



Registration Number: DAP 001:2017



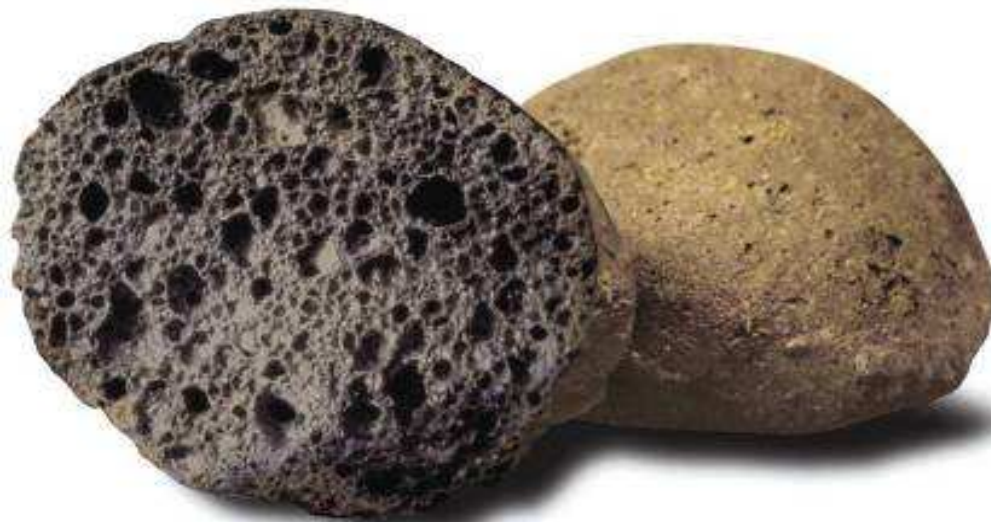
ECO EPD Registration Number: 00000628

### LIGHTWEIGHT EXPANDED CLAY AGGREGATE LECA®

ISSUE DATE: 2017-07-24

VALID UNTIL: 2022-07-23

**LECA PORTUGAL, S.A.**





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## 1. GENERAL INFORMATION

### 1.1. The DAPHabitat System

<b>Program operator:</b>	Associação Plataforma para a Construção Sustentável <a href="http://www.centrohabitat.net">www.centrohabitat.net</a> <a href="mailto:centrohabitat@centrohabitat.net">centrohabitat@centrohabitat.net</a>	 centroHabitat Plataforma para a Construção Sustentável
<b>Address:</b>	Departamento Engenharia Civil Universidade de Aveiro 3810-193 Aveiro	
<b>Email address:</b>	<a href="mailto:deptecnico@centrohabitat.net">deptecnico@centrohabitat.net</a>	
<b>Telephone number:</b>	(+351) 234 401 576	
<b>Website:</b>	<a href="http://www.daphabitat.pt">www.daphabitat.pt</a>	
<b>Logo:</b>		

### 1.2. EPD OWNER

<b>Name of the owner:</b>	Leca Portugal, S.A.
<b>Production site:</b>	Industrial Center of Avelar - Estrada Nacional 110 s/n, Tojeira, 3240-356 Avelar
<b>Address (head office):</b>	Industrial Center of Avelar - Estrada Nacional 110 s/n, Tojeira, 3240-356 Avelar
<b>Telephone:</b>	Industrial Center of Avelar: +351 236620600 Cristina Freire: +351 925659217
<b>E-mail:</b>	<a href="mailto:cristina.freire@leca.pt">cristina.freire@leca.pt</a> ; <a href="mailto:info@leca.pt">info@leca.pt</a>
<b>Website:</b>	<a href="http://www.leca.pt">www.leca.pt</a>
<b>Logo:</b>	
<b>Information concerning the applicable management Systems:</b>	Scope of certification: lightweight aggregates Manufacturing expanded clay NP EN ISO 9001: 2008 - certification body SGS - No. of Compliance Certificate / PT10/03335 NP EN ISO 14001: 2012 - certification body SGS - No. of Compliance Certificate / PT09/02792
<b>Specific aspects regarding the production:</b>	SIC Code 23992: MANUFACTURE OF OTHER MISCELLANEOUS NON-METALLIC MINERAL PRODUCTS
<b>Organization's environmental policy:</b>	Integrated into the Quality, Environment and Safety Policy: <ol style="list-style-type: none"> <li>1. Efficiently produce and market quality products that meet the needs of our customers, minimizing their environmental impact and risk, and in compliance with applicable laws, regulations and other applicable requirements.</li> <li>2. Prevent the occurrence of incidents and accidents by the active management of Safety and Environment.</li> </ol>





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3. Make employees responsible for their and their colleagues safety, promoting the goal of "zero occupational accidents" and "zero occupational diseases".
  4. Prevent environmental damages by promoting the rational use of materials and energy resources that lead to the goal of "zero environmental accidents" and to the progressive reduction of the impact of our activities.
  5. Commit to IMS continuous improvement commitment.

### 1.3. Information concerning the EPD

<b>Authors:</b>	Leca Portugal, S.A. S+A Green Lab
<b>Contact of the authors:</b>	1. Leca Portugal, S.A. Industrial Center of Avelar: +351 236620600 Cristina Freire (+351 925659217) 2. S+A Green Lab T. 213939340 E. mmatos@greenlab.com.pt
<b>Emission date:</b>	2017-07-24
<b>Registration date:</b>	2017-12-26
<b>Registration number:</b>	DAP 001:2017
<b>ECOPlatform registration number:</b>	00000628
<b>Valid until:</b>	2022-07-23
<b>Representativity of the EPD (location, manufacturer, group of manufacturers):</b>	EPD of one (1) product produced in one (1) industrial unit belonging to a single producer (Leca Portugal, S.A.).
<b>Where to consult explanatory material:</b>	<a href="http://www.leca.pt">www.leca.pt</a>
<b>Type of EPD:</b>	EPD from cradle-to-gate

### 1.4. Demonstration of the verification

External independent verification, accordingly with the standard ISO 14025:2009 and EN 15804:2012+A1:2013	
<b>Certification Body</b>	<b>Verifier(s)</b>
	
(CERTIF – Associação para a Certificação)	(Marisa Almeida   José Dinis Silvestre)

### 1.5. EPD Registration

<b>Program Operator</b>

(Plataforma para a Construção Sustentável)

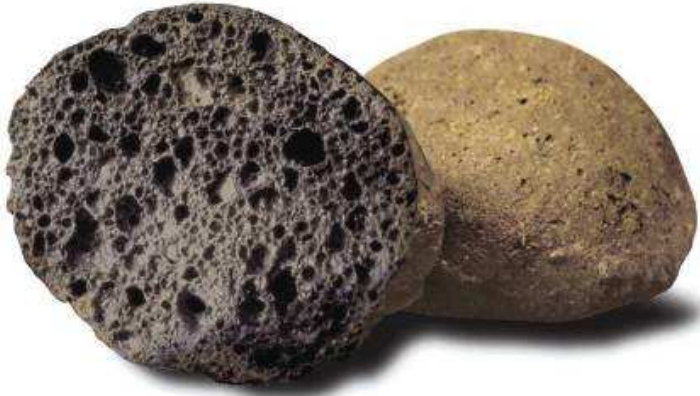


## 1.6. PCR of reference

<b>Name:</b>	<ol style="list-style-type: none"> <li>1. PCR: basic module for construction products and services</li> <li>2. PCR: Thermal Insulation</li> </ol>
<b>Emission date:</b>	<ol style="list-style-type: none"> <li>1. Edition of September 2015</li> <li>2. Edition of December 2014</li> </ol>
<b>Number of registration on the data base:</b>	<ol style="list-style-type: none"> <li>1. RCP-mb001</li> <li>2. RCP004:2014</li> </ol>
<b>Version:</b>	<ol style="list-style-type: none"> <li>1. Version 2.0.</li> <li>2. Version 1.1.</li> </ol>
<b>Identification and contact of the coordinator (s):</b>	<ol style="list-style-type: none"> <li>1. PCR: basic module for construction products and services <ul style="list-style-type: none"> <li>○ Luis Arroja   <a href="mailto:arroja@ua.pt">arroja@ua.pt</a></li> <li>○ Marisa Almeida   <a href="mailto:marisa@ctcv.pt">marisa@ctcv.pt</a></li> <li>○ José Silvestre   <a href="mailto:jds@civil.ist.utl.pt">jds@civil.ist.utl.pt</a></li> </ul> </li> <li>2. PCR: Thermal Insulation <ul style="list-style-type: none"> <li>○ José Dinis Silvestre</li> <li>○ Manuel Duarte Pinheiro</li> </ul> </li> </ol>
<b>Identification and contact of the authors:</b>	<ol style="list-style-type: none"> <li>1. PCR: basic module for construction products and services <ul style="list-style-type: none"> <li>○ Marisa Almeida   <a href="mailto:marisa@ctcv.pt">marisa@ctcv.pt</a></li> <li>○ Luis Arroja   <a href="mailto:arroja@ua.pt">arroja@ua.pt</a></li> <li>○ José Silvestre   <a href="mailto:jds@civil.ist.utl.pt">jds@civil.ist.utl.pt</a></li> <li>○ Fausto Freire</li> <li>○ Cristina Rocha</li> <li>○ Ana Paula Duarte</li> <li>○ Ana Cláudia Dias</li> <li>○ Helena Gervásio</li> <li>○ Victor Ferreira</li> <li>○ Ricardo Mateus</li> <li>○ António Baio Dias</li> </ul> </li> <li>2. PCR: Thermal Insulation <ul style="list-style-type: none"> <li>○ José Dinis Silvestre</li> <li>○ Manuel Duarte Pinheiro</li> </ul> </li> </ol>
<b>Composition of the Sector Panel:</b>	<p>PCR: Thermal Insulation:</p> <ul style="list-style-type: none"> <li>• Amorim Isolamentos</li> <li>• Sofalca-Aglomerados de Cortiça, ACE</li> <li>• Argex-Argila Expandida, S.A.</li> <li>• IberFibran-Poliestireno Extrudido, S.A.</li> <li>• Termolan-Isolamentos termo-acústicos, S.A.</li> <li>• Eurofoam-Indústria de poliestireno extrudido, Lda</li> <li>• Knauf Insulation</li> </ul>
<b>Consultation period:</b>	<ol style="list-style-type: none"> <li>1. 18/11/2015 - 18/01/2016</li> <li>2. 01/08/2013 - 30/11/2013</li> </ol>
<b>Valid until:</b>	<ol style="list-style-type: none"> <li>1. January of 2021</li> <li>2. February of 2019</li> </ol>



## 1.7. Information concerning the product/product class

<b>Identification of the product:</b>	Lightweight Expanded Clay Aggregate Leca®, bulk, with a density of 275 kg/m <sup>3</sup> (Leca® L e Geo Leca®)																										
<b>Illustration of the product:</b>																											
<b>Brief description of the product:</b>	<p>Lightweight expanded clay aggregate is a granular ceramic material made from natural clay. The clay is mixed with organic material, dried and expanded to 4-5 times its original volume in rotary kilns at temperatures of about 1150°C. The output lightweight expanded clay aggregate granules, in the range 0-32 mm, are sieved and blended into different grades of products and distributed in bulk or in bags. Each granule has a hard ceramic shell that surrounds a honeycomb core.</p> <p>Lightweight expanded clay aggregate is a durable product with an unlimited lifespan and 100% of the installed product can be reused or recycled. Lightweight expanded clay aggregate has low density (typical loose bulk density range depending on grain size 200-800 kg/m<sup>3</sup>) and relatively high strength. Due to its interesting characteristics it has a broad range of applications.</p> <p style="text-align: center;"><b>Table 1: Composition of the product Leca®:</b></p> <table border="1"> <thead> <tr> <th>Component</th> <th>Percentage (mass)</th> </tr> </thead> <tbody> <tr> <td>Clay</td> <td>100%</td> </tr> </tbody> </table> <p>For the purpose of this EPD, the results indicated refer to the range with the lowest density, corresponding to the product with higher granulometry. Because the production process is the same for all Leca® products, it is possible to have the EPD results for the products with different grading using a conversion factor, as indicated in the table below.</p> <p style="text-align: center;"><b>Table 2: Factor to apply to EPD results for different grading (in relation to the values of Leca® L and Geo Leca®).</b></p> <table border="1"> <thead> <tr> <th>Product</th> <th>Density (kg/m<sup>3</sup>)</th> <th>Factor</th> </tr> </thead> <tbody> <tr> <td>Leca® 0/3</td> <td>610</td> <td>2,22</td> </tr> <tr> <td>Leca® XS</td> <td>455</td> <td>1,65</td> </tr> <tr> <td>Leca® S</td> <td>430</td> <td>1,56</td> </tr> <tr> <td>Leca® M</td> <td>330</td> <td>1,20</td> </tr> </tbody> </table>	Component	Percentage (mass)	Clay	100%	Product	Density (kg/m <sup>3</sup> )	Factor	Leca® 0/3	610	2,22	Leca® XS	455	1,65	Leca® S	430	1,56	Leca® M	330	1,20							
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Leca® S	430	1,56																									
Leca® M	330	1,20																									
<b>Main technical characteristics of the product:</b>	<p style="text-align: center;"><b>Table 3: Technical characteristics – Leca® XS</b></p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Testing / Decision</th> <th>Declared value</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Particle size</td> <td>EN 13055-</td> <td>1-3</td> <td>mm</td> </tr> <tr> <td>Density</td> <td>1:2002/AC:2004</td> <td>455 ± 15%</td> <td>kg/m<sup>3</sup></td> </tr> </tbody> </table> <p style="text-align: center;"><b>Table 4: Technical characteristics – Leca® S</b></p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Testing / Decision</th> <th>Declared value</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Particle size</td> <td rowspan="3">EN 13055- 1:2002/AC:2004</td> <td>1-5</td> <td>mm</td> </tr> <tr> <td>Density</td> <td>430 ± 15%</td> <td>kg/m<sup>3</sup></td> </tr> <tr> <td>Resistance to fragmentation / crushing</td> <td>≥ 1,8</td> <td>N/mm<sup>2</sup></td> </tr> </tbody> </table>	Parameter	Testing / Decision	Declared value	Units	Particle size	EN 13055-	1-3	mm	Density	1:2002/AC:2004	455 ± 15%	kg/m <sup>3</sup>	Parameter	Testing / Decision	Declared value	Units	Particle size	EN 13055- 1:2002/AC:2004	1-5	mm	Density	430 ± 15%	kg/m <sup>3</sup>	Resistance to fragmentation / crushing	≥ 1,8	N/mm <sup>2</sup>
Parameter	Testing / Decision	Declared value	Units																								
Particle size	EN 13055-	1-3	mm																								
Density	1:2002/AC:2004	455 ± 15%	kg/m <sup>3</sup>																								
Parameter	Testing / Decision	Declared value	Units																								
Particle size	EN 13055- 1:2002/AC:2004	1-5	mm																								
Density		430 ± 15%	kg/m <sup>3</sup>																								
Resistance to fragmentation / crushing		≥ 1,8	N/mm <sup>2</sup>																								



**Table 5: Technical characteristics – Leca® M**

Parameter	Testing / Decision	Declared value	Units
Particle size	EN 13055-1:2002/AC:2004	4-12,5	mm
Density		330 ± 15%	kg/m <sup>3</sup>
Percentage of crushed particles		≤ 25%	mass
Resistance to fragmentation / crushing		≥ 1,0	N/mm <sup>2</sup>
Water absorption		< 34%	Dry mass

**Table 6: Technical characteristics – Leca® L**

Parameter	Testing / Decision	Declared value	Units
Particle size	EN 13055-1:2002/AC:2004	10-20	mm
Density		275 ± 15%	kg/m <sup>3</sup>
Percentage of crushed particles		≤ 25%	mass
Resistance to fragmentation / crushing		≥ 0,7	N/mm <sup>2</sup>
Water absorption		< 38%	Dry mass
Reaction to fire	Decision of the Commission 96/603/EC, altered by the Decision 2000/605/CE	A1	Class
Thermal conductivity	EN 14063-1:2004/AC:2006	0,110	W/m.K
Resistance to fragmentation / crushing		≥ 0,7	N/mm <sup>2</sup>
Durability of reaction to fire with aging / degradation		Unalterable over time	-
Durability heat resistance to the aging / degradation		Unalterable over time	-
Durability of the resistance to fragmentation / crushing with aging / degradation		Unalterable over time	-

**Table 7: Technical characteristics – Leca® 0/3**

Parameter	Testing / Decision	Declared value	Units
Particle size	EN 13055-1:2002/AC:2004	0-3	mm
Density		610 ± 15%	kg/m <sup>3</sup>

**Table 8: Technical characteristics – Geo Leca®**

Parameter	Testing / Decision	Declared value	Units
Particle size	EN 13055-2: 2004	10-20	mm
Density		275 ± 15%	kg/m <sup>3</sup>
Percentage of crushed particles and departures		≤ 25%	mass
Crushing strength		≥ 0,7	N/mm <sup>2</sup>
Water absorption		< 38%	mass
Reaction to fire	Decision of the Commission 96/603/EC, altered by the Decision 2000/605/CE	A1	Euroclass
Water permeability	EN 15732:2012	> 10E-03	m/s
Thermal conductivity		0,12	W/m.K
Water vapor Transmission		2	Tabulated value
Compressive strength		CS (10) > 600	kPa
		CS (2) > 250	kPa
Resistance to dynamic loads		< 1,0% (120 kPa, 2000000 cycles)	-
Durability of reaction to fire with aging / degradation		Unalterable over time	-
Durability heat resistance to the aging / degradation		Unalterable over time	-



	<table border="1"> <tr> <td>Durability of the resistance to fragmentation / crushing with aging / degradation</td> <td></td> <td>Unalterable over time</td> <td>-</td> </tr> <tr> <td>Durability against chemical and biological attack</td> <td></td> <td>Durable</td> <td>-</td> </tr> </table>	Durability of the resistance to fragmentation / crushing with aging / degradation		Unalterable over time	-	Durability against chemical and biological attack		Durable	-
Durability of the resistance to fragmentation / crushing with aging / degradation		Unalterable over time	-						
Durability against chemical and biological attack		Durable	-						
<b>Description of the products application:</b>	<p>Lightweight expanded clay aggregate for use in:</p> <ul style="list-style-type: none"> <li>- Concrete, precast and mortars in buildings, roads and civil engineering works;</li> <li>- Thermal insulation, formed on site, attics, roofing tiles, floors and underground floors;</li> <li>- Geotechnical applications with or without binders, as light slope and resistant thermal insulation in roads and railways, and other Civil Engineering works;</li> <li>- As light filler of tunnels and underground stations,</li> <li>- As light and drainage slopes in masonry retaining walls in Civil Engineering works.</li> <li>- Hydroponic crop, water and air filters, growing media for plants, drainage on golf courses.</li> </ul>								
<b>Reference service life:</b>	Not specified								
<b>Placing on the market / Rules of application in the market / Technical rules of the product:</b>	<ul style="list-style-type: none"> <li>• Decision No. 768/2008 / EC of the European Parliament and of the Council of 9 July 2008</li> <li>• Regulation ( EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008</li> <li>• Regulation (EC) No 764/2008 of the European Parliament and of the Council of 9 July 2008</li> <li>• Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 and its amendments.</li> <li>• Technical Product Standards: <ul style="list-style-type: none"> <li>○ EN 13055-1:2002</li> <li>○ EN 13055-1:2002/AC:2004</li> <li>○ EN 13055-2: 2004</li> <li>○ EN 14063-1:2004</li> <li>○ EN 14063-1:004/AC:2006</li> <li>○ EN 15732:2012</li> </ul> </li> </ul>								
<b>Quality control:</b>	According with Technical Product Standards								
<b>Special delivery conditions:</b>	Not applicable								
<b>Components and substances to declare:</b>	Not applicable								
<b>History of the LCA studies:</b>	--								



## 2. ENVIRONMENTAL PERFORMANCE OF THE PRODUCT

### 2.1. Calculation rules of the LCA

<b>Declared unit:</b>	1 m <sup>3</sup> of bulk product with the density of 275 kg/m <sup>3</sup> (Leca® L e Geo Leca®)
<b>Functional unit:</b>	-
<b>System boundaries:</b>	EPD from cradle-to-gate
<b>Criteria for the exclusion:</b>	<p>The following processes were not considered in this study, since they fell on the cut-off criteria:</p> <ul style="list-style-type: none"> <li>• Construction of industrial infrastructures and manufacture of equipment and machinery;</li> <li>• The burdens of infrastructures (vehicle manufacturing, road maintenance) associated to transportation of pre-products and raw materials;</li> <li>• Water consumption or waste and wastewater produced from administrative areas and laboratories was also not considered, since these burdens are not directly associated to the production process.</li> <li>• Maintenance products used in the plant were also not considered in this assessment because they represent less than 1% of the total mass and less than 5% of energy usage and mass in the production process.</li> </ul>
<b>Assumption and limitations:</b>	This EPD is intended to represent one (1) product that can be produced in one (1) manufacturing unit and may have different granulometries.
<b>Quality and other characteristics about the information used in the LCA:</b>	Production data collected corresponds to the year of 2015 and is in accordance with reality. The generic data used belongs to Ecoinvent v3 and meets the quality criteria (age, geographical and technology coverage, plausibility, etc.) for generic data.
<b>Allocation rules:</b>	The industrial plant where Leca® products are manufactured produces only expanded clay, but with different densities, according to its application. Considering this fact, it was not necessary to use allocation rules since the impacts are allocated to the same amount of final product (in mass).
<b>Comparability of EPD for construction products:</b>	The EPD of construction products and services cannot be comparable in case they are not produced according to EN 15804 and EN 15942 and according to the comparability conditions determined by ISO 14025.

### 2.1.1. Flow diagram of input and output of the processes

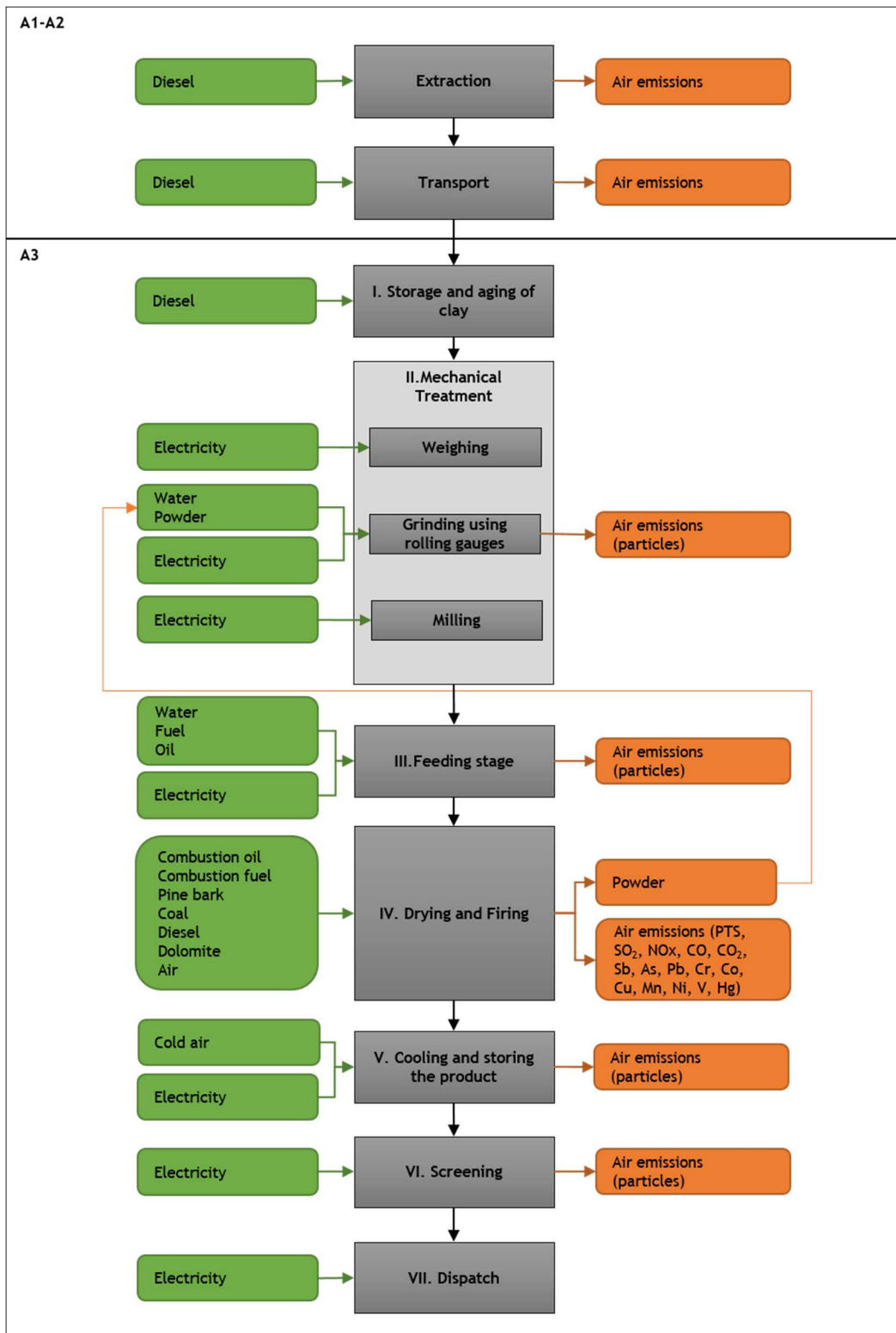


Figure 1: Product stage of the product Leca® (A1-A3).



## 2.1.2. Description of the system boundaries

(✓= included; ✗= module not declared)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport	Construction installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-constructions, demolition	Transport	Waste processing	Disposal	Re-use, recovery, recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗



## 2.2. Parameters describing environmental impacts

	Product	Global warming potential; GWP	Depletion potential of the stratospheric ozone layer; ODP	Acidification potential of soil and water, AP	Eutrophication potential, EP	Formation potential of tropospheric ozone, POCP	Abiotic depletion potential for non-fossil resources	Abiotic depletion potential for fossil resources
		kg CO <sub>2</sub> equiv.	kg CFC 11 equiv.	kg SO <sub>2</sub> equiv.	kg (PO <sub>4</sub> ) <sup>3-</sup> equiv.	kg C <sub>2</sub> H <sub>4</sub> equiv.	kg Sb equiv.	MJ, P.C.I.
Raw material supply Transport Manufacturing	A1 – A3 Leca® L / Geo Leca® 275 kg/m <sup>3</sup>	9,74E+01	5,55E-06	5,30E-01	4,91E-02	3,50E-02	5,69E-07	1,01E+03
<p>LEGEND:</p> <p><span style="border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Product stage</p> <p>NOTES: P.C.I. – Low Heating Value (LHV). Units expressed per declared unit (1m<sup>3</sup>).</p>								

## 2.3. Parameters describing resource use

	Product	Primary energy						Secondary materials and fuels, and use of water			
		EPR	RR	TRR	EPNR	RNR	TRNR	MS	CSR	CSNR	Net use of fresh water
		MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	kg	MJ, P.C.I.	MJ, P.C.I.	m <sup>3</sup>
Raw material supply Transport Manufacturing	A1 – A3 Leca® L / Geo Leca® 275 kg/m <sup>3</sup>	1,29E+02	0,00E+00	1,29E+02	9,63E+02	0,00E+00	9,63E+02	0,00E+00	2,02E+02	5,36E+01	2,38E-02
<p>LEGEND:</p> <p><span style="border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Product stage</p> <p>EPR = use of renewable primary energy excluding renewable primary energy resources used as raw materials;  RR = use of renewable primary energy resources used as raw materials;  TRR = total use of renewable primary energy resources (EPR + RR);  EPNR = use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;  RNR = use of non-renewable primary energy resources used as raw materials;  TRNR = total use of non-renewable primary energy resources (EPNR + RNR);  MS = use of secondary material;  CSR = use of renewable secondary fuels;  CSNR = use of non-renewable secondary fuels.</p> <p>* Not applicable to processes in this factory</p> <p>NOTE: Units expressed per declared unit (1m<sup>3</sup>).</p>											



## 2.4. Other environmental information describing different waste categories

		Product	Hazardous waste disposed kg	Non hazardous waste disposed kg	Radioactive waste disposed kg
Raw material supply					
Transport	A1- A3	Leca® L / Geo Leca® 275 kg/m <sup>3</sup>	1,92E-04	1,23E+00	3,13E-03
Manufacturing					
<p>LEGEND:</p> <p><span style="display: inline-block; width: 15px; height: 15px; background-color: #d9ead3; border: 1px solid black; margin-right: 5px;"></span> Product stage</p> <p>NOTE: Units expressed per declared unit (1m<sup>3</sup>).</p>					

## 2.5. Other environmental information describing output flows

Parameters	Units*	Results
Components for re-use	kg	**
Materials for recycling	kg	8,01E-01
Radioactive waste disposed	kg	3,13E-03
Materials for energy recovery	kg	**
Exported energy	MJ per energy carrier	**
* expressed by declared unit (1m <sup>3</sup> ).		
** Not applicable to processes in this factory		



### 3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

#### 3.1. A4 Transport to the building site – Construction process stage

Parameters	Units*	Results
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Litre of fuel type per distance, or vehicle type, Commission Directive 2007/37/EC (European Emission Standard)	N/A
Distance	km	N/A
Capacity utilization (including empty returns)	%	N/A
Bulk density of transported products	kg/m <sup>3</sup>	N/A
Volume capacity utilisation factor (factor=1 or < 1 or > 1 for compressed or nested packaged products)	Not applicable	N/A
* expressed per declared unit		

#### 3.2. A5 Installation of the product in the building – Construction process stage

Parameters	Units*	Results
Ancillary materials for installation (specified by material)	kg or other units as appropriate	N/A
Water use	m <sup>3</sup>	N/A
Other resource use	kg	N/A
Quantitative description of energy type (regional mix) and consumption during the installation process	kWh ou MJ	N/A
Waste of materials on the building site before waste processing, generated by the product's installation (specified by type)	kg	N/A
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	kg	N/A
Direct emissions to ambient air, soil and water	kg	N/A
* expressed per declared unit		

#### 3.3. B1 Use stage

(Relevant information about the use of the product) if applicable



### 3.4. B2 Maintenance

Maintenance process	(Description or source where description can be found)	
Process	Units*	Results
Maintenance cycle	Number per RSL or year	N/A
Ancillary materials for maintenance e.g. cleaning agent, specify materials	kg/cycle	N/A
Waste material resulting from maintenance (specify materials)	kg	N/A
Net fresh water consumption during maintenance	m <sup>3</sup>	N/A
Energy input during maintenance e.g. vacuum cleaning, energy carrier type, e.g. electricity, and amount, if applicable and relevant	kWh	N/A
<sup>1</sup> Description of other scenarios	Units as appropriate	N/A
* expressed per declared unit		

### 3.5. B3 Repair

Repair process	(Description or source where description can be found)	
Process	Units*	Results
Repair cycle	Number per RSL or year	N/A
Ancillary materials, e.g. lubricant, specific materials	Kg or kg/ cycle	N/A
Waste material resulting from repair (specify materials)	kg	N/A
Net fresh water consumption during repair	m <sup>3</sup>	N/A
Energy input during repair, e.g. crane activity, energy carrier type, e.g. electricity, and amount	kWh /RSL, kWh / cycle	N/A
<sup>2</sup> Description of other scenarios	units as appropriate	N/A
* expressed per declared unit		

<sup>1</sup> In case there are no more described scenarios, this line should be eliminated in the final document.

<sup>2</sup> In case there is no more described scenarios, this line should be eliminated in the final document

### 3.6. B4 Replacement

Process	Units*	Results
Replacement cycle	Number per RSL or year	N/A
Energy input during replacement, e.g. crane activity, energy carrier type, e.g. electricity and amount if applicable and relevant	kWh	N/A
Exchange of worn parts during the product's life cycle, e.g. zinc galvanized steel sheet, specify materials	kg	N/A
<sup>5</sup> Description of other scenarios	units as appropriate	N/A
* expressed per declared unit		

### 3.7. B5 Refurbishment

Refurbishment process (Description or source where description can be found)

Process	Units*	Results
Refurbishment cycle	Number per RSL or year	N/A
Energy input during refurbishment, energy carrier type e.g. electricity, and amount if applicable and relevant	kWh	N/A
Material input for refurbishment e.g. bricks, including ancillary materials for the refurbishment process e.g. lubricant	kg or kg/cycle	N/A
Waste material during from refurbishment	kg	N/A
<sup>3</sup> Further assumptions for scenario development e.g. frequency and time period of use, number of occupants	units as appropriate	N/A
* expressed per declared unit		

### 3.8. B6 Use of energy

Parameters	Units*	Results
Ancillary materials specified by material	kg or units as appropriate	N/A
Net fresh water consumption	m <sup>3</sup>	N/A
Type of energy carrier e.g. electricity, natural gas, district heating	kWh	N/A
Power output of equipment	kW	N/A
Characteristic performance e.g. energy efficiency, emissions, variation of performance with capacity utilization, etc.	units as appropriate	N/A
<sup>6</sup> Further assumptions for scenario development e.g. frequency and period of use, number of occupants	units as appropriate	N/A
* expressed per declared unit		

<sup>3</sup> In case there are no more described scenarios, this line should be eliminated in the final document.



### 3.9. Use of water

Parameters	Units*	Results
Ancillary materials specified by material	kg or units as appropriate	N/A
Net fresh water consumption	m <sup>3</sup>	N/A
Type of energy carrier e.g. electricity, natural gas, district	kWh	N/A
Power output of equipment	kW	N/A
Characteristic performance e.g. energy efficiency, emissions, variation of performance with capacity utilization, etc.	units as appropriate	N/A
<sup>6</sup> Further assumptions for scenario development e.g. frequency and period of use, number of occupants	units as appropriate	N/A
* expressed per declared unit		

### 3.10. [C1 – C4] End of life of the product

Processes	Units*	Results
Collection process specified by type	kg collected separately	N/A
	kg collected with mixed construction waste	N/A
Recovery system specified by type	kg for re-use	N/A
	kg for recycling	N/A
	kg for energy recovery	N/A
Disposal specified by type	kg product or material for final deposition	N/A
<sup>4</sup> Assumptions for scenario development e.g. transportation	units as appropriate	N/A
Definition of scenario <sup>7</sup>	units as appropriate	N/A
* expressed per declared unit		

<sup>4</sup> In case there is no more described scenarios, this line should be eliminated in the final document

### 3.11. Additional information on release of dangerous substances to indoor air, soil and water during the use stage

Scenario title	Parameters	Units*	Results
Release scenario Indoor air	<b>Test results according to CEN/TC 351</b>		N/A
	Description scenario 1 <sup>7</sup>	units as appropriate	N/A
	Description scenario n <sup>7</sup>	units as appropriate	N/A
Release scenario Soil	<b>Test results according to CEN/TC 351</b>		N/A
	Description scenario 1 <sup>7</sup>	units as appropriate	N/A
	Description scenario n <sup>7</sup>	units as appropriate	N/A
Release scenario Water	<b>Test results according to CEN/TC 351</b>	(...)	N/A
	Description scenario 1 <sup>7</sup>	units as appropriate	N/A
	Description scenario n <sup>7</sup>	units as appropriate	N/A
* expressed per declared unit			
<b>Note:</b> Emissions to indoor air and releases to soil and water according to the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised testing methods according to the provisions of the respective Technical Committees for European product standards, when available.			



## REFERENCES

- ✓ General Instructions of the DAPHabitat System, Version 1.0, Edition March 2013 (in [www.daphabitat.pt](http://www.daphabitat.pt));
- ✓ **PCR – basic module for construction products and services.** DAPHabitat System. Version 2.0, September 2015 (in [www.daphabitat.pt](http://www.daphabitat.pt));
- ✓ **PCR – thermal insulation.** DAPHabitat System. Version 1.1, December 2014 (in Portuguese);
- ✓ **ISO 14025:2009** Environmental declarations and labels – Type III environmental declarations – Principles and procedures;
- ✓ **EN 15804:2012+A1:2013** Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products;
- ✓ **EN 15942:2011** Sustainability of construction works – Environmental product declarations – Communication format business-to-business.