BRICKS, BLOCKS, TILES, FLAGSTONE OF CLAY AND SILICEOUS EARTHS (CONSTRUCTION PRODUCT)

PCR 2012:01-SUB-PCR-D

Sub-PCR to PCR 2012:01 (v2.34)

INTRODUCTION

This document is a sub-PCR to *PCR 2012:01 Construction products and construction services*, version 2.31, available at www.environdec.com Please note that it is **not** a PCR in its own, but intended to be a further specification of a specific product group to be used together with PCR 2012:01. See Figure 1 for the role of this sub-PCR.

For more details about the scope of this sub-PCR see the Section 1 of this document and Section 7 of PCR 2012:01.

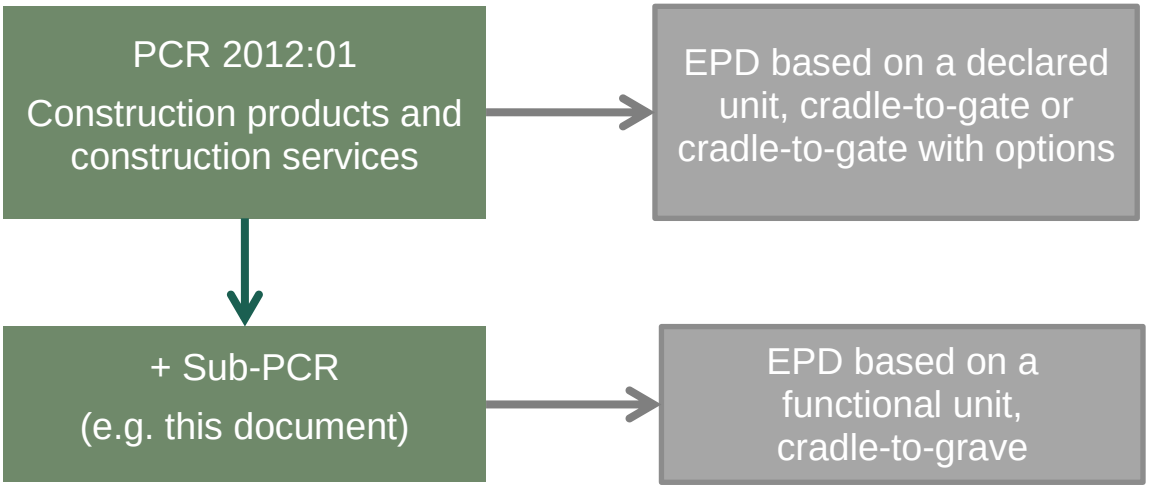

Figure 1 Overview of PCR 2012:01 and its sub-PCRs to create EPDs with different scopes.

This sub-PCR has been developed in the following procedure:

1. Draft proposed (industry stakeholders);
2. Coordination of this document in relation to the PCR for Construction product and construction services and other similar documents (Secretariat of the International EPD® System and PCR Moderator of PCR for Construction product and construction services);
3. Open consultation period;
4. Review and approval (Technical Committee of the International EPD® System);
5. Publication on www.environdec.com

For the development of this sub-PCR all the internationally available PCR documents for the product category at the date of preparation have been taken into account as listed below:

- Tiles & Bricks Europe TBE, TBE PCR for clay construction products – Guidance document for developing an EPD. Final draft, 2014-03-10.
- Institute Bauen und Umwelt e.V., PCR Guidance-Texts for Building-Related product and Services. Part B_Requirements on the EPD for Ceramic tiles and panels. Version 1.6, dated 2014-07-30.
- Institute Bauen und Umwelt e.V., PCR Guidance-Texts for Building-Related product and Services. Part B_Requirements on the EPD for Bricks,. Version 1, dated 17.07.2012.
- Institute Bauen und Umwelt e.V., PCR Guidance-Texts for Building-Related product and Services. Part B_Requirements on the EPD for Roof tiles,. Version 1, dated 16.07.2012.
- Aenor – Asociación Española de Normalización y Certificación: Regla de categoría de producto " Recubrimientos Cerámicos". Version 1.0, 2013-09-06.

1 GENERAL INFORMATION

Name:	Bricks, blocks, tiles, flagstone of clay and siliceous earths
Registration no:	PCR 2012:01-Sub-PCR-D
Programme:	The International EPD® System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
Date:	2021-11-08
This sub- PCR was prepared by	Quotasette S.r.l, Fornace SILMA S.r.l.
Appointed PCR moderator:	Paolo Simon Ostan, Quotasette S.r.l. paolo.simon.ostan@quotasette.it
Open consultation period:	2015-04-14 – 2015-06-14
Review panel for this PCR:	The Technical Committee of the International EPD® System. Full list of TC members available on www.environdec.com/TC
Valid within the following geographical representativeness:	Global
PCR language:	English. The English version takes precedence over any translated versions.
Valid until:	*2022-02-28* *The validity of this sub-PCR is dependent on the validity of PCR 2012:01 Construction products and construction services.*

This document provides further specification to PCR 2012:01 Construction products and construction services, Version 2.34. It may be used for Environmental Product Declarations that have a cradle-to-grave scope and uses a functional unit for the product group “Bricks, blocks, tiles, flagstone of clay and siliceous earths“.

Harmonization with similar available PCRs from different programmes has been considered, e.g. in terms of functional unit or reference service life. General Programme Instructions of the International EPD® System and the PCR 2012:01 were the main references in case of any discrepancies.

This sub-PCR is publically available on www.environdec.com. It is a living document. If relevant changes in the LCA methodology or in the technology for the product category occur, the documents will be revised and any changes will be published on the website.

Any comments to this document may be given on the PCR Forum or directly to the PCR moderator during the period of validity.

The EPD shall refer to a specific PCR version number, as well as this sub-PCR. The production of new PCR versions does not affect the EPD certification period.

2 DEFINITION OF THE PRODUCT GROUP

The products covered by this sub-PCR are the following articles of clay and other siliceous earths:

- Bricks and blocks;
- Tiles, ceramic tiles and flagstones;
- Roof tiles.

The product category is defined under the UN CPC codes 37310 and 37370. In particular the UN-CPC's classification is:

Group	Class	Subclass	Description
373			Refractory products and structural non-refractory clay products
	3731	**37310**	**Bricks, blocks, tiles and other ceramic goods of siliceous earths**
	3737	**37370**	**Ceramic flags and paving, hearth or wall tiles; ceramic mosaic cubes and the like**

With the aim to provide a consistent reference of the articles covered by this sub-PCR, in coherence with the corresponding ISIC code (2392), also the following underlined articles of the UN CPC code 37350 are included:

37350 - Non-refractory ceramic building bricks, flooring blocks, support or filler tiles, roofing tiles, chimneypots, cowls, chimney liners, architectural ornaments and other ceramic construction goods.

All the other CPC codes of the groups 373 and 375 are excluded from the purpose of this sub-PCR.

2.1 SPECIFICATION OF THE PRODUCT

A general description of the product, including the basic material and its intended use or function shall be included in the EPD.

The EPD shall also contain a technical description of the product, in terms of functional characteristics and performances. In particular, the following information on the product shall be included, if applicable.

Any exclusion and the use of alternative standards shall be justified. Other specifications are voluntary.

Bricks and blocks

Mandatory Information (properties characterizing bricks and blocks)	
Technical specification	**Reference Test Method**
Gross density	EN 771-1:2011 EN 772-13:2011
Percentage of voids	EN 771-1:2011 EN 772-3:2011 EN 772-9:2011
Compressive strength	EN 771-1:2011 EN 772-1:2011 ISO 9652-4:2000

Thermal transmittance	EN 771-1:2011 EN 1745-1:2012 EN 1934:2000
Sound insulation capacity	ISO 10140-1:2010 ISO 717-1:2013 ISO 717-2:2013
Water absorption	EN 772-7:2011 EN 772-11:2011

Tiles, ceramic tiles and flagstones

Mandatory Information (properties characterizing tiles)	
Technical specification	**Reference Test Method**
Water absorption	EN 1344:2013 ISO 10545-3:2014
Breaking load	EN 1344:2013 ISO 10545-4:2014
Bending strength	EN 1344:2013 ISO 10545-4:2014
Resistance to chemical attack	EN 1344:2013 ISO 10545-13:2014
Resistance to stains	ISO 10545-14:2014
Anti-slip properties	EN 1344:2013 DIN 51130
Resistance to deep abrasion	EN 1344:2013 ISO 10545-6, :2014
Resistance to surface abrasion	EN 1344:2013 ISO 10545-7:2014
Impact resistance	ISO 10545-5:2014
Frost resistance	EN 1344:2013 ISO 10545-12:2014

Roof tiles

Mandatory Information (properties characterizing roof tiles)	
Technical specification	**Reference Test Method**
Flexural strength	EN 538:1994 EN 1304: 2013
Frost resistance	EN 539-2:2013 EN 1304: 2013
Impermeability	EN 539-1:2005 EN 1304: 2013

Reaction to fire	EN 1304: 2013

NOTE 1 - The mandatory and the voluntary information shall be coherent with the corresponding Technical Data Sheet.

NOTE 2 - Equivalent standard methods, other than those indicated, may be used (e.g. ASTM, DIN, etc.). The company who develops the EPD can use the latest version of the standards if it verifies that the content is equivalent to the standards listed above.

3 FUNCTIONAL UNIT AND REFERENCE SERVICE LIFE (RSL)

Since this sub-PCR shall be used for an EPD that have a cradle-to-grave scope, a functional unit has been defined. The functional unit is the reference unit used to quantify the performance of a product system, taking into account its in-use function. The functional unit is not generally coincident with the declared unit (used for a cradle-to-gate EPD) for the product category.

Bricks and blocks

For structural bricks and blocks the functional unit is 1'000 kg of laid bricks or blocks while for facing bricks the functional unit is 1 m² of surface covered with the product.

Regarding the facing bricks, the weight of the product per square meter of surface covered (functional unit) shall be declared in the EPD.

The functional unit shall be declared in the EPD. The environmental impacts shall be given per functional unit.

For bricks and blocks the Reference Service Life (RSL) is 150 years[1]. The RSL shall be declared in the EPD.

Tiles, ceramic tiles and flagstones

For tiles, ceramic tiles and flagstones the functional unit is 1 m² of surface covered with the product.
The weight of the product per square meter of surface covered (functional unit) shall be declared in the EPD.

The functional unit shall be declared in the EPD. The environmental impacts shall be given per functional unit.

For tiles, ceramic tiles and flagstones the Reference Service Life (RSL) is 40 years[2]. The RSL shall be declared in the EPD.

Roof tiles

For roof tiles the functional unit is 1 m² of roof covered with the product.

The weight of the product per square meter of roof covered (functional unit) shall be declared in the EPD.

The functional unit shall be declared in the EPD. The environmental impacts shall be given per functional unit.

For tiles and flagstones the Reference Service Life (RSL) is 40 years[3]. The RSL shall be declared in the EPD.

[1] Referring to ISO 15686-1

[2] Referring to ISO 15686-1

[3] Referring to ISO 15686-1

4 LIFE CYCLE STAGES INCLUDED

This sub-PCR shall be used for Environmental Product Declarations that have a cradle-to-grave scope, covering all information modules A1 to C4.

The following table (figure 2), extracted from the PCR 2012:01, shows all the mandatory life cycle stages for a cradle-to-grave EPD based on a defined functional unit[4].

The specifications about the life cycles stages for the product category are provided in the following paragraphs.

[4] In some cases certain modules may not be relevant to the environmental performance of a product. In such cases the irrelevant module shall be declared as “Module Not Declared, MND” in the EPD. Such a declaration shall not be regarded as an indicator result of zero (see PCR 2012:01 §6)

		Comparability basis:	Within the product group	Performance in a construction application
Life cycle stages in the International EPD® System	**Asset life cycle stages (EN 15804)**	**Information module (EN 15804)**	**EPD type**	
			Declared unit: Cradle-Gate, Cradle-Gate with options	**Functional unit: Cradle-Grave**
Upstream	A1) Raw material supply	A1-A3) Product stage	Mandatory	Mandatory
Core	A2) Transport			
	A3) Manufacturing			
Downstream	A4) Transport	A4-A5) Construction process stage	Optional	Mandatory
	A5) Construction installation			
	B1) Use	B1-B5) Use stage	Optional	Mandatory
	B2) Maintenance			
	B3) Repair			
	B4) Replacement			
	B5) Refurbishment			
	B6) Operational energy use			
	B7) Operational water use;			
	C1) Deconstruction, demolition	C1-C4) End of life stage	Optional	Mandatory
	C2) Transport			
	C3) Waste processing			
	C4) Disposal			
Other environmental information	D) Future, reuse, recycling or energy recovery potentials	D) Recovery stage*	Optional	Optional
Inclusion of reference service life (RSL)	—	—	Mandatory if any module in B is included	Mandatory

* Just called module D in EN 15804.

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

4.1 UPSTREAM PROCESSES (A1)

The following upstream processes/life cycle stages (adapted from PCR 2012:01) are included:

A1 - RAW MATERIAL SUPPLY

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

4.2 CORE PROCESSES (A2-A3)

The following core processes/life cycle stages (adapted from PCR 2012:01) are included:

A2 - TRANSPORTATION

- External transportation to the core processes and internal transport.

A3 - MANUFACTURING

- In case that the manufacturing incorporate (at the same site) recycling process of any purchased recycled material and the transport from the recycling process to where the material is used;
- Manufacturing of the product, including all processes and operations at production plant level (e.g. pre-processing, mixing, extrusion/moulding, drying, firing, glazing, etc.)[5];
- Packing materials etc. used;
- Production of ancillary materials or pre-products;
- Treatment of waste generated from the manufacturing processes. Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product

4.3 DOWNSTREAM PROCESSES (A4-C4)

The following downstream processes/life cycle stages are included.

The technical information (specific scenarios), required by the PCR 2012:01 § 8.1.5, covering the life cycle stages from A4 to C4, shall be provided in the background LCA report.

[5] processes included as examples are not all relevant or applicable for every type of products covered by this sub- PCR and do not represent an exhaustive list

A4 - TRANSPORT TO CONSTRUCTION SITE

The transport from the production plant to a central warehouse or storage (if relevant) and the transport to the construction site shall be included.

The distances shall be defined taking into consideration an average transports scenario. The distribution scenario shall be declared in the EPD.

The storage of the product (e.g. heating, cooling, humidity control etc.) is not relevant for the product category.

A5 - CONSTRUCTION INSTALLATION

The Installation of the product at the construction site is usually by hand. Anyway the manufacture and transportation of ancillary materials (e.g. mortar, glue for laying) and any energy or water required for installation or operation of the construction site shall be considered. It also includes other related on-site operations to the product.

Waste processing of the waste from product packaging and product wastage during the construction shall be included (when it is not reused at the construction site as aggregates) according to PCR 2012:01 § 6.5.5. If specific data about the waste destinations and treatments are lacking, country specific scenarios may be used. The transport of the waste generated from the construction site to the waste processing plant shall also be included.

The wastage of the product during the installation (additional production processes to compensate for the loss of wastage of products) shall be considered and calculated according to PCR 2012:01 § 6.3, figure 2. If specific data is not available, the default wastage (percentage in mass) shall be:

- 3% for bricks and blocks;
- 3% for tiles, ceramic tiles and flagstones;
- 2% for roof tiles.

B1 - USE

This module covers environmental aspects and impacts arising from the product during its normal use.

In general, the products covered by this sub-PCR do not generate relevant environmental impacts during the use phase. Any possible release of substances, related to the product, from the wall, facade, roof, floor covering and other surfaces (interior or exterior) to air, soil or water shall be considered.

B2-B5 – MAINTENANCE, REPAIR, REPLACEMENT AND REFURBISHMENT

Structural bricks and blocks and facing bricks do not require any maintenance, repair or replacement during the RSL.

For tiles, ceramic tiles, flagstones and roof tiles, maintenance and replacements during the RSL have to be modelled according to manufacturer guidelines.

The production and the transportation of any ancillary products used for the extraordinary maintenance (e.g. specific floor treatment products) including the transport and the end of life processes of any waste from maintenance shall be included. Ordinary maintenance (e.g. cleaning processes) is excluded.

The production and the transportation of replacement part and of any ancillary materials used for replacement (e.g. mortar, glue, etc.), use of energy and water, including the transport and the end of life processes of any waste from replacement shall be included.

Maintenance and replacement scenarios, according to RSL, shall be declared in the EPD. Scenarios shall be coherent with the corresponding Technical Data Sheet and other specific documentation provided by the manufacturer to ensure the technical performances of the product.

B6-B7 - OPERATIONAL ENERGY USE AND OPERATIONAL WATER USE

Operational energy use (B6) and operational water use (B7) are not relevant for the product category.

C1 - DECONSTRUCTION, DEMOLITION

Deconstruction/demolition of bricks and blocks is conducted at the end-of-life of the building, conventionally using an excavator or a construction crane. The environmental impacts of the building demolition process (e.g. diesel consumption in the demolition machines) and any on-site sorting of the materials shall be allocated by mass to the bricks and blocks.

Deconstruction/demolition of tiles, ceramic tiles and flagstones at the end of RSL (see chapter 3) is usually conducted with a selective deconstruction/demolition, using an electric demolition hammer. The use of energy shall be considered.

Deconstruction/demolition of roof tiles at the end of RSL (see chapter 3) is usually conducted with a selective deconstruction/demolition by hand. If any other kind of deconstruction/demolition processes is expected for a specific product (e.g. using particular demolition machines), the use of energy shall be considered.

In case of demolition scenarios other than those mentioned above, the specific scenario and the allocation methods shall be described in EPD.

C2 - TRANSPORT

This module includes the transportation of the discarded product as part of the waste processing, e.g. to a recycling site and transportation of waste e.g. to final disposal.

If specific data about the waste destinations are lacking a default distance of 50 km by lorry may be used.

C3 - WASTE PROCESSING

After the deconstruction/demolition stage, wastes are usually crushed (recycling process) towards secondary materials for another application (e.g. roadwork, concrete aggregates, etc.). Waste processing of material flows intended for reuse, recycling and energy recovery shall be accounted according to “polluter pays principle” (see PCR 2012:01 § 6.5.5).

As a general rule national scenario for the end-of-life stage should be used if no specific data is available. The scenario shall be reported in the EPD.

C4 - DISPOSAL

Waste disposal including physical pre-treatment and management of the disposal site. Emissions from waste disposal are considered part of the product system under study and therefore part of this module, according to the “polluter pays principle”.

As a general rule national scenario for the end-of-life stage should be used if no specific data is available. The scenario shall be reported in the EPD.

5 CHANGES IN THIS SUB-PCR

VERSION 2016-08-04

Original version of sub-PCR, based on PCR 2012:01 *Construction products and construction services*, Version 2.01.

VERSION 2017-05-30

- Updated nomenclature of sub-PCRs in accordance with version 2.2 of PCR 2012:01.
- Editorial changes

VERSION 2018-11-16

- Updated validity to 2020-03-03 to align with version 2.3 of PCR 2012:01.
- Editorial changes

VERSION 2020-02-17

- Updated validity to 2020-09-01 to align with version 2.31 of PCR 2012:01.

VERSION 2020-07-02

- Updated validity to 2020-12-31 to align with version 2.32 of PCR 2012:01.

VERSION 2020-09-18

- Updated validity to 2021-12-31 to align with version 2.33 of PCR 2012:01.

VERSION 2021-11-08

- Updated validity to 2022-02-28 to align with version 2.34 of PCR 2012:01.

6 REFERENCES

- Product Category Rules and PCR basic module 2012:01, *Construction product and Construction services*. The International EPD System, version 2.0, dated 2015-03-03.
- Product Category Rules 2011:09, *Tiles, flagstone, bricks and similar articles, of cement, concrete or artificial stone*. The International EPD System, version 2.0, dated 2011-08-25 (expired).
- Tiles & Bricks Europe TBE, TBE PCR for clay construction products – Guidance document for developing an EPD. Final draft, 2014-03-10.
- Institute Bauen und Umwelt e.V., PCR Guidance-Texts for Building-Related product and Services. Part B_Requirements on the EPD for Ceramic tiles and panels. Version 1.6, dated 2014-07-30.
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- Institute Bauen und Umwelt e.V., PCR Guidance-Texts for Building-Related product and Services. Part B_Requirements on the EPD for Roof tiles,. Version 1, dated 16.07.2012.
- Aenor – Asociación Española de Normalización y Certificación: Regla de categoría de producto " Recubrimientos Cerámicos". Version 1.0, 2013-09-06.
- ISO 15686-1. 2011. Buildings and constructed assets -- Service life planning -- Part 1: General principles and framework.

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