related energy and water use.

D, Benefits and loads beyond the system boundary, information module

Module D includes:

D, reuse, recovery and/or recycling potentials, expressed as net impacts and benefits.

4.5 CUT-OFF RULES

The default cut-off value for this PCR is 1%. In other words, the included inventory data (excluding inventory data that explicitly exceeds the system boundaries described in Section 4.3) should collectively produce at least 99% of the environmental impact category results. In addition, 99% of the product mass content and 99% of the energy usage during the product life cycle should be stated. However, discarding data should be avoided and all available inventory data should be used.

The list of discarded data must be recorded in the LCA report, and EPD developers should provide the auditor with supporting information that the auditor deems necessary for conducting a review of the list of discarded data.

4.6 ALLOCATION RULES

The following procedures may apply the multifunctional products and processes produce more than the intended product:

4.6.1 GENERAL ALLOCATION RULES

1. The allocation shall be avoided, if possible, by dividing the unit process into two or more sub-processes and collecting the inputs and outputs 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. Where physical relationships alone cannot be established or used as the basis for allocation (or it is too time-consuming), the inputs shall be divided between the products and the functions to reflect the other relations. For example, the input and output data can be divided among co-products in proportion to the economic value of the products.

4.6.2ALLOCATION RULES OF CO-PRODUCT

To avoid the allocation by dividing the process to be allocated into sub-processes and collecting

the inventory data for each sub-process.

If a process can be sub-divided but respective data are not available, the inputs and outputs of the system should be partitioned among different products or functions, which reflects the underlying physical relationships between them; i.e. they shall reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system;

In the case of the processes cannot be sub-divided, allocation shall respect the main purpose of the processes studied, allocating all relevant products and functions appropriately. The purpose of a plant and therefore of the related processes is generally declared in its permit and should be considered. Processes generating a very low contribution to the overall revenue may be neglected. Joint co-product allocation shall be allocated as follows:

—Allocation shall base on physical properties (e.g. mass, volume) if the difference in revenue from the co-products is low;

—In all other cases allocation shall be based on economic values;

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

4.6.3 ALLOCATION RULES OF MULTIFUNCTIONAL PRODUCTS

In case the product has multifunction, the environmental impacts shall be allocated to its main purpose and function, while other functions shall be neglected.。

4.6.4 ALLOCATION RULE FOR REUSE, RECYCLING, AND RECOVERY PROCESS

The final waste treatment process (landfill and incineration), where waste generation is related to the product life cycle, must be included in the study. It is necessary to conduct scenario analysis based on national or regional regulations when it is impossible to conduct due to a lack of information.

In the process of reuse, recycling, and recycling, a truncated allocation method should be adopted, which only considers the impact of waste transportation to the treatment plant. When transportation distance is not available, a reasonable estimate should be made. If the loads and benefits of recycling and recovery processes are quantified, the environmental impacts should be reported separately (report in stage D).

4.7 DATA QUALITY REQUIREMENTS

An LCA calculation and EPD generally requires two different kinds of data:

- Process data: data related to the inputs and outputs inventory of the considered system (such as materials or energy flows that enter the production system). These data usually come from the company that is performing the LCA calculation.
- Impact data: data related to the environmental impacts of the material or energy flows that enter the production system. These data usually come from databases.

Process data is divided into specific data and general data, which are defined as follows:

- 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 actually delivered services, transportation that takes place based on actual fuel consumption, and related emissions, etc.;
- General data, divided into:
  - Selected generic data – data from commonly used data sources (e.g., commercial and free databases) that meet specified data quality characteristics, including accuracy, completeness;
  - Proxy Generic Data - Data from commonly used data sources (such as commercial and free databases) that do not all meet all data quality characteristics of Selected Generic Data.

4.7.1 GENERAL DATA REQUIREMENTS

The selection of data shall follow the requirements according to EN ISO 14044: 2006.

As a general rule, specific data shall always be used as the first choice. If specific data are not available, generic data shall be used, generic data shall be time-, geographical-, and technological-representative. If generic data are used for LCA calculation, a data quality assessment should be documented.

Particularly, the following specific requirements shall apply:

- Data shall be recent, data used for LCA calculation should be within the time boundary of the products or systems assessment period, for different products and systems, more specific time range shall be identified in specific PCR;
- Manufacturing data shall be state-of-the-art, the inputs and outputs shall represent the physical reality for the reference product or system;
- In case the reference product or system has a different manufacturing site along its life cycle stages, data shall be based on its geographic coverage (e.g. different electricity mix in a different region);

If selected generic data that meets the above data quality requirements are not available, proxy (generic) data can then be used. The environmental impact related to proxy (generic) data shall not exceed 10% of the overall environmental impact of the product system.

Table 5: Optional database for general data.

Type	Scope	Details	Database
Reinforcing bar	Asia/ Global	Steel rebar/Asia Steel rebar/GLO	Ecoinvent 3.7 (see latest version), Industrial data 2.0
Concrete	Global average execpt Switzerland	Concrete, normal {RoW}| market for | Alloc Def, U	1mi1-CN, Ecoinvent 3.7 (see latest version),
Poduct stage and eletricity usage	China	*Consider the distribution of electricity grid in China	1mi1-CN, Ecoinvent 3.7 (see latest version),

4.7.2PRODUCTION STAGE DATA REQUIREMENTS

For data used in the production stage, such as raw material use, energy consumption, waste generation, etc., the data should be based on 1-year average specific data (extreme 6-month data, data shorter than 6 months, should be justified). If the data for the EPD application is less than 1 year old, it should be updated when the 1-year average data is available. Specific data should be used at this stage.

If the product is in the development stage, has not yet entered the mass production stage, or the production inventory has not reached 1 year, the design EPD can be developed at this stage, and the validity period of the design EPD is 1 year; when the specific data of 1 year can be obtained, the EPD

should be renewed within 6 months, otherwise the EPD will be cancelled in EPD China. Design EPDs can only be used for communication on specific occasions (such as project bidding), not for comparison.

4.7.3 DISTRIBUTION STAGE DATA REQUIREMENTS

For all transportation that occurs at different stages of the life cycle, specific data that actually occurs should be used. If not, it is recommended to use reasonably estimated data. The data type and estimation method should be recorded in the LCA report, and sensitivity analysis of assumptions is required to prove the rationality of the hypothesis.

4.7.4 CONSTRUCTION/INSTALLATION STAGE DATA REQUIREMENTS

If the materials and energy consumption of this stage is not available, reasonable estimation shall be made based on recent research articles or related international or regional standard. The methods for such kind of estimation should be reported, and sensitivity analysis shall be conducted

4.7.5 USE STAGE DATA REQUIREMENTS

If some of the unit process data is unable to quantify or the system is still in use, a resealable estimation can be made based on research articles or calculations based on the basic data (e.g. past couple years data). If this applies, the related calculation procedures shall be reported in the LCA report, sensitivity analysis shall be conducted to shorten the gap.

4.7.6 ELECTRICITY MIX

For electricity modeling in all unit processes, specific electricity mix should be prioritized. If EPD/CFP owners have purchased and used electricity from specific suppliers (local wind/solar energy suppliers), it is allowed to simulate this power combination in LCA (distribution and conversion losses should be considered) and provide relevant contracts or proof documents provided by local power authorities for verification. The power combination must be specified in EPD and CFP.

4.7.6 TRANSPORTATION

Specific data shall be collected in the transportation stages while the generic data can be applied if there is difficulty to collect the raw data.

4.7.7 END-OF-LIFE DATA REQUIREMENTS

- Default scenarios for C2: transport to waste disposal site should be made (e.g. 100 km) if no specific data is available and sensitivity analysis should be conducted on the assumptions;

- More than one scenario for waste treatment and disposal should be included if there are several relevant common practices, but the most conservative scenario shall always be included.

5.IMPACT CATEGORIES AND IMPACT ASSESSMENT

5.1 ENVIRONMENTAL IMPACTS

This PCR provides environmental impact categories, characteristic factor indicators, and evaluation models. The recommended impact indicators from EN 15804:2012+A2:2019 are listed below, and these impact categories shall be included and disclosed when developing an EPD.

Table 6: Environmental impact categories

Impact category	LCIA method / model	Indicator	Unit
Climate change - Total[a]	Baseline model of 100 years of the IPCC based on IPCC 2013 （IPCC 100 year baseline model based on IPCC 2013）	Global Warming Potential total (GWP-total)	kg CO_2 eq.
Climate change - fossil		Global Warming Potential total (GWP fossil)	kg CO_2 eq.
Climate change-biogenic		Global Warming Potential total (GWP biogenic)	kg CO_2 eq.
Climate change - land use and change in land use [b]		Global Warming Potential total (GWP luluc)	kg CO_2 eq.
Ozone Depletion	Steady-state ODPs, WMO 2014	Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.
Acidification	Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008	Acidification potential, Accumulated	mol H^+ eq.
Eutrophication	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe	Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)	kg P eq.
Photochemical ozone formation	LOTOS-UROS, Van Zelm et al., 2008, as applied in ReCiPe	Exceedance (AP)	kg NMVOC eq.
Consumption of abiotic resources - minerals and materials [c d]	CML 2002, Guinée et al., 2002, and van Oers et al. 2002.		kg Sb eq.

Consumption of abiotic resources - fossil resources [c]	CML 2002, Guinée et al., 2002, and van Oers et al. 2002.	Formation potential of tropospheric ozone (POCP)	MJ, Calculated with low calorific value
Water consumption	Available WAter REmaining (AWARE) Boulay et al., 2016	Abiotic Depletion for non-fossil resources potential (ADP-minerals & metals)	m^3 eq.

Notes:

a The total global warming potential (GWP-total) is the sum of

— GWP-fossil

— GWP-biogenic

— GWP-luluc

b It is permitted to omit GWP-luluc as separate information if its contribution is < 5 % of GWP-total over the declared modules excluding module D. However, this should not be omitted in the carbon footprint assessment (CFP) reports.

c The abiotic depletion potential is calculated and declared in two different indicators:

— ADP-minerals&metals include all non-renewable, abiotic material resources (i.e. excepting fossil resources);

— ADP-fossil includes all fossil resources and includes uranium.

d Ultimate reserve model of the ADP-minerals&metals model

5.2 ADDITIONAL ENVIRONMENTAL IMPACT CATEGORY

Additional environmental impact category is optional to be included if not listing in section 5.1 while its method and models shall be well justified.

Table 7: Additional environmental impact category

Impact category	LCIA method	Indicator	Unit

5.3 USE OF RESOURCES

Besides the environmental impact indicators, indicators describing resource use shall also be provided in PCR. Similar to environmental impact indicators, deviations are allowed for less unnecessary or

additional indicators, and this should be verified during the PCR verification process. Below demonstrates the use of resources categories, taken from EN 15804: 2012+A2: 2019.

Table 8: Primary and secondary resource consumption

Parameters	**Unit of measurement**
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials, PENRE	MJ, net calorific value
Use of non-renewable primary energy resources used as raw materials, PENRM	MJ, net calorific value
Use of renewable primary energy excluding renewable primary energy resources used as raw materials, PERE	MJ, net calorific value
Use of renewable primary energy resources used as raw materials, PERM	MJ, net calorific value
Total use of renewable primary energy resources, PERT	MJ, net calorific value
Total use of non-renewable primary energy resources, PENRT	MJ, net calorific value
Net use of fresh water (FW)	m^3
Use of secondary raw materials (SM)	kg
Use of renewable secondary fuels (RSF)	MJ, net calorific value
Use of non-renewable secondary fuels (NRSF)	MJ, net calorific value
Note: In order to identify the input part of renewable/non-renewable primary energy used as an energy carrier and not used as raw materials, the indicator "use of renewable/non-renewable primary energy excluding renewable/non-renewable primary energy resources used as raw materials" is considered and can be calculated as the difference between the total input of primary energy and the input of energy resources used as raw materials.	

5.4 WASTE PRODUCTION AND OUTFLOWS

Table 9: Waste production

Impact category	Unit of measurement
Hazardous waste disposal (HWD)	kg
Non-hazardous waste disposed (NHWD)	kg
Radioactive waste disposed (RWD)	kg
Materials for energy recovery (MER)	kg
Material for recycling (MFR)	kg
Components for reuse (CRU)	kg
Exported thermal energy (ETE)	MJ, net calorific value
Exported electricity energy (EEE)	MJ, net calorific value

Notes: Disposal of characteristic hazardous waste should follow the applicable laws of the host country (China).

5.5 BIOGENIC CARBON CONTENT

Information on biogenic carbon content which shall be included in the EPD.

Table 10: Biogenic carbon content

Biogenic carbon content	**Unit**
Biogenic carbon content in product	kg C
Biogenic carbon content in accompanying packaging	kg C

NOTE: If the mass of biogenic carbon containing materials in the product is less than 5 % of the mass of the product, the declaration of biogenic carbon content may be omitted.
If the mass of biogenic carbon containing materials in the packaging is less than 5 % of the total mass of the packaging, the declaration of the biogenic carbon content of the packaging may be omitted.

5.5 ADDITIONAL ENVIRONMENTAL INFORMATION

Additional information related to environmental issues, other than the environmental information derived from LCA shall be included. Detailed information can be found at sections 5.4, 7.3 and 7.4 in EN 15804, and section 7.2.3 in ISO14025.

6.CONTENT OF EPD BASED ON THIS PCR

6.1 PRINCIPLES OF INCLUDING MULTIPLE PRODUCTS IN THE SAME EPD

If the difference in declared environmental performance indicators between any included products does not exceed 10%, the products can be included in the same EPD.

6.2 MANDATORY INFORMATION AND FORMAT OF THE EPD

EPDs based on this PCR shall contain the information described in the following sections. 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.EPDChina.cn.

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

6.3 GENERAL INFORMATION

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, judgments, or direct comparison with other products. A reasonable number of EPDs should be produced for the target audience and purpose.

6.3.1 PROGRAM INFORMATION

Table 11: Programmme information

Program operator:	EPD China www.EPDChina.cn
Product category rules (PCR):	Construction products and construction services
PCR review was conducted by:	EPD China Technical Committee
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☑ EPD Process, data and report review ☐ EPD report review only	
Third-party verifier: EPD China Technical Committee	**Name of the verifier:** The list can be found on the official website of the EPD China
Approved by:	EPD China
Are third-party verifiers involved in the annual review of data and results during the EPD validity period: ☐ Yes ☐ No	

6.3.2 INFORMATION ABOUT THE COMPANY OR MANUFACTURER

The following information should be declared by the manufacturer:

- The location of main manufacturing plant(s) of the final assembly;
- Environmental policy of the manufacturer;
- Relevant environmental certifications e.g. EN ISO 9001, EN ISO 14001, OSHAS 18001.

6.3.3 DESCRIPTION OF THE PRODUCTS OR SYSTEM ANALYZED

- Basic information of the products and their applications
- Constitutive materials and substances
- The harmful substances contained in the product should refer to relevant international standards and regulations such as (EU) 1907/2006 (REACH) and (EU) 1272/2008
- Manufacturing processes
- Product manufacturing process diagram and related introduction

6.4 LCIA INFORMATION

a) Functional/Declared unit

b) System boundary

c) Excluded processes

d) Assumptions and limitations

e) Allocations

f) Cut-off rules

g) Electricity mix

h) Environmental Impacts

6.5 ABOUT CARBON FOOTPRINT DECLARATION

Companies can use the PCR to declare its product carbon footprint. When preparing the CFP report, the requirements and specifications of PCR shall also be followed. Additionally, following statements shall be justified in the CFP report:

1. Purchased carbon credits and/or sinks: the carbon footprint reductions caused by purchased carbon credits and/or carbon sinks (including CCER, carbon allowances, etc.) are not directly link to the activities taken place within the product system boundary, it should be reported separately in chapter 6.7 Additional information;

2. Absoluteness of CFP results: the CFP results shall declare the true carbon footprint results related to the entire product system boundary. The product shall not be declared using definitions such as "low carbon" or "carbon neutral" though the product carbon footprint result is low or net-zero caused by other offsets;

3. Sensitivity analysis: For any input with uncertainty (including data quality, unit processes in the LCA model, etc.) that accounts for more than 10% of the total result, sensitivity analysis should be conducted to demonstrate its impact on the final result;

4. Carbon footprint and carbon reduction: CFP should not be replaced by carbon reduction declarations. If manufacturers have taken carbon reduction measures (such as ecological design, green supply chain, or circular economy) to reduce the carbon footprint of their products, they should also make a separate statement in the CFP report.

6.6 SUPPLEMENTARY DECLARATION ON PRODUCT CARBON REDUCTION (OPTIONAL)

In case a product carbon footprint reduction declaration is required by stakeholders, a benchmark product CFP report shall be conducted first. The product carbon footprint reduction declaration shall be conducted separately and adopt following specifications:

1. Object of declaration: The object of emission reduction declaration must be the same type of products or services that meet the same function;
2. Evaluation criteria: The evaluation of benchmark products and emission reduction products needs to comply with the same PCR rules, and the emission reductions are calculated on the basis of the same evaluation background database (R1, R1 = carbon footprint of the benchmark product minus the carbon footprint of the new product); if the background database for the same product type has changed, the emission reduction effect due to the background database upgrade needs to be listed separately (R2, R2 = the carbon footprint of the new product based on the new database minus the carbon footprint of the new product based on the original database), and the final emission reduction effect is equal to the direct emission reduction R1 plus the indirect emission reduction R2 of the database upgrade (R=R1+R2);
3. Evaluation basis: For the optimization and improvement measures such as the energy usage rate, material type, production process change, etc. of the emission-reduction products, it is necessary to submit clear evidence to prove the relevance of the changes;
4. Cannot be seen as a basis for emission reduction: if it has nothing to do with the company's implementation of cleaner production, ecological design, green supply chain and economic structure model optimization (such as circular economy, service economy, etc.) The behavior of purchasing carbon sinks and other external carbon emission reduction activities to offset the company's own carbon emissions by its own cannot be used as the basis for carbon emission reduction;
5. Evaluation of system carbon emission reduction: Enterprises can calculate the carbon emission reduction at the system level outside the organization due to the improvement of products in the organization. To do so, it is necessary to optimize the functions of the system outside the organization (such as the optimization of the engine product contributes to the emission reduction at the system-level of transportation, etc.) to conduct a carbon footprint standard assessment and

then use the same rules as above to evaluate the system-level emission reduction effect due to optimized products;

6. Sensitivity analysis requirements: For important assumptions and uncertain data that contribute more than 10% to the carbon footprint results, sensitivity analysis needs to be carried out in combination with the actual situation to determine the possible reasonable floating range of emission reductions; For the hypothetical data that may cause a change of more than 10% or more in the carbon footprint results due to the potential floating interval (based on a reasonable estimate, or the result of taking 3 standard deviations above and below the mean, that is, the upper and lower limits of the 99% confidence interval), it is necessary to carry out necessary verification on the hypothetical and alternative data in order to judge the cumulative difference of the emission reduction caused by this, and the difference must not exceed the emission reduction value, otherwise the emission reduction statement will be invalid. If the difference is less than the emission reduction value, the interval value of the maximum and minimum emission reduction caused by the uncertain data needs to be indicated in the emission reduction result; (Note: The uncertain data here does not include the background database and methodological uncertainty).

7. REFERENCES

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[3] EPD China (2021) General Programme Instructions for the EPD China. Version 4.0, dated 2021-03-29. www.EPDChina.com.

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

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

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

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

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

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

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

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

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