

## ESCALATORS AND MOVING WALKS

PRODUCT GROUP CLASSIFICATION: UN CPC 4354

C-PCR-XXX (TO PCR 2019:14). **DRAFT FOR OPEN CONSULTATION. DO NOT USE OR CITE.**  
VERSION: 20XX-YY-ZZ



DRAFT PCR FOR OPEN  
CONSULTATION

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## INTRODUCTION TO OPEN CONSULTATION

This draft c-PCR document is available for open consultation from 2022-07-05 until 2022-09-04. Feel free to forward the draft to any other stakeholder you might think is relevant, including colleagues and other organisations.

This is the first version of this document to be developed. We are therefore interested in comments from stakeholders on:

- General
  - o Alignment with PCRs available in other programmes for type III environmental declarations, industry-specific LCA guides or similar.
- Scope of PCR
  - o Product category definition and description
  - o Classification of product category using CPC codes
- Goal and scope, life cycle inventory and life cycle impact assessment
  - o Functional unit/declared unit
  - o System boundary
  - o Allocation rules
  - o Data quality requirements
  - o Recommended databases for generic data
  - o Impact categories and impact assessment methodology
- Additional information

Comments may be sent directly to the PCR Moderator (contact details available in Section 1). There is a template for comments on [www.environdec.com](http://www.environdec.com) that may be used.

For questions about the PCR, please contact the PCR Moderator. For general questions about the International EPD® System, EPD or PCR development, please contact the Secretariat via [pcr@environdec.com](mailto:pcr@environdec.com).

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# 1 INTRODUCTION

## 1.1 GENERAL

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

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

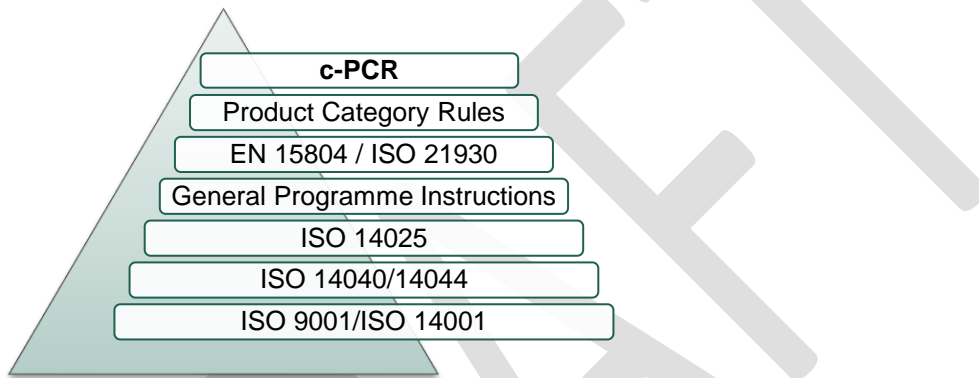


Figure 1 This c-PCR in relation to the hierarchy of standards and other documents.

Within the present c-PCR, the following terminology is adopted:

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

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

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

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

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

<sup>1</sup> Type III environmental declarations in the International EPD® System are referred to as EPD, Environmental Product Declarations.

## 1.2 ROLE OF THIS DOCUMENT

This document provides complementary product category rules (c-PCR) to PCR 2019:14 Construction products available at [www.environdec.com](http://www.environdec.com). This document cannot be used by itself but shall be used together with PCR 2019:14 and the European standard EN 15804:2012+A2:2019 (called EN 15804 in short). If a c-PCR is available for a product category, it shall be used.

See Figure 2 for an illustration on how PCR 2019:14 and this c-PCR relate to each other and the EPDs that may be based on them.

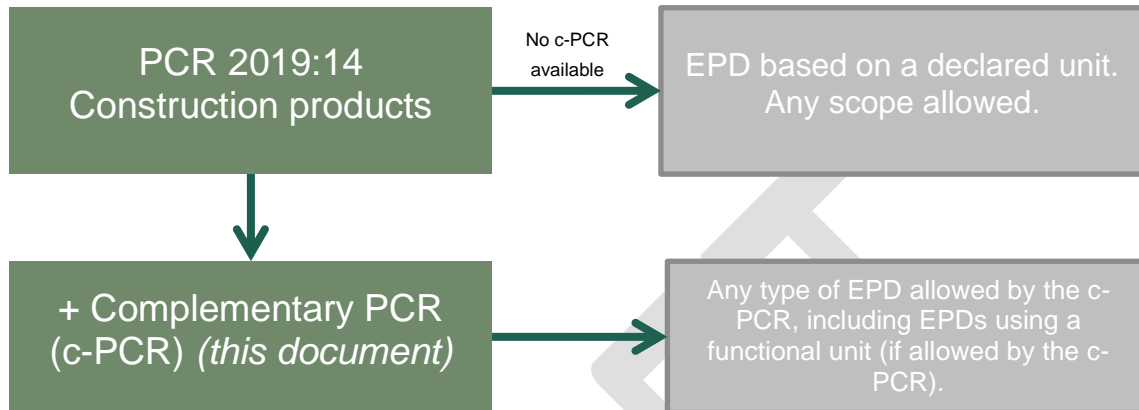



Figure 2 Overview of using PCR 2019:14 directly to develop an EPD, or how to use it together with this c-PCR.

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## 2 GENERAL INFORMATION

### 2.1 ADMINISTRATIVE INFORMATION

Name:	Escalators and moving walks
Registration number and version:	<i>To be added by the Secretariat</i>
Programme:	 The International EPD System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden.  Website: <a href="http://www.environdec.com">www.environdec.com</a> E-mail: <a href="mailto:info@environdec.com">info@environdec.com</a>
PCR Moderator:	Dr.-Ing. Nikolay Minkov, greenzero.me GmbH (on the behalf of the European Lift Association, ELA) <a href="mailto:nikolay.minkov@greenzero.me">nikolay.minkov@greenzero.me</a>
PCR Committee:	"Product Ecology" Working Group (WG) for PCR of the ELA
Date of publication and last revision:	<i>To be added by the Secretariat</i>
Valid until:	<i>To be added by the Secretariat</i>
Schedule for renewal:	This document will be revised together with the PCR for Construction products. In case a c-PCR is developed by a CEN Product TC, the standard will replace this c-PCR, with a transition period of at least 90 days under which both are valid.
Standards conformance:	<ul style="list-style-type: none"> <li>▪ General Programme Instructions (GPI) of the International EPD System, version 4.0, based on ISO 14025:2006, ISO 14040:2006 and ISO 14044:2006</li> <li>▪ EN 15804:2012+A2:2019</li> <li>▪ ISO 21930:2017. This standard is used in selected sections, such as allocation, when it provides additional but not contradictory rules to EN 15804.</li> </ul> <p>All EPDs based on this PCR shall be compliant with EN 15804:2012+A2:2019. If additional rules are followed, e.g., additional indicators, this PCR may also be used to develop an EPD compliant with ISO 21930:2017.</p>
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.

### 2.2 SCOPE

#### 2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This c-PCR provides category rules for the assessment of the environmental performance of **escalators and moving walks** and the declaration of this performance by an EPD. The product category corresponds to **UN CPC 4354 Lifts, skip hoists, escalators and moving walkways**.

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The product category corresponds to the following group and underlying classes and sub-classes in the UN CPC classification (when used within construction):

- Section: 4 - Metal products, machinery and equipment
  - Division: 43 - General-purpose machinery
    - Group: 435 - Lifting and handling equipment and parts thereof
      - Class: 4354 - Lifts, skip hoists, escalators and moving walkways

**UN CPC 4354 Lifts, skip hoists, escalators and moving walkways** includes many different types of machinery. However, the scope of this PCR is limited to machinery defined as **escalators and moving walks** (called only “escalators” for short further on, when a specific differentiation between escalators and moving walks is not necessary<sup>2</sup>), since production technologies and functionality are specific. Therefore, the PCR cannot be used for other type of products (e.g., skip hoists, or lifts (elevators)) classified under the same UN CPC 4354. The product group and UN CPC code shall be specified in the EPD. Moreover, **the EPD shall clearly describe the escalator system considered and its scope of application** using as a minimum the mandatory performance characteristic listed in Section 2.2.3.

Escalators covered by this PCR are designed for transportation of passengers and can have inclined or horizontal trajectories. Escalator systems consist of subsystems and components, which may be grouped differently, depending on the product structure definition, applied by the respective company (escalator manufacturer). **The company shall define and disclose the configuration of the product under analysis in a tabular or schematic format in the EPD.**

This c-PCR and PCR 2019:14 are limited to those products that are used as construction products. Products used in other applications are outside of the scope.

## 2.2.2 SPECIFICATION OF THE COMPANY

Information about the company issuing the EPD shall be specified in the EPD, including a description of the company and a description of its overall environmental work, as follows:

Mandatory information:

- Name and address of the company

Voluntary information:

- Short description of the company
- Geographical location of suppliers / manufacturing sites / customers
- Information about ISO 14001 and/or EMAS certificates of manufacturing sites considered in the core module
- Specific aspects regarding the production
- Company logotype

## 2.2.3 SPECIFICATION OF THE PRODUCT

The product-related part of the EPD shall include the following mandatory information (Table 1):

<sup>2</sup> The following definitions for distinguishing between the different systems are adopted: a **horizontal moving walk** is such that has no inclination (angle of inclination,  $\alpha = 0^\circ$ ); an **inclined moving walk** is such with an inclination  $\alpha$  up to  $12^\circ$ ; an **escalator** is such that has an inclination  $\alpha$  from  $12^\circ$  up to  $35^\circ$  and consists of steps, instead of pallets (in contrast to moving walks).

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Table 1 Mandatory information required for the specification of the product

Characteristic	Values	Representative values chosen in case of ranges
Type of installation	<ul style="list-style-type: none"> <li>escalator OR moving walk (horizontal) OR moving walk (inclined)</li> </ul>	
Type of configuration (see Section 4.2)	<ul style="list-style-type: none"> <li>new specific installation OR new generic installation</li> <li>with modernization OR without modernization</li> </ul>	
Commercial name	As stated in the operating manual or sales catalogue	
Recommended application (main market)	e.g. commercial, public transport, etc.	
Geographic region of intended installation	Region, e.g., specific country or continent	
Optional equipment	List, if applicable	
Designed Reference Service Life (RSL)*	Generic escalator: 15 years Specific escalator: the RSL is not fixed and the manufacturer may select and declare an alternative value.	
Applied Usage Class (UC) (fixed or range) (as per Table 2 of the c-PCR)	e.g., 1 ... 4	e.g., 1
Nominal speed (fixed or range)	e.g., 0.4 -0.75 m/s	e.g., 0.5 m/s
Number of operating days per year (fixed or range)	e.g., 150 – 365	e.g., 365
Operation mode (as per Table 3 of ISO 25745-3)	e.g., Auto start, continuous, slow- speed, power off	
Specific parameters in case of an <b>escalator</b> (to be skipped if a moving walk is declared)		
Angle of inclination, $\alpha$ (fixed or range)	e.g., 27.3° / 30° / 35°	e.g., 30°
Vertical rise (fixed or range)	e.g., up to 20 m	e.g., 4.5 m
Step width (fixed or range)	e.g., 600 / 800 / 1000 mm	e.g., 1000 mm
Specific parameters in case of a <b>moving walk</b> (to be skipped if an escalator is declared)		
Angle of inclination, $\alpha$ (fixed or range)	e.g., 0° / 10° / 12°	e.g., 12°
Vertical rise, in case of <b>inclined</b> moving walk (fixed or range)	e.g., up to 5 m	e.g., 4 m
Length, in case of <b>horizontal</b> moving walk (fixed or range)	e.g., up to 100 m	e.g., 65 m
Pallet width (fixed or range)	e.g., 800 - 1600 mm	e.g., 1000 mm

\* RSL is the service life of a product which is known to be expected under a set of reference (defined) in-use conditions and which can form the basis for estimating the service life under other in-use conditions. The RSL is described as part of the functional unit (see Section 4.1). For more details, refer to Section 6.3.4.1 of EN 15804.

## 2.2.4 TYPE OF EPD AND INFORMATION MODULES INCLUDED

Following the requirements in Section 2.2.2 of PCR 2019:14, an EPD based on this c-PCR are of a type c) “cradle to grave and module D (A + B + C + D)”. Section 4.3 below provides more information on each life-cycle stage concerning the product category in scope.

## 2.2.5 GEOGRAPHICAL SCOPE

This c-PCR may be used globally (as in PCR 2019:14, Section 2.2.3).



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## 2.2.6 EPD VALIDITY

As in PCR 2019:14, Section 2.2.4.

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### 3 PCR REVIEW AND BACKGROUND INFORMATION

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

#### 3.1 OPEN CONSULTATION

##### 3.1.1 VERSION 20XX-YY-ZZ

This c-PCR is available for open consultation from 2022-07-05 until 2022-09-04, during which any stakeholder is able to provide comments by contacting the PCR Moderator and/or the Secretariat.

*Information about any physical or web-based meetings held during the open consultation phase, if applicable, will be added after the open consultation.*

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

- *List of stakeholder names and affiliations will be added after the open consultation*

#### 3.2 PCR REVIEW

##### 3.2.1 VERSION 20XX-YY-ZZ

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members is available at <a href="http://www.environdec.com">www.environdec.com</a> . The review panel may be contacted via <a href="mailto:info@environdec.com">info@environdec.com</a> . Members of the Technical Committee were requested to state any potential conflict of interest with the PCR Committee, and if there were conflicts of interest they were excused from the review.
Chair of the PCR review:	<i>To be added by the Secretariat</i>
Review dates:	<i>To be added by the Secretariat</i>

#### 3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

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

- International EPD® System
- IBU (Institut Bauen und Umwelt e.V.)
- ECO-Platform

No existing PCRs/c-PCRs or other relevant internationally standardised methods with overlapping scope were identified.

#### 3.4 REASONING FOR DEVELOPMENT OF C-PCR

This c-PCR was developed to provide requirements and guidelines additional to those in PCR 2019:14 and EN 15804, for developing EPDs for the product category. The c-PCR thereby enables different practitioners to generate consistent results when assessing the

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environmental impact of products of the same product category, and thereby it supports comparability of products within a product category.

### 3.5 UNDERLYING STUDIES USED FOR C-PCR DEVELOPMENT

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

- Schindler Fahrtreppen International GmbH, *ENVIRONMENTAL FACT SHEET (EFS) of Escalator Schindler 9300-11 / -15*, Version 1.0, June 2018
- KONE Corporation, *ENVIRONMENTAL PRODUCT DECLARATION of KONE TransitMaster™ 140*, Version 1.0, February 2021

These are the only publicly available studies that were identified during the PCR development process. It is known that the majority of the PCR Committee members have experience with LCA of escalators and their knowledge and experience is applied in this project. Due to the confidentiality of their work, however, no other data or studies have been publicly disclosed herewith.

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

This section provides specific rules, requirements and guidelines for developing an EPD for the product category as defined in Section 2.2.1.

### 4.1 FUNCTIONAL UNIT

EPDs based on this c-PCR shall be based on a functional unit (FU). According to ISO 14040:2006, LCA is a relative approach, which is structured around a FU. The FU is defined as a "quantified performance of a product system for use as a reference unit". All subsequent analyses then refer to that FU, as all inputs and outputs in the life cycle inventory (LCI) and consequently the life cycle impact assessment (LCIA) profile are related to the FU.

This reference is necessary to ensure comparability of LCA results. This is particularly critical when different systems are being assessed, to ensure that such comparisons are made on a common basis. Comparability is therefore only achievable if the following performance characteristics are equivalent:

- Functional unit (FU)
- Operation Mode
- Usage Class (UC)
- Operation days per year
- Reference Service Life (RSL)
- Geographic region<sup>3</sup>

The function of an escalator is the transportation of passengers over an inclined (or horizontal) trajectory. Thus, the FU is defined as **the transportation of one passenger over one m, i.e., passenger-metre [pm]** over an inclined (or horizontal) trajectory.

LCA results shall be presented per FU, i.e., per 1 [pm]. To do so, first the total amount of [pm] (called also **transportation value, TV** for short) shall be calculated, followed by division of the respective inputs and outputs by the TV to obtain the LCA results per FU.

TV shall be calculated according to the formula and parameters shown below.

- **Definition of the Usage Class (UC)**

Four UCs are defined to distinguish between different use cases (Table 2). The average number of passengers per day shall be defined according to the selected UC shown in Table 2.

Table 2 Different UCs of escalators and their characteristics

Usage Class	1	2	3	4
Typical location (as per ISO 25745-3, Table A.1)	Shops, museums...	Department stores...	Major airports...	Larger major airports...
Usage intensity	Very low	Low	Medium	High
Average number of passengers per day (N)*	2'500	7'000	15'000	40'000
Typical range (as per ISO 25745-3, Table A.1)	<3'000	3'000 to < 10'000	10'000 to < 20'000	≥ 20'000

\*Based on default step width 1000 mm and speed 0.5 m/s

- **Definition of the Transportation value (TV)**

<sup>3</sup> In case of comparability, the equivalence of the geographic region is important due to the specifics of the energy mix used

The TV shall be calculated as passenger-metre during the RSL [pm] according to the following formula:

$$TV = L * N * d_{op} * RSL$$

where:

- $L$  – length<sup>4</sup> of the escalator/moving walk in [m], based on the specification of the product (according to Table 1)
- $d_{op}$  – number of operating days per year, based on the specification of the product (according to Table 1)
- $RSL$  – reference service life in years, based on the specification of the product (according to Table 1)
- $N$  – average number of passengers transported per day (according to Table 2)

## 4.2 ESCALATOR CONFIGURATIONS

The present c-PCR can be used for the issuing of EPDs for new escalators. The manufacturer shall decide whether they want to declare the environmental performance of a **specific escalator** (designed for a specific installation and having already **fixed parameters**) or a **generic escalator** (i.e., selected by the company from their product portfolio and covering a given **range of products and performance characteristics**). In both cases, new escalators shall imply a complete escalator system. The type of escalator under declaration shall be clearly stated in the EPD, followed by the disclosure of the performance characteristics according to Section 2.2.3. In case of a specific escalator, the RSL can be freely defined by the manufacturer, whereas in the case of a generic escalator, the RSL shall be fixed at 15 years.

In case of generic escalator, ranges of different performance characteristics can be applicable. The EPD owner shall declare in the EPD for which UCs the generic escalator in scope is designed and the respective performance characteristics, and/or their ranges. Further, LCA results shall be reported for each of these declared UCs. Moreover, the EPD shall describe whether the results cover the whole range (and even combinations of ranges) of the performance characteristics or not. If not, the limited representativity of the results shall be indicated. For more details on how multiple scenarios can be declared in the same EPD, please refer to Section 9.3.1 of GPI v4.0 and Section 6.3.9 of EN 15804. In cases when only the operational energy use (module B6 – see next section) differs, results for the different scenarios may be presented only for this module.

Furthermore, the FU and TV are independent of the travel direction, but this is not the case regarding the operational energy use (module B6). Therefore, to make the impact of the travel directions visible, the results of for the operational energy use (module B6) and the total for the whole life cycle shall be presented individually for up and down directions (as two tables of results or as additional columns in the tables for B6 and Total).

## 4.3 SYSTEM BOUNDARIES

EPDs that are developed based on this c-PCR shall have a cradle-to-grave scope; thus, they shall cover the mandatory life cycle stages required by PCR 2019:14. Nevertheless, considering also certain specifics related to the peculiarities of the production of escalators, their use and disposal, the present c-PCR gives additional guidance on how certain information modules shall be approached. In the following Table 3, the life cycle stages, and information modules are described in relation to the specifics of escalators' life cycle.

Table 3 Life cycle stages and information modules, relevant for escalators

<sup>4</sup> The length (L) of an escalator or an inclined moving walk shall be calculated as the rise (H) divided by a tangent of the angle of inclination ( $\alpha$ ), i.e.,  $L=H/\tan(\alpha)$

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Life cycle stage	Information module		Comment
A1-A3 Product stage	A1	Raw material supply	Included
	A2	Transport	Included
	A3	Manufacturing	Included
A4-A5 Construction process stage	A4	Transport	Included
	A5	Installation	Included
B1-B7 Use stage	B1	Use	Excluded; not applicable for escalators
	B2	Maintenance	Included
	B3	Repair	Excluded; it is an intervention that cannot be programmed or foreseen, because it depends on the building application and users' behaviour
	B4	Replacement	Merged with B5
	B5	Refurbishment	Included when extension of the escalator's designed lifetime is foreseen (i.e. extended RSL)
	B6	Operational energy use	Included
	B7	Operational water use	Excluded; not applicable for escalators
C1-C4 End-of-life stage	C1	Deconstruction	Included
	C2	Transport	Included
	C3	Waste processing	Included
	C4	Waste disposal	Included
D Benefits and loads beyond the system boundary	D	Reuse, recovery, recycling, potential	Included

#### Additional clarifications to modules B2-B5:

Escalators are products with a long operation time, during which not only preventive maintenance (covered by **B2 Maintenance**), but also corrective maintenance is needed. Corrective maintenance activities, i.e., such that are usually to be accounted in **B3 Repair**, are excluded, because these repair interventions cannot be programmed or foreseen; they depend on the building application and users' behaviour and are not under the control of the company supplying the original escalator.

As regards **B4 Replacement** and **B5 Refurbishment**, a clear separation between the two modules when escalators are concerned is not necessary; they shall be merged and declared under **B5 Refurbishment** only. Activities under this module are such that consider "modernization" of the escalator. Modernization is generally defined as a process of components' exchange that leads to the extension of the designed lifetime of an escalator.

The following subsections describe the covered information modules and the respective processes. For detailed information on each module, see EN 15804 (Section 6.3.5). Here only specific descriptions related to this c-PCR are provided.

### 4.3.1 PRODUCT STAGE: MODULES A1-A3

See PCR 2019:14 and Section 6.3.5.2 of EN 15804.

- **A1 Raw material supply:** extraction and production of raw material for parts and components needed to produce the escalator, including:
  - reuse of products or materials from a previous product system,
  - processing of secondary materials used as input for manufacturing the product, but not including those processes that are part of the waste processing in the previous product system,
  - generation of electricity, steam and heat from primary energy resources, also including their extraction, refining and transport,

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- energy recovery and other recovery processes from secondary fuels, but not including those processes that are part of waste processing in the previous product system.

Processes that can be excluded:

- production, maintenance, and disposal of outsourced manufacturing infrastructure (buildings, machinery and capital goods),
- internal transportation of materials and components between factories and internal transportation within the factories.
- **A2 Transport:** transportation to manufacturing site (outsourced and in-house) from direct suppliers, i.e. from previous production or extraction process. Earlier transport journeys<sup>5</sup> should be included in module A1.

Transport distances can be based on actual data or on scenario defined by the company.

- **A3 Manufacturing:** manufacturing and assembly of components for the escalator in state ready for transportation to building site, including:
  - production and use of operating and auxiliary materials consumed,
  - production of intermediate packaging materials, incl. such that are necessary to protect the escalator components during their transport from the manufacturing site to the building site,
  - direct emissions to air, water or soils,
  - treatment of waste generated from the manufacturing and assembly of main parts.

Processes that can be excluded are:

- internal transportation between the company's own factories, if the impact is below the general 5% cut-off threshold,
- production, maintenance, and disposal of infrastructure (buildings, machinery and capital goods) at the sites where the product is manufactured,
- business travel of personnel and travel to and from work by personnel,
- indirect activities (like administration, sales, research and development activities etc.).

#### 4.3.1.1 Information requirements for component manufacturers

The component manufacturer shall provide the escalator manufacturer with the following information:

- information of materials used (mandatory), information of manufacturing processes (not needed if this process is allocated to the upstream module – see Table 4. Data can be estimated by the escalator manufacturer),
- declaration of the component useful life,
- information on the necessary maintenance activities to guarantee a correct operation during the declared useful life,
- information regarding dismantling activities necessary for the management of the component end of life.

Alternatively, if there is an agreement between the customer and the supplier, the component manufacturer can directly provide the escalator manufacturer with data of the environmental impact of their components. If this is case, the component manufacturer shall follow the rules of this PCR for the calculation of such environmental impacts, as if they were components for modernization<sup>6</sup>. It is mandatory that the component manufacturer use the same background generic data sources (i.e., databases) as the escalator manufacturer (see Section 4.7). Moreover, all supporting documentation (in the best-case external verification or critical review) shall be made available to the EPD owner to facilitate the EPD verification process.

## 4.3.2 CONSTRUCTION PROCESS STAGE: MODULES A4-A5

See PCR 2019:14 and Section 6.3.5.3 of EN 15804.

<sup>5</sup> Example: transport of raw materials, finished and semi-finished parts to in-house and outsourced manufacturing locations of main components, in particular air cargo transport such as e.g. electrical and electronic equipment & PWBs from South East Asia

<sup>6</sup> This PCR, however, cannot be used for the development of EPDs of single components.

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- **A4 Transport:** transportation of the product from the manufacturing site to the building site
- **A5 Installation:** installation of the product, including:
  - the production and transport of auxiliary materials and energy used during the installation of the escalator,
  - treatment of waste generated from the escalator packaging materials.

### 4.3.3 USE STAGE: MODULES B1-B7

See PCR 2019:14 and Section 6.3.5.4 of EN 15804.

- **B2 Maintenance:** also known as “preventive maintenance”, including:
  - transportation of workers from their working place to the building site,
  - the production and transport of the components and auxiliary materials and energy used for the escalator maintenance activities,
  - treatment of waste generated from the components and their packaging,
  - the end-of-life processes of any waste from transportation and the maintenance process, including any part of the component and ancillary materials removed.

The expected maintenance activities, number and type of spare parts expected to ensure a good functioning of the escalator during the useful lifetime declared by the manufacturer shall be communicated to the escalator customer and be reported in the LCA.

- **B5 Refurbishment:** also known as “modernization”, including:
  - the production and transport of the components and auxiliary materials and energy used for the refurbishment,
  - treatment of waste generated from the components and their packaging,
  - the end-of-life processes of any losses suffered during transportation and the refurbishment process, including the components and ancillary materials removed.

In case of modernization, the EPD shall clearly describe what original components remain in the installation and what parts or components are being replaced, as well as the foreseen effects that these replacements would have in the different life cycle phases of the escalator (e.g., higher or lower energy consumption during the RSL, or extended RSL, etc.). This content shall be defined and disclosed by the manufacturer.

- **B6 Operational energy use:** expected energy consumption of the escalator calculated according to Annex A of ISO 25745-3; the calculation of the energy consumption shall be carried out, based on the same parameters as for the calculation of TV (e.g. N according to Table 2);

The weight per passengers shall be considered as 75 kg for the calculation.

The usage profiles considered according to ISO 25745-3, Table 3 shall be declared in the EPD.

Different usage profiles and/or usage classes can be declared in the same EPD.

Regarding this module, the LCA inventory shall contain as a minimum

- Clear documentation of power and energy measurements in the underlying LCA report (as per ISO 25745-1), or
- Clear documentation of the electricity demand calculation in the underlying LCA report (as per ISO 25745-3).

In case of an EPD for a specific escalator, in which a **customized estimation of the energy consumption** has been made, any deviation to this calculation method shall be reported and justified in the EPD.

### 4.3.4 END-OF-LIFE (EOL) STAGE: MODULES C1-C4

See PCR 2019:14 and Section 6.3.5.5 of EN 15804.

- **C1 Deconstruction:** including:
  - dismantling or demolition of the product from the building,



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- initial on-site sorting of the materials,
- auxiliary materials and energy used during the deconstruction of the escalator.
- **C2 Transport:** transportation of the deconstructed product from the building site to the waste treatment site.
- **C3 Waste processing:** e.g. collection of waste fractions from the deconstruction and waste processing of material flows intended for reuse, recycling and energy recovery according to a generic scenario defined by the company.
- **C4 Waste disposal:** including physical pre-treatment and management of the disposal site, according to a generic scenario defined by the company.

Each company shall define its own EoL (waste treatment) scenario, considering the specifics of the geographical region where the escalator is installed (or intended to be installed). The EoL scenario shall be clearly documented and justified in the EPD describing the final method of disposal, i.e., recycling, incineration and/or landfill.

Processes excluded are:

- Production, maintenance, and disposal of infrastructure (buildings, machinery and capital goods) at the sites where the product is disposed.

#### 4.3.5 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY: MODULE D

See Section 4.5.3 of PCR 2019:14 and Section 6.3.5.6 and 6.4.3.3 of EN 15804.

Module D includes reuse, recovery and/or recycling potentials, expressed as net impacts (loads) and benefits. Any declared net benefits and loads from net flows leaving the product system that have passed the end-of-waste state shall be included in module D, except those which have been allocated as co-products.

Among some of the general principles of module D are:

- Impacts (loads) related to the recycling or recovery process from beyond the system boundary up to the point of functional equivalence (where the secondary material or energy substitutes primary production) are added; subtracted, on the other hand, are impacts resulting from the avoided production from primary resources.
- A justified value-correction factor to reflect the differences in the functional equivalence between the secondary and primary material shall be added.

As this c-PCR does not recommend any specific procedure for the determination of the quality factors of the recycled material at the point of substitution (i.e., the value-correction factors), these can be based on their economic value, as recommended by PCR 2019:14, Section 4.5.3.

According to Section 6.4.3.3 of EN 15804, where a secondary material or fuel crosses the system boundary e.g. at the end-of-waste state and if it substitutes another material or fuel in the following product system, the potential benefits or avoided loads can be calculated based on a specified scenario which is consistent with any other scenario for waste processing and is based on current average technology, current practices and current rates of recycling, reuse and recover of materials. If today's average is not available for the quantification of potential benefits or avoided loads, a conservative approach shall be used.

Please refer to the same Section of EN 15804 for an approach to calculate the net impacts in Module D. Annex D (Section D.3.4) of EN 15804 describes the applicable formula for the calculation of loads and benefits beyond the system boundary per unit of output for Module D. In the current version of the EN 15804, the applicable EoL formula is based in the EC Product Environmental Footprint (PEF) formula.

#### 4.3.6 OTHER BOUNDARY SETTING

See PCR 2019:14 and EN 15804.

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## 4.4 SYSTEM DIAGRAM

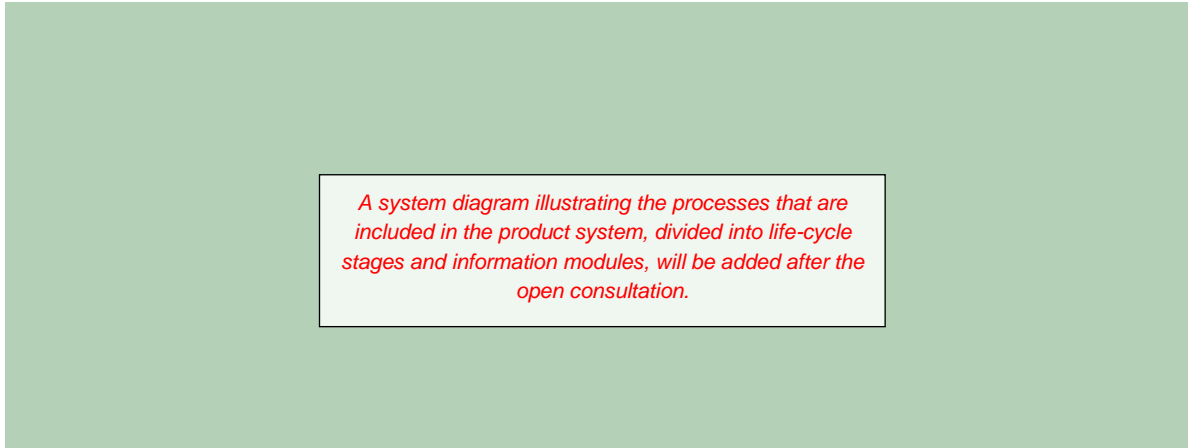


Figure 3 System diagram illustrating the processes that are included in the product system, divided into life-cycle stages and information modules.

## 4.5 CUT-OFF RULES

See Section 4.4 of PCR 2019:14 and EN 15804.

LCI data shall, according to EN 15804, include a minimum of 95% of total inflows of mass and energy per module i.e., maximum of 5% exclusion of flows is allowed per module for both mass and energy.

## 4.6 ALLOCATION RULES

See Section 4.5 of PCR 2019:14 and EN 15804.

In addition, the allocation factor of input and output flows during in-house manufacturing (A3) can be done by applying a more detailed process description and separating the different production lines. If that is not possible, the allocation may be based on mass criteria or man-hours used to produce each co-product.

If mass criteria are applied, the allocation factor shall be calculated as the total mass of flows for the specific escalator or component divided by the total mass of all escalators or components produced at the given production site.

The use of economic allocation criteria should be avoided, because of its sensibility to market specific conditions. Moreover, please refer to Section 6.4.3.2 of EN 15804 where additional criteria for using economic allocation according to the different contributions to the overall revenue are described. If economic allocation has been used, a specific sensitivity analysis shall be provided to the verifier and the monitoring of the relationship between results and current economic value shall be documented and updated.

The allocation procedures shall be documented in the LCA report and the EPD. In case of economical allocation, the EPD shall explain the reference values that have been used.

## 4.7 DATA QUALITY REQUIREMENTS

See Section 4.6 of PCR 2019:14 and EN 15804.

Generic and specific data shall be applied as defined by EN 15804. This is shown in Table 4 herewith:

Table 4 Application of generic and specific data

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

In addition to the information given in Table 4, the use of generic data is generally accepted. However, the EPD shall include references to the generic database (and version) used and identify the unit processes represented. How the different materials were assigned to the respective generic LCI process data sets shall be documented in the LCA report.

#### 4.7.1 DATA QUALITY REQUIREMENTS AND OTHER MODELLING GUIDANCE TO INFORMATION MODULES A1 AND A3

For information modules **A1** and **A3**, depending on the production supply chain specifics for each manufacturer, different possibilities exist about which commodities, raw materials and/or product components are taking place in-house or are outsourced to external suppliers. In this regard, for processes that the manufacturer has influence over<sup>7</sup>, manufacturer's average or specific data shall be used. Otherwise, when these processes are outsourced (i.e., upstream processes), generic data may be used. The respective data type rules as per Table 4 above shall apply for each respective process.

Manufacturer's average or specific data, called primary data herewith, are gathered from the actual manufacturing plant(s), where 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 from a contracted supplier being able to provide data for the actual delivered services, transportation taking place based on the actual fuel consumption and related emissions, etc.

The requirements for primary data also include actual product weights, gross amounts of raw materials used (including material losses) and amounts of waste, etc.

If no primary data is available to account for material losses (cuttings, wastage, residues, etc.) mass of materials used in the main components shall be accounted for with an increase of 5%. Generic data must not exceed 10% of the life cycle inventory for the processes the manufacturer has influence over on the bases of the overall environmental impact from the product system.

If specific data on recycled content of raw materials (**A1**) is known, generic datasets shall be adapted accordingly, and values and origin of the data shall be declared in the EPD. If specific recycled content is unknown, average recycled content of datasets is acceptable. In the latter case, it shall be declared in the EPD that average recycled and not specific recycled contents were used for LCIA and respective average values and origin of average data shall be declared in the EPD.

For the calculation of the environmental impact of the manufacturing and assembly of components for the escalator (**A3**), the energy mix should ideally correspond to the actual consumption mix of the geographic region(s) where the components are manufactured. It is acceptable to use 100% generic upstream data for electricity production, whereas quantity of energy used shall be primary/system specific modelled data. In all cases, the applied energy mix(es) shall be declared in the EPD.

Data regarding components manufactured and/or assembled by sub-suppliers can be approximated by own manufacturing data of comparable processes and be applied instead of using specific data from the sub-supplier, or in combination with (other) generic data (e.g., metal working process data of ecoinvent) representative for the sub-supplier's manufacturing process. In such a case, this shall be made transparent in the background LCA report.

<sup>7</sup> A manufacturer has influence over the processes of his own plant and usually of his Tier-1 suppliers, since the suppliers' plant processes are directly dependent on the manufacturer's orders for components.

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#### 4.7.2 DATA QUALITY REQUIREMENTS AND OTHER MODELLING GUIDANCE TO INFORMATION MODULES A2 AND A4

For the transportation modules **A2** and **A4**, use of primary data is recommended as a minimum for the specific distance and specific mass transported, and optionally for loading rates and empty return rates of the respective means of transportation (else predetermined value used by the underlying LCI background data is acceptable, e.g., average loading rate of 100%, and an empty return rate of 0%). Selection of generic LCI data within a transportation category shall reflect as close as possible the geographical context of the representative unit, e.g., with regard to lorry capacities (e.g., 17 t, 40 t, etc.) or emission classes (e.g., EURO 3, EURO 5, etc.) and shall be transparently documented in the LCA report. This should allow reflecting benefits of efforts of regional manufacturing with shorter transport distances and of own 'clean' cargo fleet efforts or those of third-party logistic service providers hired.

If these data sources do not supply the necessary data, other generic data may be used, but shall be clearly documented. The environmental impact of the processes where the other generic data are used must not exceed 10% of the overall environmental impact from the product system.

#### 4.7.3 DATA QUALITY REQUIREMENTS AND OTHER MODELLING GUIDANCE TO INFORMATION MODULE B6

As regards module B6, accuracy of energy measurements and demand calculations shall comply with the requirements of ISO 25745-1 and ISO 25745-3. For the calculation of the environmental impact of the energy consumption during the operation phase (**B6**), the energy mix should ideally correspond to the actual consumption mix of the geographic region where the specific escalator is installed. For generic escalators, the consumption mix for the geographic region where the escalator is intended to be installed shall be used. It is acceptable to use 100% generic upstream data for electricity production, whereas quantity of energy used shall be primary/system specific modelled data. In all cases, the applied energy mix shall be declared in the EPD.

Moreover, following PCR 2019:14 in Section 1.4 and Section 4.8.1 on the requirements for documenting the GWP-GHG results, in kg CO<sub>2</sub> eq./kWh, of the upstream electricity used in the manufacturing process **A3**, the same rule shall apply also for module **B6**. This is justified by the fact that the energy consumption of the escalator operation accounted in **B6** is assumed to have a significant overall environmental impact.

### 4.8 ENVIRONMENTAL PERFORMANCE INDICATORS

See Section 4.7 of PCR 2019:14 and EN 15804.

In addition, the potential environmental impacts shall be reported per FU, i.e., 1 [pm] and in absolute figures (i.e. total values) for the complete product over its RSL (e.g. "New escalator in operation for 15 years") as specified in Table 1, separately for each information module.

### 4.9 INCLUDING MULTIPLE PRODUCTS IN THE SAME EPD

See Section 5.3.3 of PCR 2019:14 and Section 4.2 above.

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## 5 CONTENT AND FORMAT OF EPD

For most of the topics to this section, the present c-PCR follows the requirements as per Section 5 of PCR 2019:14 with certain exceptions.

### 5.1 EPD LANGUAGE

As in PCR 2019:14, Section 5.1.

### 5.2 UNIT AND QUANTITIES

As in PCR 2019:14, Section 5.2.

### 5.3 USE OF IMAGES IN EPD

See PCR 2019:14.

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, and wildlife that are not related to the declared product shall, therefore, be used with caution and in compliance with national legislation and best available practices in the markets in which the EPD is intended to be used.

### 5.4 EPD REPORTING FORMAT

As in PCR 2019:14, Section 5.3. 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

As in PCR 2019:14, Section 5.3.1.

#### 5.4.2 PROGRAMME INFORMATION

As in PCR 2019:14, Section 5.3.2.

In addition, the mandatory statement as per PCR 2019:14 ““EPDs of construction products may not be comparable if they do not comply with EN 15804” shall be extended to as follows: “EPDs of construction products may not be comparable if they do not comply with EN 15804+A2:2019.”

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### 5.4.3 PRODUCT INFORMATION

As in PCR 2019:14, Section 5.3.3.

In addition, the EPD shall contain the following statement: “Comparability between EPDs based on c-PCR-xxx (to PCR 2019:14) is only achievable, if the following performance characteristics are equivalent: functional unit (FU), operation mode, usage class (UC), operation days per year, Reference Service Life (RSL) and geographic region.”

### 5.4.4 CONTENT DECLARATION INCLUDING PACKAGING

As in PCR 2019:14, Section 5.3.4.

In addition to PCR 2019:14, the gross weight declared in the EPD shall not include spare parts. Moreover, the EPD shall include a declaration of the escalator composition<sup>8</sup> in quantitative terms (percentage of the total weight, considering all lifecycle phases and according to the cut off rules), grouped at least according to the following categories:

- Ferrous metals
- Non-ferrous metals
- Plastics and rubbers
- Inorganic materials (e.g. concrete)
- Organic materials (e.g. paper or wood)
- Lubricants (e.g. oils and greases), paintings, coatings, adhesives and fillers
- Electric and electronic equipment
- Batteries and accumulators
- Refrigerants in car air conditioners (if any)
- Other materials<sup>9</sup>

Proprietary materials and substances covered by exclusive legal rights including patent and trademarks can be reported under “Other materials”.

The escalator manufacturer can be more specific in the reporting of the escalators material composition if wished.

Escalators put on certain markets can be subject of further local regulations or specific requirements of stakeholders. In such cases, additional requirements to declare the content of certain substances may be needed. This can be done in an annex of the EPD.

### 5.4.5 ENVIRONMENTAL PERFORMANCE

As in PCR 2019:14, Section 5.3.5.

### 5.4.6 ADDITIONAL ENVIRONMENTAL INFORMATION

As in PCR 2019:14, Section 5.3.6.

Moreover, additional environmental information can optionally also include recommendations for energy saving measures. Other environmental information describing different waste categories and output flows may be declared as follows:

- Components potentially suitable for re-use (e.g. ...); in kg and % of total system weight as installed
- Materials potentially suitable for recycling (e.g. all ferrous and non-ferrous parts) in kg and % of total system weight as installed
- Materials potentially suitable for energy recovery (e.g. used oils, plastic parts); in kg and % of total system weight as installed

<sup>8</sup> A detailed bill of materials shall be available in the LCA report.

<sup>9</sup> Other materials include those, for which the material contents cannot be established.

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Additional environmental information can also include a more detailed description of an organization's overall environmental work (e.g., relevant Type I and Type II environmental labels awarded to the product), information that is identified as an important environmental aspect of the product or information asked by the customer and other stakeholders

Moreover, any extraordinary efforts performed by the company for recycling and reuse of their escalator material, such as e.g., voluntary take back programs of the escalator company for recycling, refurbishment and reuse of PWBs and e-waste can also be declared.

In case information regarding green building certification schemes is to be disclosed, this shall be done in this section. Such information can be e.g.:

- Annual energy consumption and energy efficiency, following ISO 25745-3
- Reference to published Health Product Declarations (HPD) or Cradle to cradle certificates (C2C)
- Noise generation
- Reference to REACH regulation compliance.

Any claims made about the product shall be verifiable.

#### 5.4.7 INFORMATION RELATED TO SECTOR EPD

As in PCR 2019:14, Section 5.3.7.

#### 5.4.8 DIFFERENCES VERSUS PREVIOUS VERSIONS

As in PCR 2019:14, Section 5.3.8.

#### 5.4.9 REFERENCES

As in PCR 2019:14, Section 5.3.9.

#### 5.4.10 EXECUTIVE SUMMARY IN ENGLISH

As in PCR 2019:14, Section 5.3.10.

## 6 LIST OF ABBREVIATIONS

In addition to abbreviations listed in PCR 2019:14, Section 6 and in addition:

CPC	= Central Product Classification
ELA	= European Lift Association
EOL	= End-of-Life
FU	= Functional unit
GPI	= General Programme Instructions
PWB	= Printed Wiring Board
RSL	= Reference Service Life
TV	= Transportation value
UC	= Usage class

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## 7 REFERENCES

CEN (2019) EN 15804:2012+A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

EPD International (2019) PCR 2019:14 Construction products, version 1.2.

EPD International (2021) General Programme Instructions of the International EPD® System. Version 4.0, dated 2021-03-29.  
[www.environdec.com](http://www.environdec.com).

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

- Other references relevant for escalators:

CEN (2018): EN 115-1 Safety of escalators and moving walks - Part 1: Construction and installation

ISO (2012): ISO 25745-1:2012 – Energy performance of lifts, escalators and moving walks – Part 1: Energy measurement and verification

ISO (2015): ISO 25745-3:2015 – Energy performance of lifts, escalators and moving walks – Part 3: Energy calculation and classification of escalators and moving walks

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## 8 VERSION HISTORY OF C-PCR

VERSION 20XX-YY-ZZ

*Description of the c-PCR version, e.g. "Original version of the c-PCR", will be added upon its publication.*

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