ENVIRONMENTAL PRODUCT DECLARATION

Self-locking blocks for external pavements

CLASSICI – DESIGN – FILTRANTI

Produced in the manufacturing site of

FERRARA

Via Ferrara, 31 – Poggio Renatico (FE) - ITALIA

First issue: 18.06.2020

Valid until: 18.06.2025

Program Operator: EPDItaly

Publisher: EPDItaly

Declaration No.: 016/18-SVS-EPD-FE – Rev. 01

Registration No. EPDItaly: EPDITALY0106

Registration No. ECO Platform: 00001280

Declaration conforming to ISO 14025 and EN 15804:2012+A1
GENERAL INFORMATION

EPD OWNER: PAVER Costruzioni S.p.a. – Strada di Cortemaggiore, 25 – Piacenza (PC) – ITALIA

Manufacturing site: Via Ferrara, 31 – Poggio Renatico (FE) - ITALIA

This declaration is prepared conforming to the EPDItaly program, in adherence with the General Programme instructions. The detailed version of the regulations and other information are available at www.epditaly.it

PAVER Costruzioni S.p.a. relieves EPDItaly of any responsibility from the non-compliance of the environmental legislation self-declared by itself.

This declaration is drafted for the self-locking blocks of the Series: CLASSICI – DESIGN - FILTRANTI

Detailed information on the products included in this study are available in the successive pages of this declaration.

Reference PCR: ICMQ-001/15 rev. 2.1 dated 03/06/2019

CPC code: 375 (Articles of concrete, cement and plaster)

Independent verification of the declaration and the data reported according to EN ISO 14025:2010 □ Internal  ☑ External

Third party verification performed by: ICMQ S.p.A. - Via Gaetano de Castillia, 10 - 20124 Milano (MI) - ITALIA (www.icmq.it)

Environmental declarations of products of the same category but belonging to different programmes may not be comparable. In particular, EPD of construction products may not be comparable if they don’t conform to EN 15804.

CONTACT

PAVER Costruzioni S.p.a.
Ing. Moris Maradini (maradini@paver.it)
Tel: +39 0523 599611

The Life Cycle Assessment (LCA) study and this EPD have been developed in collaboration with Qoncert S.r.l.
(info@qoncert.it; www.qoncert.it).
GENERAL INFORMATION OF THE COMPANY

PAVER Costruzioni S.p.A. is one of the leading manufacturers in the fields of pre-fabricated concrete structures for buildings and urban furnishings. In its 50 years of existence the organization has had a constant development up to the current structure of having an articulated production in four manufacturing locations present in the central and northern Italy.

The focal points of the production are the speed of execution, durability and quality of the materials. The products correspond well to technical and aesthetic needs: from the antique style to the innovative design, from the drainable flooring to the anti-seismic construction, from the acoustic to the thermal insulation.

The company aims to apply environmental and social sustainability policies, especially in the approach adopted for environmental sustainability, aims to maintain the quality and re-use of natural resources. For this reason all self-locking blocks, curbstones made by PAVER contain a percentage of recycled material.

All PAVER production units are currently certified according to ISO 14001 "Environmental Management Systems" to guarantee continuous monitoring of their impacts and to guarantee continuous improvement of their environmental performance.

For further information: www.paver.it
PRODUCT DESCRIPTION

This Environmental Declaration reports the environmental performance of the self-locking blocks for external pavements of the Series: CLASSICI.

The Classici series comprises of smaller blocks characterized by square forms and gives an urban texture to any area in a city, satisfying the aesthetic and architectural needs of designers and administrators and at the same time guaranteeing extreme wear resistance with minimal maintenance. It is suitable for creating spaces of all kinds, from sidewalks to large parking lots, from public squares to areas in the industrial zones.
PRODUCT DESCRIPTION

This Environmental Declaration reports the environmental performance of the self-locking blocks for external pavements of the Series:

The DESIGN Series has been designed to meet the needs of contemporary design. Clear texture with little obvious gaps, captivating colors and natural finishes designed for open spaces, pedestrian and vehicular traffic. The colors are almost all flamed, ranging from shades of gray to brown to best meet new architectural trends.
PRODUCT DESCRIPTION

This Environmental Declaration reports the environmental performance of the self-locking blocks for external pavements of the Series:

The FILTRANTI Series is made with a special mixture with increased grain size. This mixture increases its filtering capacity and favors the passage of water towards the aquifer without the use of aids for collecting surface water.
PRODUCT COMPOSITION

All the blocks belonging to the three series under study are composed of two layers: the lower layer (also called the "rough" layer) is made with a mixed design made up of aggregates (sand, gravel, recycled materials), cement, water and additives. The upper layer (also called the "fine" layer) is also made with a mixed design consisting of aggregates (sands, quartz granules) cement, water and plasticizers.

The final composition of the blocks is obtained by combining the raw materials used in the two layers:

<table>
<thead>
<tr>
<th>Material</th>
<th>CLASSICI</th>
<th>DESIGN</th>
<th>FILTRANTI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%mass</td>
<td>kg/ton_BLOCK</td>
<td>%mass</td>
</tr>
<tr>
<td>Sand (virgin)</td>
<td>29,49 %</td>
<td>294,9 kg</td>
<td>29,49 %</td>
</tr>
<tr>
<td>Sand (recycled)</td>
<td>6,32 %</td>
<td>63,2 kg</td>
<td>6,32 %</td>
</tr>
<tr>
<td>Gravel (virgin)</td>
<td>10,28 %</td>
<td>102,8 kg</td>
<td>10,28 %</td>
</tr>
<tr>
<td>Gravel (recycled)</td>
<td>27,67 %</td>
<td>276,7 kg</td>
<td>27,67 %</td>
</tr>
<tr>
<td>Production waste (ground and re-used)</td>
<td>9,49 %</td>
<td>94,9 kg</td>
<td>9,49 %</td>
</tr>
<tr>
<td>Quartz granulated</td>
<td>3,43 %</td>
<td>34,3 kg</td>
<td>3,43 %</td>
</tr>
<tr>
<td>Cement</td>
<td>10,58 %</td>
<td>105,8 kg</td>
<td>10,58 %</td>
</tr>
<tr>
<td>Water</td>
<td>2,71 %</td>
<td>27,1 kg</td>
<td>2,71 %</td>
</tr>
<tr>
<td>Additives</td>
<td>0,03 %</td>
<td>0,3 kg</td>
<td>0,03 %</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100,00 %</td>
<td>1000,0 kg</td>
<td>100,00 %</td>
</tr>
</tbody>
</table>

NOTE: All the products included in this EPD do not contain or release harmful substances (Regulations (EU) 1907/2006 (REACH) and (EU) 1272/2008).
FINISHINGS AND COLORS

The blocks belonging to the three series under study are available in different surface finishes according to the required aesthetic needs. The different finishes can be obtained through appropriate adjustments to the ingredients of the ‘fine’ layer mix.

This EPD declaration lists the environmental performance of the blocks made with "quartz" finish and "gray" coloring, obtained without coloring agents added to the mixture of the ‘fine’ layer.

The blocks are also available in other finishes (eg. the "standard" finish does not require the use of quartz granulate in the mixture of the fine layer) and in other colors, based on the proportion of the dyes added to the mixture of the fine layer (eg. green colored blocks are made with the use of green chromium oxide, the yellow blocks are obtained with the use of yellow iron oxide, the "mix color" blocks are made by adding different metal oxides characterized by different colors to the mixture, etc.). The impact of the different finishes and colors on the overall life cycle impacts is not assessed in this EPD.
The production process is analogous to all three types of blocks presented in this EPD.

The principal phases included are as follows:
- Receival and storage of raw materials
- Raw material handling from the storage to the processing department
- Making the mixtures in the concrete mixers
- Vibro-compression molding
- Curing of the blocks in ventilated cells
- Palettizing and final storage
SYSTEM BOUNDARIES AND EPD TYPE

This LCA study analyzes the life cycle of the blocks “from cradle to gate”, therefore the system boundaries include the production and supply of raw materials (A1), transport (A2) and production (A3). Instead, the following phases are excluded from the system boundaries: distribution (A4), installation (A5), use (B1-B7) and end of life (C1-C4). The study did not evaluate the presence of any benefits beyond the system boundaries (D).

<table>
<thead>
<tr>
<th>PRODUCTION STAGE</th>
<th>CONSTRUCTION STAGE</th>
<th>USE STAGE</th>
<th>END OF LIFE STAGE</th>
<th>BENEFITS AND LOADS BEYOND THE BOUNDARIES OF THE SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction and supply of raw materials</td>
<td>Transport to the manufacturer</td>
<td>Product manufacture</td>
<td>Assembly</td>
<td>Use</td>
</tr>
<tr>
<td>A1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
<td>A5</td>
</tr>
</tbody>
</table>

MND: Module Not Declared

EPD TYPE : Specific, only for the products listed in the successive page of this declaration

DATABASE : Ecoinvent, 2018, v 3.5, released 2018-11

SOFTWARE : Simapro 9.0.0.35

GEOGRAPHICAL VALIDITY OF THE EPD : ITALY – Products manufactured and sold in the country

REFERENCE PERIOD : Year 2018
PROCESSES INCLUDED IN SYSTEM BOUNDARIES

UPSTREAM – Module A1

Impacts associated with the production of all the raw materials used as ingredients:
- For virgin raw materials, both the impacts associated with the materials and those associated with the related production processes were considered.
- For recycled raw materials, only the impacts of the recycling process were considered.
- For the internally ground material, in line with the provisions of the allocation rules applied to the study, no environmental load was attributed to the incoming material while the impacts associated with the rework were calculated (transport using internal material handling, grinding process).

Furthermore, as foreseen by the reference PCR, the impacts associated with the energy consumption of the production unit were also included within module A1, namely:
- Electricity consumption
- LPG consumption
PROCESSES INCLUDED IN SYSTEM BOUNDARIES

CORE – Module A2

In the A2 module the following were considered:
- External transport of raw materials and packaging materials to the Paver plant
- External transport of forgings (auxiliary materials)
- Internal transport related to the product handling using diesel-powered vehicles

CORE – Module A3

Within the A3 module the followed were evaluated:
- Water consumption of the plant (excluding the use as raw material)
- The production of waste from the entire plant and its final treatment
- Packaging production
- The production of forgings (auxiliary materials)
- Emissions to air from the combustion of LPG for heating
## CALCULATION RULES

**Functional Unit:** 1 ton of self-locking blocks  
**Reference Service Life:** N.D. – *LCA carried out with “cradle to gate” approach*

<table>
<thead>
<tr>
<th>Data quality</th>
<th>Allocazioni</th>
<th>Cut-off</th>
</tr>
</thead>
<tbody>
<tr>
<td>This EPD is based on primary data for the fundamental aspects, such as: the type of raw materials used and the composition of the products examined, the distances between the suppliers of the raw materials and the production site, the energy consumption of the plant.</td>
<td>For virgin raw materials, both the impacts associated with the materials and those associated with the related production processes were considered.</td>
<td>Not present</td>
</tr>
<tr>
<td>All processes for which primary data were not available, reference was made to secondary data taken from the LCA ecoinvent v3.5 database, Allocation, Cut-off by classification.</td>
<td>For recycled raw materials, only the impacts of the recycling process were considered. Recycled outputs are considered inputs for the subsequent life cycle.</td>
<td>Exclusions</td>
</tr>
<tr>
<td>As required by the PCR &quot;Construction products and construction services&quot;, the use of generic data (proxy data) was limited and their contribution does not exceed 10% of the overall impact.</td>
<td>Some impacts of production (electricity, LPG used for heating and waste) have been allocated among the products analyzed on an economic basis.</td>
<td>As required by the PCR used, the Company’s capital assets were not considered and as was the contribution of the infrastructure, which was also excluded.</td>
</tr>
<tr>
<td>The impacts related to the transport of the personnel to and from the workplace were also excluded.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CALCULATION METHOD

- **Impact categories:**  
  - “CML-IA baseline v3.05”  
  - “Cumulative Energy Demand v1.11”  
  - “ReCiPe 2016 Mid-point (H) v1.03”  
  - “EDIP 2003 v1.07”

- **Energy resources:**  
- **Net consumption of water:**  
- **Radioactive wastes:**
1. Results: ENVIRONMENTAL IMPACTS

<table>
<thead>
<tr>
<th>ENVIRONMENTAL IMPACTS</th>
<th>UNIT</th>
<th>CLASSICI Series</th>
<th></th>
<th></th>
<th>DESIGN Series</th>
<th></th>
<th></th>
<th>FILTRANTI Series</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UPSTREAM</td>
<td>CORE</td>
<td>TOTAL</td>
<td>UPSTREAM</td>
<td>CORE</td>
<td>TOTAL</td>
<td>UPSTREAM</td>
<td>CORE</td>
<td>TOTAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
</tr>
<tr>
<td>GWP</td>
<td>[kg CO2-Eq.]</td>
<td>1,07E+02</td>
<td>2,22E+01</td>
<td>8,09E+00</td>
<td>1,37E+02</td>
<td>2,22E+01</td>
<td>8,09E+00</td>
<td>1,37E+02</td>
<td>2,16E+01</td>
<td>8,05E+00</td>
</tr>
<tr>
<td>ODP</td>
<td>[kg CFC11-Eq.]</td>
<td>4,67E-06</td>
<td>4,12E-06</td>
<td>6,37E-07</td>
<td>9,42E-06</td>
<td>4,67E-06</td>
<td>4,12E-06</td>
<td>9,42E-06</td>
<td>4,01E-06</td>
<td>6,34E-07</td>
</tr>
<tr>
<td>AP</td>
<td>[kg SO2-Eq.]</td>
<td>2,57E-01</td>
<td>8,62E-02</td>
<td>3,28E-02</td>
<td>3,76E-01</td>
<td>2,57E-01</td>
<td>8,62E-02</td>
<td>3,28E-02</td>
<td>8,39E-02</td>
<td>3,26E-02</td>
</tr>
<tr>
<td>POCP</td>
<td>[kg C2H4-Eq.]</td>
<td>9,48E-03</td>
<td>3,69E-03</td>
<td>3,10E-03</td>
<td>1,63E-02</td>
<td>9,48E-03</td>
<td>3,69E-03</td>
<td>3,10E-03</td>
<td>3,60E-03</td>
<td>3,08E-03</td>
</tr>
<tr>
<td>EP</td>
<td>[kg (PO4)3–-Eq.]</td>
<td>6,87E-02</td>
<td>2,03E-02</td>
<td>1,20E-02</td>
<td>1,01E-01</td>
<td>6,87E-02</td>
<td>2,03E-02</td>
<td>1,20E-02</td>
<td>1,98E-02</td>
<td>1,19E-02</td>
</tr>
<tr>
<td>ADPE</td>
<td>[kg Sb-Eq.]</td>
<td>3,93E-05</td>
<td>6,55E-05</td>
<td>2,06E-05</td>
<td>1,25E-04</td>
<td>3,93E-05</td>
<td>6,55E-05</td>
<td>2,06E-05</td>
<td>6,37E-05</td>
<td>2,02E-05</td>
</tr>
<tr>
<td>ADPF</td>
<td>[MJ]</td>
<td>5,04E+02</td>
<td>3,38E+02</td>
<td>1,30E+02</td>
<td>9,71E+02</td>
<td>5,04E+02</td>
<td>3,38E+02</td>
<td>1,30E+02</td>
<td>3,29E+02</td>
<td>1,29E+02</td>
</tr>
</tbody>
</table>

GWP: Global Warming Potential
ODP: Depletion potential of the stratospheric ozone layer
AP: Acidification Potential of land and water
POCP: Formation potential of tropospheric ozone photochemical oxidants
EP: Eutrophication Potential
ADPE: Abiotic depletion potential for non-fossil resources
ADPF: Abiotic depletion potential for fossil resources
## 2. Results: RESOURCE USAGE

<table>
<thead>
<tr>
<th>ENVIRONMENTAL IMPACTS</th>
<th>UNIT</th>
<th>CLASSICI Series</th>
<th>DESIGN Series</th>
<th>FILTRANTI Series</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UPSTREAM</td>
<td>TOTAL</td>
<td>UPSTREAM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
</tr>
<tr>
<td>PERE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[MJ]</td>
<td></td>
<td>4.98E+01</td>
<td>2.45E+00</td>
<td>4.23E+00</td>
</tr>
<tr>
<td>PERM</td>
<td></td>
<td>1.15E+01</td>
<td>1.13E+00</td>
<td>3.68E+02</td>
</tr>
<tr>
<td>PERT</td>
<td></td>
<td>6.12E+01</td>
<td>3.57E+00</td>
<td>3.72E+02</td>
</tr>
<tr>
<td>PENRE</td>
<td></td>
<td>6.00E+02</td>
<td>3.64E+02</td>
<td>1.50E+02</td>
</tr>
<tr>
<td>PENRM</td>
<td></td>
<td>4.74E-03</td>
<td>1.11E-02</td>
<td>3.32E-02</td>
</tr>
<tr>
<td>PENRT</td>
<td></td>
<td>6.00E+02</td>
<td>3.64E+02</td>
<td>1.50E+02</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>3.60E+02</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
</tr>
<tr>
<td>RSF</td>
<td>[MJ]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
</tr>
<tr>
<td>NRSF</td>
<td></td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
</tr>
<tr>
<td>FW</td>
<td>[m³]</td>
<td>8.94E-01</td>
<td>6.20E-02</td>
<td>7.97E-02</td>
</tr>
</tbody>
</table>

**PERE** Use of renewable primary energy excluding renewable primary energy resources used as raw materials  
**PERM** Use of renewable primary energy resources used as raw materials  
**PERT** Total use of renewable primary energy resources  
**PENRE** Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials  
**PENRM** Use of non-renewable primary energy resources used as raw materials  
**PENRT** Total use of non-renewable primary energy resources  
**SM** Use of secondary material  
**RSF** Use of renewable secondary fuels  
**NRSF** Use of non-renewable secondary fuels  
**FW** Use of net fresh water
## 3. Results: OUTPUT FLOWS AND WASTE CATEGORIES

<table>
<thead>
<tr>
<th>ENVIRONMENTAL IMPACTS</th>
<th>UNIT</th>
<th>CLASSICI Series</th>
<th>DESIGN Series</th>
<th>FILTRANTI Series</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UPSTREAM</td>
<td>CORE</td>
<td>TOTALE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
</tr>
<tr>
<td>HWD</td>
<td>[kg]</td>
<td>0,00E+00</td>
<td>0,00E+00</td>
<td>1,59E-01</td>
</tr>
<tr>
<td>NHWD</td>
<td>[kg]</td>
<td>0,00E+00</td>
<td>0,00E+00</td>
<td>2,16E+01</td>
</tr>
<tr>
<td>RWD</td>
<td>[kg]</td>
<td>2,82E-03</td>
<td>2,32E-03</td>
<td>3,46E-04</td>
</tr>
<tr>
<td>CRU</td>
<td>[kg]</td>
<td>N.D.</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
<tr>
<td>MFR</td>
<td>[kg]</td>
<td>N.D.</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
<tr>
<td>MER</td>
<td>[kg]</td>
<td>N.D.</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
<tr>
<td>EEE</td>
<td>[MJ]</td>
<td>N.D.</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
<tr>
<td>EET</td>
<td>[MJ]</td>
<td>N.D.</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
</tbody>
</table>

HWD  Hazardous waste disposal  
NHWD  Non-hazardous waste disposal  
RWD  Radioactive waste disposed  
CRU  Components for re-use  
MFR  Materials for recycling  
MER  Materials for energy recovery  
EEE  Exported electrical energy  
EET  Exported thermal energy  

N.D. Not Declared
RIFERIMENTI

- ISO 14025:2006 – Environmental labels and declarations - Type III environmental declarations - Principles and procedures.
- PCR ICMQ 001/15-rev 2.1 Product Category Rules “Prodotti da costruzione e servizi per costruzioni” (Building-Related Products and Services) - www.epditaly.it
- Regolamento EPDItaly Revision 4 dated 03.06.2019 - www.epditaly.it
- SimaPro v9.0.0.35 - www.pre-sustainability.com
- LCA report issued by Qoncert S.r.l. – Masselli autobloccanti per pavimentazioni esterne – Stabilimento: Ferrara – Rev. 01 – 15.06.2020