

**PRODUCT CATEGORY RULES**  
**THERMAL INSULATION**



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**Developd versions**

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1.0	First version of the Product Category Rules document for the DAPHabitat System	10.02.2014 – February 2014
1.1	Information update according to the new version of the PCR document: base model for construction products and services V.2.0.	20.12.2014 – December 2014
1.2	Extension of the document's validity period	18.11.2020 – November 2020
1.3	Update of the PCR document when updating the Standard EN 15804:2012+A2:2019	01.06.2022 – June 2022

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## 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.

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### 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
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### 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 thermal insulation, 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”<sup>1</sup>;
-  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”<sup>2</sup>;
-  NP EN ISO 14040:2008 – “Gestão ambiental - Avaliação do ciclo de vida - Princípios e enquadramento”<sup>3</sup>.

## 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 thermal insulation category;
-  EDP for products that serve as thermal insulation.

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#### Note

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

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

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

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 “thermal insulation”, based on the LCA. This document is intended for all manufacturers (and other interested parties) of thermal insulation.

## 2.2. PCR document identification

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

**Table 1:** PCR document identification

NAME	PCR – Thermal Insulation - V.1.3 (2014)	
REGISTER DATE AND NUMBER	10/02/2014   PCR004	
VERSION	New <input type="checkbox"/>	Update <input checked="" type="checkbox"/>
PCR COORDINATORS	José Dinis Silvestre   <a href="mailto:jose.silvestre@tecnico.ulisboa.pt">jose.silvestre@tecnico.ulisboa.pt</a> Manuel Duarte Pinheiro   <a href="mailto:manuel.pinheiro@ist.utl.pt">manuel.pinheiro@ist.utl.pt</a>	
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SECTOR PANEL	Amorim Isolamentos Sofalca – Aglomerados de Cortiça, ACE Argex – Argila Expandida, S.A. Sonae Industria, SGPS, S.A. IberFibran – Poliestireno Extrudido, S.A. MasterBlock Termolan – Isolamentos termo-acústicos, S.A. Eurofoam – Indústria de poliestireno extrudido, Lda Knauf Insulation	
CONSULTATION PERIOD	01/08/2013 to 30/11/2013	
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 – Thermal Insulation 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 thermal insulation.

**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.
IBU environmental product declarations (Alemanha) epd-online.com	PCR Guidance-Texts for Building-Related Products and Services. <b>Part B: Requirements on the EPD for Insulating materials made of foam plastics.</b> Version 1.1 - 2012/10/29. PCR Guidance-Texts for Building-Related Products and Services. <b>Part B: Requirements on the EPD for Mineral insulating materials.</b> Version 1.1 - 2012/10/29.
DAPc System (Spain) csostenible.net/sistema_dapc	RCP - <b>Productos aislantes térmicos.</b> RCP 001 - Sistema DAPc. Versión 1. 2010.
The Norwegian EPD Foundation epd-norge.no	Product Category Rules (PCR) for preparing an environmental declaration (EPD) for Product Group <b>Insulation materials.</b> Abril 2007.

After analysing the documents in **Table 2**, the need to prepare the PCR document for thermal insulation 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.
-  Some of the PCR documents analysed are made for specific products within the category of thermal insulation, not including all products for thermal insulation considered in this document;  
The PCR documents analysed include different specifications that may compromise the comparison between the EDP of similar products within the scope of thermal insulation according to point 6.7.2. of NP EN 14025: 2009.






### 3. PRODUCT GROUP DEFINITION

The product category for “thermal insulation” includes different types of products designed to reduce heat transfers between buildings and other construction works and the outer space, or between spaces of these constructions. A product can be included in this category as long as the respective technical characteristics necessary for the performance described above are demonstrated (in a document following national legislation).









Thermal insulation products are materials with thermal conductivity less than 0.065 (W/m.°C) and a thermal resistance greater than 0.30 (m<sup>2</sup>.°C/W), following national regulations applicable to the thermal behaviour of buildings. However, other materials that do not have these characteristics (eg light granules in bulk or light concrete), can ensure the function of thermal insulation of buildings and other construction work and therefore be included in this product category<sup>4</sup>.

#### 3.1. Main types of products for thermal insulation









The main types of thermal insulation products are classified according to their microstructure, chemical constitution, and their shape. In most cases, thermal insulation products can be classified according to their typology as follows:

-  they may have a fibrous (eg wool) or cellular microstructure (eg foams, expanded and cellular products, including light granules);
-  they can be produced from mineral raw materials or synthetic polymers, or made from raw materials of plant or animal origin;
-  they can be found on the market in the form of rigid or flexible plates, rollers, foams to be applied on-site by projection or injection, or light granules in bulk.

Following the harmonized European standards within the scope of CE Marking for Construction products (applying its latest edition), thermal insulation products may consist of the following materials (designation in English and applicable harmonized European standards presented in parentheses):

-  *insulation cork board* – ICB; EN 13170;
-  *flexible elastomeric foam* – FEF; EN 14304;
-  *polyethylene foam* – PEF; EN 14313;
-  *polyisocyanurate foam* – PIR; EN 14308;
-  *phenolic foam* – PF; EN 13166 e EN 14314;
-  *rigid polyurethane foam* – PUR; EN 13165 e EN 14308;
-  *wood fibres* – WF; EN 13171;
-  *expanded clay lightweight aggregate* – LWA; EN 14063-1;

<sup>4</sup> According to the publication LNEC “ITE50 - Coefficients of thermal transmission of elements of the building envelope”.









-  light granules of expanded vermiculite (*exfoliated vermiculite* - EV; EN 14317-1 e EN 15600-1);
-  wood wool – WW; EN 13168;
-  mineral wool - MW; EN 13162, EN 14064-1 e EN 14303;
-  expanded perlite – EPB; EN 13169, 14316-1 e 15599-1;
-  expanded polystyrene - EPS; EN 13163, EN 14309 e EN 14933;
-  extruded polystyrene - XPS; EN 13164, EN 14307 e EN 14934;
-  calcium silicate – CS; EN 14306;
-  cellular glass – CG; EN 13167 e EN 14305.

The description of the thermal insulation product to be included in the specific EDP should be detailed, including the raw materials used in its manufacture, the manufacturing process, and its particularities and finishing processes, the scope of use, and the performance characteristics according to with the applicable harmonized European standard.

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. Thermal insulation products are used in the installation, repair, and maintenance of insulation in buildings and other places, corresponding to the classification: Section F, class 4329 - “Other installations in construction”.

### 3.1.1. Application

The products belonging to the category of thermal insulation 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;
-  special large-span structures;
-  dwellings;
-  administrative and school buildings.

## 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:

***“1 m<sup>2</sup> of thermal insulation (specify material, product and thickness) with a thermal resistance of (x) (m<sup>2</sup>.°C)/W for a reference life of (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 cradle-to-grave, information related to the environmental performance of the declared product unit (1 m<sup>3</sup>, referring to density) must also be included.

The thermal resistance of the thermal insulation product must be equal to or greater than the value considered for this purpose (which corresponds to the design value of the thermal resistance) during the respective reference service life. As such, it must be determined from the declared thermal resistance value (under the CE marking or other third party quality proofing system) or certified (through an Approval Document, Application Document or European Technical Approval) “According to the procedures contained in the relevant European standardization, considering realistic increases (due, in particular, to the water content, to “aging”, to the average temperature), which reflect the conditions of application and the useful life of the products in the works”<sup>5</sup>. The mentioned aggravations correspond to a decrease in the thermal resistance of the thermal insulation product during the respective reference service life.

**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.**

### 4.2. Declared unit

Declared unit can be:

***“1 m<sup>3</sup> thermal insulation produced in (specify product, material and density)” (packaging included)***

In addition, information related to the environmental performance of another declared product unit (eg 1 m<sup>2</sup> with a thickness of (x) m, or 1 t) can also be included in the EDP.


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<sup>5</sup> According to the LNEC publication “ITE50 - Coefficients of thermal transmission of elements of the building envelope”, 2007. The relevant European standardization referred to in this publication and which is still in force is as follows: EN ISO 10456: 2007 - “Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values”.

### 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:

 Rigid plate obtained by expansion:

- Raw materials: extraction or manufacture, transport to the factory, reception and storage at the factory;
- Expansion and moulding in blocks;
- Drying and/or stabilization;
- Cut;
- Selection, packaging, and storage.

 Light granules:

- Raw materials: extraction or manufacture, transport to the factory, reception and storage at the factory;
- Cooking;
- Drying
- 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- base model 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. 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 lifetime 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 “thermal insulation” 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:**

The module on the “use of the installed product” covers the environmental aspects and impacts arising from building components or other construction work during their normal (expected) uses - (emissions to the environment not covered by B2-B7 modules), including the release of expanding gases used in the manufacture of thermal insulation products.

**B2) Maintenance:**

The environmental impacts of this module are not relevant because, as a rule, the product is not accessible for this type of activities.

**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 thermal insulation is 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 thermal insulation is 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 thermal insulation 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 technical characteristics of the product (eg according to the harmonized European standard applicable to the product under the CE marking);
-  Description of the product's application (eg: facades, interior walls, false ceilings, traditional and/or inverted roofs, buried floors and walls, vertical and / or horizontal application);
-  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;
-  environmental information on the release of dangerous substances, including in the case of thermal insulation products, the identification of any dangerous substances that are released by the product in the event of a fire after its application in the building;
-  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](http://www.daphabitat.pt) for formatting and presentation of content in the EPD.

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




## 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](http://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 12524:2000 - *“Building materials and products - Hygrothermal properties - Tabulated design values”*;
-  EN 15804:2012+A2:2019 - *“Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products”*;
-  EN ISO 10456:1999 - *“Building materials and products - Procedures for determining declared and design thermal values”*;
-  ISO 21930:2007 - *“Building Construction - Sustainability in building construction”*;
-  NP EN ISO 14040:2008 - *“Gestão ambiental - Avaliação do ciclo de vida - Princípios e enquadramento”*;
-  NP EN ISO 14044:2010 - *“Gestão ambiental - Avaliação do ciclo de vida - Requisitos e linhas de orientação”*;
-  NP ISO 14025:2009 - *“Rótulos e declarações ambientais - Declarações ambientais Tipo III - Princípios e procedimentos”*;
-  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;
-  Product Category Rules (PCR) for preparing an environmental declaration (EPD) for Product Group *Insulation materials* - The Norwegian EPD Foundation, NPCR, draft version, April 2007;
-  PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for Insulating materials made of foam plastics. IBU environmental product declarations. Version 1.1 - 2012/10/29;
-  PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for Mineral insulating materials. IBU environmental product declarations. Version 1.1 - 2012/10/29;
-  RCP - Productos aislantes térmicos. RCP 001 - Sistema DAPc. Versión 1. 2010;
-  Santos, C. & Matias, L.; Coeficientes de transmissão térmica de elementos da envolvente dos edifícios. ITE 50. Lisboa: Laboratório Nacional de Engenharia Civil. 2006.