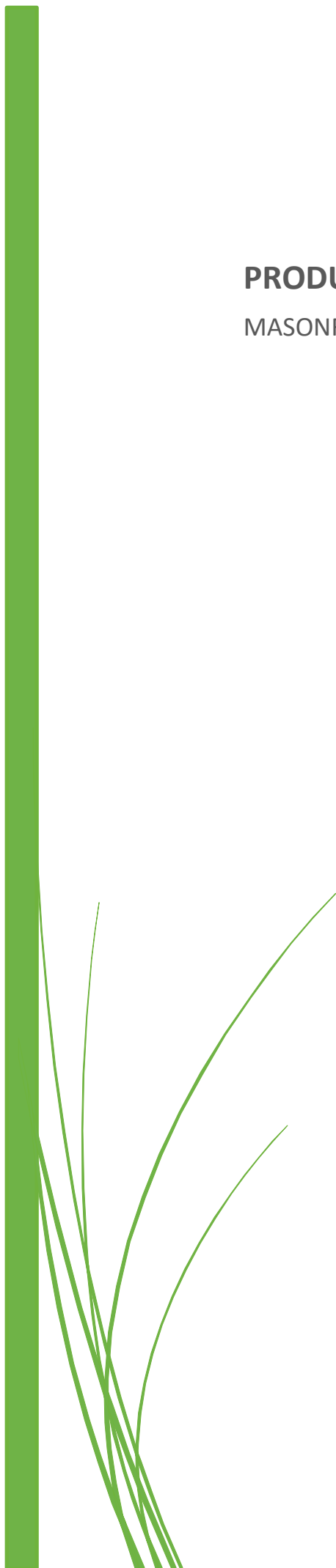


PRODUCT CATEGORY RULES

MASONRY UNITS



Version 1.2.

Aveiro, June 2022

Developed versions

Version	Comments	Edition date
1.0	First version of the Product Category Rules document for the DAPHabitat System	18.12.2015 – December 2015
1.1	Extension of the document's validity period	18.11.2020 – November 2020
1.2	Update of the PCR document when updating the Standard EN 15804:2012+A2:2019	01.06.2022 – June 2022

Contact

DAPHabitat System

Departamento de Engenharia Civil – Universidade de Aveiro

3810 – 198 Aveiro

Portugal

www.daphabitat.pt

deptecnico@centrohabitat.net

INDEX

1.1.	DAPHABITAT SYSTEM	1
1.2.	PROGRAM OPERATOR	1
1.3.	PRODUCT CATEGORY RULES	1
1.4.	PCR- BASIC MODULE SPECIFIC FOR CONSTRUCTION PRODUCTS AND SERVICES	2
2.	GENERAL INFORMATION	2
2.1.	SCOPE AND OBJECTIVE	2
2.2.	PCR DOCUMENT IDENTIFICATION	3
3.	PRODUCT GROUP DEFINITION	5
	THERE ARE OTHER MATERIALS THAT CAN CONSTITUTE MASONRY UNITS. SOME ARE OBTAINED THROUGH HARDENING BY CHEMICAL PROCESSES, SUCH AS ADOBE BLOCKS (OR “RAW BRICKS”), LIME BLOCKS, PLASTER BLOCKS.	6
3.1.	MAIN TYPES OF PRODUCTS FOR MASONRY UNITS	6
3.1.1.	APPLICATION	6
4.	LCA CALCULATION RULES	8
4.1.	FUNCTIONAL UNIT	8
4.2.	DECLARED UNIT	8
4.3.	SYSTEM BOUNDARIES	9
4.3.1.	PRODUCT STAGE (MANDATORY)	9
4.3.2.	CONSTRUCTION PROCESS STAGE	9
4.3.3.	USE STAGE	10
4.3.3.1.	Modules step of using information for the construction of the components (B1-B5)	10
4.3.3.2.	Information modules of use stage concerning the exploitation of construction (B6-B7)	10
4.3.4.	END OF LIFE STAGE	11
4.3.5.	BENEFITS AND ENVIRONMENTAL LOADS BEYOND THE SYSTEM BOUNDARIES – D MODULE	11
5.	EDP CONTENT	12
6.	PROJECT REPORT	13
7.	UNITS	13
8.	REFERENCES	14
ANNEX A		15

FIGURE INDEX

FIGURE 1: MASONRY STRUCTURE	5
-----------------------------------	---

TABLE INDEX

TABLE 1: PCR DOCUMENT IDENTIFICATION.....	3
TABLE 2: CONSULTATION OF EXISTING PCR DOCUMENTS IN OTHER EDP REGISTRATION PROGRAMS	4
TABLE 3: EXAMPLE UNITS AND THEIR APPLICATION.....	8
TABLE 4: EXAMPLE UNITS AND THEIR APPLICATION.....	9

GENERAL INTRODUCTION

1.1. DAPHabitat System

The DAPHabitat System is a Portuguese registration program of Type III Environmental Product Declarations (EDP) for product from habitat field. The Habitat field includes all the products and services involved in building and construction works.

This national registration program allows any company or interested entity to development or approval of Product Category Rules (PCR) and the registration of EDP, independent from its home country.

website	www.daphabitat.pt
contact	geral@daphabitat.pt

1.2. Program Operator

The administration of the DAPHabitat system is a function of the Platform for Sustainable Construction. In this EDP registration system, the administrator is called the Program Operator.

Identification	Associação Plataforma para a Construção Sustentável
NIF	509 037 321
Localization	<u>Delegação:</u> Departamento de Engenharia Civil Universidade de Aveiro 3810-193 Aveiro Portugal
Contact	deptecnico@centrohabitat.net
website	www.centrohabitat.net

1.3. Product Category Rules

PCR are documents that contain the set of rules, requirements, and specific guidelines for the development of EDP, such as the parameters and categories of impact to declare, functional unit, system boundary, the life cycle stages to consider in the processes to be included, the biogenic carbon content, rules for the preparation of scenarios, rules for calculating the life cycle inventory and impact assessment, rules regarding additional environmental information, the conditions of comparability between construction products based on the information declared in the EDP, other information to declare, issues related to the verification and registration of the EDP in the database of the registration program.

1.4. PCR- basic module specific for construction products and services

This document was developed based on the PCR-basic module document specifically for construction products and services. This document was prepared according to EN 15804:2012+A2:2019 and represents a supplement to the standard and any specific PCR document.

This document, specific PCR for masonry units, within the scope of construction products and services, must define, at least, the reference service life and the relevant functional unit for the set of products it represents. This document was carried out following the procedure described in the General Instructions for the System, as well as with national and international standardization:

- NP ISO 14025:2009 – “Rótulos e declarações ambientais – Declarações ambientais Tipo III – Princípios e procedimentos”¹;
- ISO 21930:2007 – “Building Construction – Sustainability in building construction”;
- EN 15804:2012+A2:2019 – “Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products”;
- NP EN ISO 14044:2010 – “Gestão ambiental – Avaliação do ciclo de vida – Requisitos e linhas de orientação”²;
- NP EN ISO 14040:2008 – “Gestão ambiental - Avaliação do ciclo de vida - Princípios e enquadramento”³.

2. GENERAL INFORMATION

2.1. Scope and objective

This document establishes the framework that allows organizations to develop the following studies/documents:

- Life Cycle Assessment (LCA) of the product(s) or service(s) object of the study and respective communication, for the masonry unit’s category EDP for products that serve as masonry units;
- EDP for products that serve as masonry units.

The main objective of this PCR document is to ensure that the set of rules for the development of reliable and verifiable information in a EDP is described for products belonging to the category of “masonry units”, based on the LCA. This document is intended for all manufacturers (and other interested parties) of masonry units.

Note

¹ ISO 14025:2009 – “Environmental labels and declarations – Type III environmental declarations – Principles and procedures”

² ISO 14044:2006 – “Environmental management – Life cycle assessment – Requirements and guidelines”

³ ISO 14040:2009 - “Environmental management – life cycle assessment – Principles and framework”

2.2. PCR document identification

The identification data referring to the preparation of this version of the PCR document for masonry units products are shown in **Table 1**.

Table 1: PCR document identification

NAME	PCR – Masonry Units – V.1.0 (2015)	
REGISTER DATE AND NUMBER	30/01/2015 PCR006	
VERSION	<input checked="" type="checkbox"/> New x	<input type="checkbox"/> Update
PCR COORDINATORS	Baio Dias baiodias@ctcv.pt Luís Arroja arroja@ua.pt	
AUTHOR(S):	Marisa Almeida marisa@ctcv.pt Baio Dias baiodias@ctcv.pt Luís Arroja arroja@ua.pt	
SECTOR PANEL	APICER – Associação Portuguesa da Indústria de Cerâmica Artebel, S.A – Soluções construtivas em betão ANIPB – Associação Nacional dos Industriais de Prefabricação em Betão Argex – Argila Expandida, S.A.	
CONSULTATION PERIOD	11/06/2014 to 30/06/2014	
VALID UNTIL	June 2027	

Comments on this document can be sent to the Construção Sustentável Platform or to the document's coordinators.




To establish a document that allows international comparison, the DAPHabitat System needed to harmonize the document PCR – Masonry Units with other European registration programs. In this way, a study of other similar PCR documents was carried out.

Table 2 shows the PCR documents consulted and adopted for the realization of the PCR document for masonry units.

Table 2: Consultation of existing PCR documents in other EDP registration programs

International registration programs	PCR
DAPHabitat System	PCR- basic module to construction products and services. Version 2.2.
The Norwegian EPD Foundation epd-norge.no	Product – Category Rules (PCR) For preparing an environmental declaration (EPD) for Product Group Precast concrete products . March 2012
The International EPD System - Envirodec	Product Category Rules (PCR) for preparing an Environmental Product Declaration (EPD) for Tiles, flagstones, bricks and similar articles, of cement, concrete or artificial stone . Version 2.0 – 2011/08/25
	Product Category Rules (PCR) for preparing an Environmental Product Declaration (EPD) for Tiles Other worked monumental or building stone and articles thereof; other artificially coloured granules, chippings and powder of natural stone; articles of agglomerated slate . Version 4.1 – 2011/02/17
IBU environmental product declarations (Alemanha)	PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for aerated concrete . Version 1.1 - 2012/10/29.
	PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for bricks . Version 1.1 - 2012/10/29.
	PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for lime sand bricks . Version 1.1 - 2012/10/29.

After analysing the documents in **Table 2**, the need to prepare the PCR document for masonry units was concluded for the following reasons:

-  Some of the PCR documents are not yet in line with the principles of Standard EN 15804, which includes the basic rules for developing PCR for all construction products and services.
-  The PCR documents analysed are made for specific products within the scope of masonry, not including all existing products for the intended category, masonry units, considered by this document;
-  The PCR documents analysed include different specifications that may compromise the comparison between the EDP of similar products within the scope of masonry units, according to point 6.7.2. of NP EN 14025: 2009.

3. PRODUCT GROUP DEFINITION

The product category “masonry units” includes different types of blocks made of different materials (eg. ceramic, concrete, stone, concrete with expanded clay). Masonry is the term used to designate the building systems of walls, or similar works, executed with blocks of natural or artificial stones joined together with or without mortar, in horizontal rows or in similar layers, which are repeated overlapping each other. on top of each other, forming a rigid and cohesive set. The solid and resistant blocks that make up masonry can be stone blocks, obtained by the extraction of granite quarries or other types of rock, but they can also be manufactured especially for this purpose, as ceramic blocks (ceramic bricks), concrete, plaster, or even glass. The masonry units or blocks used can be drilled or solid.

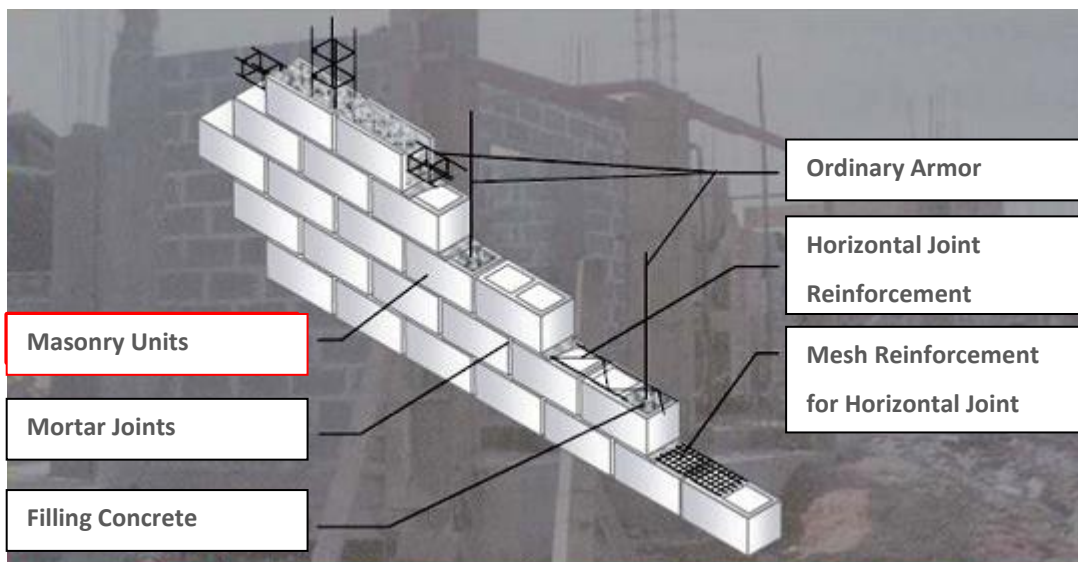








Figure 1: Masonry structure

According to Eurocode 6, the masonry unit is called: "(...) element produced to be used in the construction of masonry". Following the harmonized European standards within the scope of CE Marking for Construction products, masonry units can be:

-  Ceramic bricks;
-  Silico-limestone blocks;
-  Aggregate concrete blocks (dense and light));
-  Autoclaved aerated concrete blocks;
-  Blocks of reconstituted stone;
-  Natural stone masonry units.

There are other materials that can constitute masonry units. Some are obtained through hardening by chemical processes, such as adobe blocks (or “raw bricks”), lime blocks, plaster blocks.

3.1. Main types of products for masonry units

The main types of masonry units are classified according to their constitution, shape, and dimension. The product description must contain the applicable product standard, national or European. There are several masonry constructions, with different functions, structural, thermal, acoustic, among others, which vary the constituent masonry units, such as stone masonry, ceramic brick masonry, solid ceramic block masonry, block masonry perforated ceramic, solid block, or perforated concrete block with light or solid aggregates, among others.

In Table A. 1 of ANNEX A there are some standards for masonry units made of ceramic, concrete, autoclaved cellular concrete, natural stone, reconstructed stone or sand-lime. For undated references, the latest edition of the referenced document applies.






The product description to be included in the specific EDP should be detailed according to the example presented below.

*“The **ceramic brick** for masonry, i.e. ceramic masonry unit consists of a brick made of clay or other clay materials, with or without aggregates, fuels or other additives, fired at a sufficiently high temperature to obtain a ceramic bond ⁴”.*

In the EDP, the product group and the respective NACE codes (Statistical Nomenclature of Economic Activities of the European Community) must be specified following Decree-Law No. 381/2007 of 14 November.





3.1.1. Application

Masonry can be used in the construction of several construction elements (walls, vaults, foundation, etc....) and can have a structural or sealing function. Products belonging to the category of masonry units have a wide field of application in building and among other construction works, and can be applied in:

-  industrial buildings;
-  agricultural buildings;
-  accessory buildings and annexes and provisional facilities;
-  sports pavilions;
-  airports;

⁴ NP EN 771-1:2012 - Specifications for masonry units. Part 1: Ceramic bricks for masonry. Based on definition 3.2.

PCR – Masonry Units

-  special large-span structures;
-  dwellings;
-  administrative and school buildings
-  walls and fences.

4. LCA CALCULATION RULES

4.1. Functional unit

The functional unit provides a reference for the quantification of the environmental performance of the product, being required for a cradle-to-grave EPD.

“1m² in (specify product and material) for masonry wall (interior or exterior) with a reference service life (x years)” (packaging included)

The specification of the product and material referred to above must be precise and objective so that the product is identified unambiguously. In the case of EDP from cradle-to-grave, information related to the environmental performance of the declared product unit (1 t, referring to the conversion factor(s) of that unit to the 1m² unit) must also be included.

The reference service life must be determined according to the indications in point 5.4.1. of the PCR document - basic model specific for construction products and services.

Table 3: Example units and their application

Examples
1 m ² in ceramic brick for interior masonry wall with a reference life of 50 years.
1 m ² of autoclaved aerated concrete block for exterior masonry wall with a reference life of 50 years.

4.2. Declared unit

Declared unit can be:

“1 t (specify product and material) produced” (packaging included)

In addition, information related to the environmental performance of another declared product unit (eg. 1 m² with a thickness of (x) m and a mass of (y) kg) can also be included in the EPD.

Table 4: Example units and their application

Type unit	Examples
1 piece	1 ceramic brick produced (dimensions to be declared) 1 concrete block produced (dimensions to be declared)
Mass	1 t of masonry produced in ceramic brick 1 t of masonry produced in a concrete block produced

4.3. System boundaries

The system boundaries determine which information modules and unit processes that should be include in the LCA that underlies EDP.

Examples of unitary processes to consider in module A3 of the product stage, in a cradle-to-gate EDP:

 Ceramic brick:

- Preparation of paste;
- Extrusion;
- Drying;
- Tunnel oven cooking;
- Selection, packaging, and storage.

 Concrete block:

- Homogeneous mixture;
- Pressing;
- Controlled drying and curing;
- Selection, packaging, and storage.

As part of the definition of the system boundaries, a description must be made for each module included in the product's life cycle stages, as well as the establishment of a flow chart.

4.3.1. Product Stage (mandatory)

The product stage is composed by information modules related to the extraction and processing of raw materials, its transport until the production site and the product production. The document PCR- basic module describes some of the processes that should be considered in each sub-module A1, A2 and A3.

4.3.2. Construction Process Stage

The construction stage is an optional stage and includes the information modules about the transport of products to the construction site and its installation in the building or in other construction works, including all materials supply and energy, as well the waste processing by the end of waste status or their final disposal.

A5) Product installation process:

Example: The ceramic bricks must be wetted in (clean) water before they are laid. In this ceramic brick installation operation, the water used must be counted, as well as the transport and use of all other auxiliary materials necessary to raise the ceramic brick masonry wall.

The document PCR- base model describes some of the processes that should be considered in each sub-module A4 and A5.

4.3.3. Use Stage

The use stage is an optional step and is constituted by information modules covering the period from the delivery of the building or construction works as completed to its deconstruction or demolition. The duration of the use stage relative to the product may be different from the required service life of the building or construction work (for which the construction was designed).

The document PCR- base model describes some of the processes that should be considered in each sub-module B1-B7. However, in this document some characteristic examples of the product category “masonry units” are described.

4.3.3.1. Modules step of using information for the construction of the components (B1-B5)**B1) Use of the installed product:**

Example: Release of substances from the masonry units (indoor or outdoor) into the air, soil or water.

4.3.3.2. Information modules of use stage concerning the exploitation of construction (B6-B7)**B6) Energy consumption by the integrated technical systems in the building operational stage:**

If the masonry units are not part of the technical systems integrated into the building (as usual), module B6 should not be considered.

B7) Water consumption by the integrated technical systems in the building operational stage:

If the masonry units are not part of the technical systems integrated into the building (as usual), module B7 should not be considered.

4.3.4. End of life stage

The “end of life” stage of the masonry begins when it is replaced, disassembled, or deconstructed from the building or other construction works and has no other functionality. This can also start at the end of the building's life, depending on the choice of the product's end-of-life scenario. The document PCR- basic model describes some of the processes that must be considered in each sub-module C1, C2, C3, and C4.

4.3.5. Benefits and environmental loads beyond the system boundaries – D module

The information module “D” regard to the benefits or to the loads for environmental created by reused products, recycled materials and/or energy transfer to the outside of the product system (as secondary materials or fuels). The document PCR- basic model describes some of the processes that must be considered in this module.

5. EDP CONTENT

The DAPHabitat System requires an EDP to include certain general information regarding the registration program and the applicant organization. For the preparation of the EDP, at least the following content should be considered:

- ☰ Name and address of the manufacturer(s);
- ☰ Description of the use of the construction product/ product class and the functional unit or declared to which the data relates;
- ☰ Identification of the construction product/product class by its name (including any product code) and a simple visual representation of the construction product/product class to which the data relates;
- ☰ Description of the main components and/or product materials;
- ☰ Name of the program used as well the name and address of the program operator and, when relevant, the logo and web page;
- ☰ Issue date of the declaration and validity period up to 5 years;
- ☰ information indicating the stages are not considered, if the statement is not based on an LCA covering all stages of the life cycle;
- ☰ mention indicating that the construction product EPD may not be comparable if they are not in accordance with EN 15804 and this PCR document;
- ☰ in the case where an EDP is declared as an average environmental performance for a number of products, a mention of this must be included in the declaration, accompanied by a description of the range/variability of the results of the LCIA, if this is significant;
- ☰ the location(s), the producer or group of producers or their representatives for whom EDP is representative;
- ☰ declaration of the content in materials of the product should at least enumerate the substances contained in the product that are in the " List of substances of very high concern candidates for authorization" (under REACH) when the content exceeds the limits for registration by the European Chemicals Agency;
- ☰ Information indicating where the explanatory elements can be obtained.

This information should be declared according to the requirements indicated in the General Instruction for DAPHabitat System and with the EPD **template** at www.daphabitat.pt for formatting and presentation of content in the EPD.

More specific information about the content of an EDP is presented in the document PCR- basic model, with no specificity for the category of “masonry units”.




6. PROJECT REPORT

The project report should be systematic and complete to support the verification procedure of an EPD. The project report must register the LCA and additional information, as stated in the EPD, according to EN 15804. This must be made available to the certification body recognized by DAPHabitat System respecting the confidentiality requirements specified in EN ISO 14025.

The elements of the Project Report should follow the requirements of the EN 15804 as well as the indications described in the document General Instructions of DAPHabitat System, available at www.daphabitat.pt.

7. UNITS

The SI units should be used. The basic units to be used are meter (m), kilogram (kg), molecular weight (mole). All resources must be expressed in kg with the exception:

-  of energy resources must be used kWh or MJ;
-  the temperature should be expressed in Celsius degrees;
-  time should be expressed as a rating scale: minutes, hours, days, or years.

8. REFERENCES

- EN ISO 14025:2010 – “Rótulos e declarações ambientais; Declarações ambientais Tipo III; Princípios e procedimentos;”;
- ISO 21930:2007 – “*Building Construction – Sustainability in building construction*”;
- EN 15804:2012+A2:2019 – “*Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products*”;
- NP EN ISO 14044:2010 – “Gestão ambiental – Avaliação do ciclo de vida – Requisitos e linhas de orientação”;
- NP EN ISO 14040:2008 – “Gestão ambiental - Avaliação do ciclo de vida - Princípios e enquadramento”;
- General Instructions for the DAPHabitat System. Version 2.0, June 2022;
- PCR – Product Category Rules. Basic module construction products and services. Sistema DAPHabitat. Version 2.2 June 2022;
- Manual de Alvenaria de Tijolo, Baio Dias (Cord. Ed.), Ed. APICER/CTCV, 2ª edição, Coimbra (2009), ISBN:978-972-99478-5-8.
- CPC 3754: Tiles, flagstones, bricks and similar articles, of cement, concrete or artificial stone. The International EPD System. Version 2.0 – 2011-08-25.
- CPC 3769: Other worked monumental or building stone and articles thereof; other artificially coloured granules, chippings and powder of natural stone; articles of agglomerated slate. The International EPD System. Version 4.1 – 2011/02/17.
- PCR Guidance-Texts for Building-Related Products and Services. **Part B: Requirements on the EPD for Aereated concrete**. Institut Bauen und Umwelt e.V. (IBU) Version 1.1 - 2012/10/29.
- PCR Guidance-Texts for Building-Related Products and Services. **Part B: Requirements on the EPD for bricks**. Institut Bauen und Umwelt e.V. (IBU) Version 1.1 – 2012/10/29.
- PCR Guidance-Texts for Building-Related Products and Services. **Part B: Requirements on the EPD for lime sand bricks**. Institut Bauen und Umwelt e.V. (IBU) Version 1.1 – 2012/10/29.

ANNEX A

Table A. 1 – Examples of products for masonry units and product standards

Material type	Product standard
Ceramic bricks	<ul style="list-style-type: none"> – NP EN 771-1:2012: Especificações para unidades de alvenaria. Parte 1: Tijolos cerâmicos para alvenaria (EN 771-1:2006). – EN 771-1:2011+A1:2015: Specification for masonry units – Part 1: Clay masonry units (Substitui a EN 771-1:2011).
Sand-lime blocks	<ul style="list-style-type: none"> – NP EN 771-2: 2012: Especificações para unidades de alvenaria. Parte 2: Blocos sílico-calcários (EN 771-2:2006). – EN 771-2:2011+A1:2015: Specification for masonry units – Part 2: Calcium silicate masonry units (Substitui a EN 771-2:2011).
Concrete blocks	<ul style="list-style-type: none"> – NP EN 771-3:2012: Especificações para unidades de alvenaria. Parte 3: Blocos de betão de agregados (agregados correntes e leves) (EN 771-3:2006). – EN 771-3:2011+A1:2015: Specification for masonry units – Part 3: Aggregate concrete masonry units (dense and light-weight aggregates) (Substitui a EN 771-3:2011). – NP EN 771-4:2012: Especificações para unidades de alvenaria. Parte 3: Blocos de betão celular autoclavado (EN 771-4:2006). – EN 771-4:2011+A1:2015: Specification for masonry units – Part 3: Autoclaved aerated concrete masonry units (Substitui a EN 771-4:2011).
Stone blocks	<ul style="list-style-type: none"> – NP EN 771-5:2011+A1:2015: Especificações para unidades de alvenaria. Parte 3: Blocos de pedra reconstituída (EN 771-5:2011). – EN 771-5:2011+A1:2015: Specification for masonry units – Part 5: Manufactured stone masonry units (Substitui a EN 771-5:2011). – NP EN 771-6:2012: Especificações para unidades de alvenaria. Parte 6: Unidades de alvenaria em pedra natural (EN 771-6:2006). – EN 771-6:2011+A1:2015: Specification for masonry units – Part 6: Natural stone masonry units (Substitui a EN 771-6:2011).