ENVIRONMENTAL PRODUCT DECLARATION
as per ISO 14025 and EN 15804

Owner of the Declaration: Promat International NV
Programme holder: Institut Bauen und Umwelt e.V. (IBU)
Publisher: Institut Bauen und Umwelt e.V. (IBU)
Declaration number: EPD-PMT-20150172-IBA1-EN
Issue date: 15/09/2015
Valid to: 14/03/2021

PROMATECT®-LS
Medium density calcium silicate fire protective boards

Promat

www.bau-umwelt.com / https://epd-online.com
1. General Information

Promat International NV
Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

PROMATECT®-LS
Owner of the Declaration
Promat International NV
Bormstraat 24
B-2830 Tisselt
Belgium

Declaration number
EPD-PMT-20150172-IBA1-EN

This Declaration is based on the Product Category Rules:
Calcium silicate insulating materials, 07.2014
(PCR tested and approved by the SVR)

Issue date
15/09/2015

Valid to
14/03/2021

Scope:
The life cycle assessment is based on production data of PROMATECT®-LS of the year 2013 at the production site Tisselt, Belgium. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification
The CEN Norm /EN 15804/ serves as the core PCR
Independent verification of the declaration according to /ISO 14025/ internal
externally

Prof. Dr.-Ing. Horst J. Bossenmayer
(Managing Director IBU)

Dr. Burkhard Lehmann
(Mr. Carl-Otto Neven)
(Independent verifier appointed by SVR)

2. Product

2.1 Product description
PROMATECT®-LS is a lightweight, non-combustible, fire resisting calcium silicate board, not sensitive to moisture.

2.2 Application
PROMATECT®-LS is primarily used in interior building applications where normal to high levels of fire resistance are required. PROMATECT®-LS is intended to protect elements or to be used in technical services assemblies. Main application areas are the fire protection of ducts such as cable, ventilation and smoke extraction ducts.

2.3 Technical Data

<table>
<thead>
<tr>
<th>Constructional data</th>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross density according to /ETA 11/0039/</td>
<td></td>
<td>460 - 620</td>
<td>kg/m³</td>
</tr>
<tr>
<td>Compressive strength according to /ETA 11/0039/</td>
<td></td>
<td>4.2</td>
<td>N/mm²</td>
</tr>
<tr>
<td>Tensile strength (perpendicular) according to /EN 1607/</td>
<td></td>
<td>0.056</td>
<td>N/mm²</td>
</tr>
<tr>
<td>Flexural strength according to ETA 11/0039/</td>
<td></td>
<td>1.5</td>
<td>N/mm²</td>
</tr>
<tr>
<td>Thermal conductivity according to ETA 11/0039/</td>
<td></td>
<td>0.087</td>
<td>W/(mK)</td>
</tr>
</tbody>
</table>

Water vapour diffusion resistance factor according to /EN12572/ 3.9 -
Tensile strength (parallel) according to /EN 1608/ 445 kPa

Values are guidance values and do not reflect a statistical evaluation or guaranteed value.

2.4 Placing on the market / Application rules
For the placing on the market in the EU/EFTA (with the exception of Switzerland) the Regulation (EU) No 305/2011 applies. The product need a Declaration of Performance taking into consideration /ETA 11/0039/ and the CE marking.
For the application and use the respective national provisions apply.

2.5 Delivery status
PROMATECT®-LS fire protective calcium silicate boards are 1200 x 2500 mm and are delivered in various thicknesses: 30, 35, 40, 45 and 50mm.

2.6 Base materials / Ancillary materials
The following raw materials expressed in weight percentages are used to produce PROMATECT®-LS:
- sand: 25-45%
- lime: 25-45%
- cement: <15%
- fibres: <6%

Reaction is performed in an aqueous suspension.
None of the contents of the product is included in the "Candidate List of Substances of Very High Concern for Authorisation"

2.7 Manufacture
Sand, water and lime are mixed and blended in a reactor to form calcium silicate. This is combined in a mixer with the other raw materials to form a thick slurry. The slurry is formed to a board in a filter press. Boards are dried, edges are trimmed and the upper surface is sanded to the specific thickness. All material which is cut off or sanded away is fully recycled within the process.

2.8 Environment and health during manufacturing
Promat commit to a clean, healthy and safe working environment for every person working in and for the company.
The company and the manufacturing site have a environment, health and safety management system which is /ISO 14001/ and /OHSAS 18001/ certified. The manufacturing plant adhere to the Belgium environmental and health and safety regulations.

2.9 Product processing/Installation
The fire protective board is cut and machined using conventional woodworking equipment. Fixing the boards will require appropriate means, which will depend upon the application and bearing structure. Boards can be installed using screws or glues.
Industrial and environmental protection are assured through training and coaching staff on safety and environmental impacts. Dust levels are kept low by performing dust extraction. Noise is reduced by noise insulation on the machines and ear protection is provided for persons entering the production area. Regular measurements on noise and dust are performed and show conformity to the permitted levels. All national, local and other applicable safety regulations are complied with.

2.10 Packaging
All fire protection boards are packed onto wooden pallets, wrapped with polyester strapping tape and strengthened with cardboard corners. Part of the wooden pallets is returned by the customer and reused several times. The polyester straps and cardboard are recyclable.

2.11 Condition of use
PROMATECT®-LS boards are resistant to the effects of moisture and will not physically deteriorate when used in damp or humid conditions. Performance characteristics are not degraded by age or moisture. Boards do not encourage mould growth and are resistant to attacks by insects or vermin.

2.12 Environment and health during use
PROMATECT®-LS is chemically inert. When the product is used as designed, the current state of knowledge indicates that there is no risk involved for the environment or health.

2.13 Reference service life
The utilisation phase is not evaluated in this Environmental Product Declaration. Hence no reference to useful life is required. For information only: the reference service life of the PROMATECT®-LS boards has been estimated to be at least 25 years, according to the European Technical Approval /ETA 11/0039/ provided that the assembled product is subject to appropriate use and maintenance as specified in the ETA. The estimated RSL cannot be considered as guarantee, but are to be regarded only as a means for the specifiers to choose the appropriate criteria for the fire protective board in relation to the expected economically reasonable working life of the works.

2.14 Extraordinary effects
Fire
The PROMATECT®-LS boards have a reaction to fire classification A1 or non-combustible according to /EN13501-1/. Fire protection

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building material class</td>
<td>A1</td>
</tr>
<tr>
<td>Burning droplets</td>
<td>/</td>
</tr>
<tr>
<td>Smoke gas development</td>
<td>/</td>
</tr>
</tbody>
</table>

Water
All ingredients are firmly bound in the matrix. The boards are insensitive to moisture and no ingredients which could be hazardous to water are washed out in the event of extraordinary effects by water.

Mechanical destruction
In order to prevent any reduction of fire performance following unforeseeable mechanical destruction, all damage of the components needs to be repaired using materials specified by the /ETA 11/0039/. Besides the need for repair, the destruction will not have any significant environmental impact.

2.15 Re-use phase
Several possibilities exist for the boards after the end-of-life of the application in which they were used. If the boards are removed non-destructively by releasing the screws, the undamaged product can be re-used in accordance with the original purpose. If not contaminated with other building construction material, the boards also allow being recycled by the manufacturer. Furthermore, the products referred to could be used as

3 Environmental Product Declaration Promat – PROMATECT®-LS
filler and bulk material in civil engineering, as an absorber in cat litter or be recycled in cement industry. For this EPD, a conservative worst-case scenario was chosen at the end of life stage and product was sent for 100% to landfill.

2.16 Disposal
Within the production process, all of the generated waste is immediately re-used within the process. When after end-of-life re-using or recycling the boards as described in the previous paragraph is not practical, the boards can be disposed to landfill without pre-treatment thanks to the largely mineral ingredients resulting in an inert matrix. The waste code in accordance with the European Waste Code Index is 170101 Class I landfill.

2.17 Further information
Further information is available on the following website:
www.promat-international.com

3. LCA: Calculation rules

3.1 Declared Unit
The functional unit is 1 ton of PROMATECT®-LS.

<table>
<thead>
<tr>
<th>Functional unit</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross density</td>
<td>520</td>
<td>kg/m³</td>
</tr>
<tr>
<td>Conversion factor to 1 kg</td>
<td>0.001</td>
<td>-</td>
</tr>
<tr>
<td>Declared unit</td>
<td>1</td>
<td>t</td>
</tr>
</tbody>
</table>

3.2 System boundary
Type of EPD: cradle-to-gate - with options.
In accordance with /EN15804/, the Life Cycle Assessment in this study includes the modules:
- A1 to A3: the product stage
- A4: transport from production gate to the building site
- A5: waste processing of product packaging
- C4: end-of-life disposal of boards
- D: benefits from waste processing of product packaging

3.3 Estimates and assumptions
Most of the input and output influences of the Life Cycle Inventory Analysis could be depicted using corresponding data from the /GaBi database/. There were no data records in the /GaBi database/ available for the wooden pallets, they were approximated using the "timber spruce" dataset. Impact due to pallet incineration was overestimated as the input process was based on 65% of moisture content, whereas the incineration dataset is based on only 10% of moisture. The waste water treatment of process water was approximated by datasets of municipal waste water treatment, which will also result in an overestimation of impacts.
Blue water consumption is taken into consideration in the background data system. Water which is embedded in the product as well as water which is evaporated from the product during production is included in the calculations. Where possible, specific regional data was used when selecting background data.

3.4 Cut-off criteria
In the assessment, all utilised raw material, thermal energy and electric power were considered using GaBi 6 datasets. No cut-off criteria were used in this study.

3.5 Background data
Background data were sourced from /GaBi 6/ database version 6.108. Since production occurs in Belgium, the Belgium electricity grid mix was used.

3.6 Data quality
This study is mainly based on primary data collected directly from the manufacturing site and therefore data quality can be assumed to be very good.
The last update of the /GaBi database/ used for the background data was December 2014.

3.7 Period under review
Data for the entire production period of 2013 were collected and used for this EPD.

3.8 Allocation
Allocation in foreground data
The production process does not deliver any co-products. In module A1 to A3, specific raw material and transport data were available, energy and water could not be directly allocated to the product and were allocated via the production volume of the specific products.
Allocation for waste materials
The environmental burden of the incineration of packaging, being plastic and wooden pallets, in the end-of-life scenario is assigned to the system in module C4, the resulting credits for thermal and electrical energy are declared in module D.
Allocation for waste paper
Input of waste paper (in dataset paper/corrugated board) is considered without environmental burden, resulting waste paper is not credited. The recycling process and the production process of paper are merged in the production process.

3.9 Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

4. LCA: Scenarios and additional technical information

Transport to the building site (A4)
For the transport from the factory gate to the building site, an average distance of 100km was assumed. This distance can be assumed to be representative for deliveries within Belgium. For transport to other
countries, the impacts can be easily calculated by multiplying the impacts in module A4 with the transport distance to the specific location and dividing by 100.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Litres of fuel</td>
<td>1.61</td>
<td>l/100km</td>
</tr>
<tr>
<td>Transport distance</td>
<td>100</td>
<td>km</td>
</tr>
<tr>
<td>Capacity utilisation (including empty runs)</td>
<td>85</td>
<td>%</td>
</tr>
<tr>
<td>Gross density of products transported</td>
<td>520</td>
<td>kg/m³</td>
</tr>
</tbody>
</table>

**Installation into the building (A5)**

Only waste treatment of packaging is considered in this module.

**End-of-life (C1-C4)**

A conservative approach was used in this study. Although after end-of-life, scenarios where the boards are re-used or recycled are realistic, a scenario with 100% landfill was used.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfilling</td>
<td>1000</td>
<td>kg</td>
</tr>
</tbody>
</table>

**Re-use, recovery and/or recycling potentials (D), relevant scenario information**

Although re-use and recycling of the PROMATECT®-LS is possible, this is not yet a widely established practice. Therefore, no possible benefits of recycling or re-use of the boards were taken into account in this study. In module D, only the benefits from the incineration of waste packaging, being plastic and the share of wooden pallets that is not reused, were taken into account.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exported electrical energy</td>
<td>53.6</td>
<td>MJ</td>
</tr>
<tr>
<td>Exported thermal energy</td>
<td>165</td>
<td>MJ</td>
</tr>
</tbody>
</table>
### 5. LCA: Results

The following tables depict the results of the indicators for the Life Cycle Assessment, use of resources and waste **with reference to 1 ton of PROMATECT®-LS.**

#### DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

<table>
<thead>
<tr>
<th>PRODUCT STAGE</th>
<th>CONSTRUCTION PHASE</th>
<th>USE STAGE</th>
<th>END OF LIFE STAGE</th>
<th>BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material supply</td>
<td>Transport</td>
<td>Manufacturing</td>
<td>Assembly</td>
<td>Use</td>
</tr>
<tr>
<td>Raw material supply</td>
<td>Transport</td>
<td>Manufacturing</td>
<td>Assembly</td>
<td>Use</td>
</tr>
<tr>
<td>Raw material supply</td>
<td>Transport</td>
<td>Manufacturing</td>
<td>Assembly</td>
<td>Use</td>
</tr>
</tbody>
</table>

#### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 ton of PROMATECT®-LS

![Table](https://example.com/table.png)

#### RESULTS OF THE LCA - RESOURCE USE: 1 ton of PROMATECT®-LS

![Table](https://example.com/table.png)

#### RESULTS OF THE LCA - OUTPUT FLOWS AND WASTE CATEGORIES: 1 ton of PROMATECT®-LS

![Table](https://example.com/table.png)

### 6. LCA: Interpretation

The chart below provides information of the relative contributions of the declared modules to the most important environmental impact categories. The impact assessment results are calculated using characterisation factors generated by the Centre of Environmental Science at Leiden University/CML2001 - April 2013, Netherlands.

It can be seen that main contributions to the impact categories are coming from the production stage, more specifically from the raw material and the manufacturing. The transport of the material to the building site, the waste treatment of the packaging and the end of life scenario of 100% landfill only contribute to a minor extent.

For the raw materials impacts are mainly coming from:

- lime (for global warming potential (GWP))
- cement (for ozone depletion potential (ODP), acidification potential (AP), photochemical ozone creation potential (POCP))
- fibres (for AP, POCP, abiotic depletion potential for non-fossil resources (ADP-elements))
For the manufacturing, impacts are mainly coming from:

- thermal energy
  (for GWP, AP, eutrophication potential (EP), POCP, abiotic depletion potential for fossil resources (ADP-fossils), total use of non renewable primary energy resources (PENRT))
- electricity

The thermal energy and the electricity are needed for heating the reactors to form the calcium silicate and for drying the boards.

7. Requisite evidence

7.1 Radioactivity measurements
Radioactivity measurements on PROMATECT®-LS confirmed that it did not contain other gamma emitters than those originating from the natural radiation sources. The measured radioactivity levels do not exceed the activity concentration indices as specified by the Article 3 (Radiation Protection 112) for building products following the Council /Directive 96/29/. Activity concentration index ≤ 2.

Date: 2 December 2011
Measuring agency: SCK.CEN Laboratory for Gammaspectrometry, Mol, Belgium
Protocol: Activity concentration index (ACI)

7.2 VOC emissions
PROMATECT®-LS complies with the requirements of DIBt /DIBt-communication 4/2004/ in combination with the NIK values from /AgBB/ (March 2008) for use in the indoor environment. (values in table below having 

"<" means that the measurements were below the quantification limit)

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total VOC after 28d (C6-C16)</td>
<td>7.1</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Limit : 1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R after 28d (c/NIK)</td>
<td>0.017</td>
<td>-</td>
</tr>
<tr>
<td>Sum of VVOC after 28d (&lt;n-C6)</td>
<td>&lt;5</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Limit : 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum of SVOC after 28d (&gt;n-C16)</td>
<td>&lt;5</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Limit : 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum of cancerogenic</td>
<td>&lt;1</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Limit : 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formaldehydro</td>
<td>&lt;5</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Limit : 120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetaldehyd</td>
<td>&lt;5</td>
<td>µg/m³</td>
</tr>
</tbody>
</table>

Date: 30 September 2008
Measuring agency: Eurofins Product Testing A/S, Galten, Denmark
Report number: 765392F

8. References

Institut Bauen und Umwelt
Institut Bauen und Umwelt e.V., Berlin(pub.):

Generation of Environmental Product Declarations (EPDs);

General principles
ISO 14025
DIN EN ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804
EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

CPR

EN ISO 14040
EN ISO 14040:2009-11 -Environmental management - Life cycle assessment - Principles and framework

EN ISO 14044
EN ISO 14044:2006-10 -Environmental management - Life cycle assessment - Requirements and guidelines

PCR 2013, Part A

PCR 2014, Part B
Product Category Rules for Building Products, Part B : Requirements on the EPD for Calcium silicate insulating materials, version 1.6. www.bau-umwelt.de

GaBi 6
GaBi 6.4 dataset documentation for the software-system and databases, LBP, University of Stuttgart and Thinkstep Leinfelden-Echterdingen, 2014, (http://documentation.gabi-software.com/)

EN 13501-1

EN 14306

EN ISO 12572

ETA 07/0296
European technical approval of PROMATECT®-L fire protective board

ETA 06/0218
European technical approval of PROMATECT®-L500 fire protective board

ETA 11/0039
European technical approval of PROMATECT®-LS fire protective board

ETA 06/0219
European technical approval of PROMATECT®-100 fire protective board

ETA 07/0297
European technical approval of PROMATECT®-200 fire protective board

ETA 08/0161
European technical approval of PROMATECT®-250 fire protective board

ETA 06/0215
European technical approval of PROMAXON®-Typ A fire protective board

EN 826
EN 826: 1996 : Thermal insulating products for building applications - Determination of compression behaviour

EN 1607
EN 1607: 1996 : Thermal insulating products for building applications - Determination of tensile strength perpendicular to faces

EN 1608
EN 1608: 1996: Thermal insulating products for building applications - Determination of tensile strength parallel to faces

EN 12467
EN 12467: 2004 : Fibre-cement flat sheets - Product specification and test methods

EN 12667

OHSAS 18001
OHSAS 18001: international occupational health and safety management system specification

ISO 14001
ISO 14001: 2004: environmental management system

CML2001-April 2013
Characterisation factors of April 2013 generated by Centre of Environmental Science at Leiden University, Netherlands

Directive 96/29

DIBt-communication 4/2004
DIBt (Deutsches Institut für Bautechnik) approval guidelines for the health-related evaluation of indoor construction products-2004

AgBB
The Committee for Health-related Evaluation of Building Products, AgBB (Ausschuss für die gesundheitliche Bewertung von Bauprodukten)

**GHG Protocol**

**Kreissig & Kummel 1999**
<table>
<thead>
<tr>
<th><strong>Publisher</strong></th>
<th>Institut Bauen und Umwelt e.V.</th>
<th>Tel +49 (0)30 3087748-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panoramastr. 1</td>
<td>10178 Berlin</td>
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</tr>
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<td>Germany</td>
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<td>Web <a href="http://www.bau-umwelt.com">www.bau-umwelt.com</a></td>
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</tbody>
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<thead>
<tr>
<th><strong>Programme holder</strong></th>
<th>Institut Bauen und Umwelt e.V.</th>
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<td>10178 Berlin</td>
<td>Fax +49 (0)30 – 3087748 - 29</td>
</tr>
<tr>
<td>Germany</td>
<td>Mail <a href="mailto:info@bau-umwelt.com">info@bau-umwelt.com</a></td>
<td>Web <a href="http://www.bau-umwelt.com">www.bau-umwelt.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Author of the Life Cycle Assessment</strong></th>
<th>Promat</th>
<th>Tel +32 (0)15 71 82 83</th>
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</thead>
<tbody>
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<td>Bormstraat 24</td>
<td>2830 Tisselt</td>
<td>Fax +32 (0)15 71 82 29</td>
</tr>
<tr>
<td>Belgium</td>
<td>Mail <a href="mailto:p.vandevelde@prtc.be">p.vandevelde@prtc.be</a></td>
<td>Web <a href="http://www.prtc.be">www.prtc.be</a></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
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<th>Promat International NV</th>
<th>Tel +32 (0)15 71 81 00</th>
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</thead>
<tbody>
<tr>
<td>Bormstraat 24</td>
<td>2830 Tisselt</td>
<td>Fax +32 (0)15 71 82 29</td>
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<td>Belgium</td>
<td>Mail <a href="mailto:info@promat-international.com">info@promat-international.com</a></td>
<td>Web <a href="http://www.promat-international.com">www.promat-international.com</a></td>
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