



# Environmental Product Declaration

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for Ravaber Ceramic Fibre Blanket  
in accordance with ISO 14025 and EN 15804

Programme: The International EPD® System, [www.environdec.com](http://www.environdec.com)  
EPD Turkey, [www.epdturkey.org](http://www.epdturkey.org)

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THE INTERNATIONAL EPD® SYSTEM



ENVIRONMENTAL PRODUCT DECLARATIONS

## PROGRAMME INFORMATION

Programme	The International EPD <sup>®</sup> System  EPD International AB Box 210 60 SE-100 31 Stockholm Sweden  www.environdec.com info@environdec.com  Regional Office: EPD Turkey, Nef 09 B Blok 7/15 Kagithane/Istanbul, Turkey, www.epdturkey.org
Product Category Rules (PCR)	Construction Products and Construction Services 2012:01, version 2.3  SUB-PCR to PCR 2012:01 Thermal Insulation Products (EN 16783:2017) Versiyon 2.2
PCR Review Was Conducted By	The Technical Committee of the International EPD <sup>®</sup> System. A full list of members available on www.environdec.com.  Contact via: info@environdec.com
Verification	Independent verification of the declaration and data, according to ISO 14025:2006:  <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third Party Verifier	Ing. Luca Giacomello, PMP <sup>®</sup> Corso Gamba 36 C 10144 Torino - Italy  Approved by: The International EPD <sup>®</sup> System Technical Committee, supported by the Secretariat
Data Follow Up	Procedure for follow-up of data during EPD validity involves third party verifier:  <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
LCA Study & EPD Design Conducted By	Semtrio Sustainability Consulting AND Plaza No:10-12 Kozyatagi Istanbul/Turkey www.semtrio.com

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## COMPANY INFORMATION



*RAVABER Kayseri Manufacturing Plant, Turkey*

The owner of the EPD - RAVABER - operates in more than 350 locations in 40 countries, being a member of the Belgium-based Ravago Group and a leader in the insulation industry by meeting the mineral rockwool requirement of an area of 20,000,000 sqm annually with its wide product range for thermal insulation, sound insulation and fire safety. RAVABER is located in Kayseri Organized Industrial Zone with its high technology equipment investments in a total area of 80,000 sqm with 56,000 sqm indoor area. RAVABER is the biggest mineral wool manufacturer in the region with an annual production capacity of 120,000 tonnes.

In addition to 25 different types of mineral rockwool products, RAVABER is producing Ceramic Wool and Agro used in soilless agriculture. RAVABER has become the only company in the sector supplying all mineral wool products in the last quarter of 2018 by starting mineral wool production with the new production line of glass wool. Ravaber, the only manufacturer that can produce all mineralwool insulation materials under the same roof, offers a wide range of products with new Ravaber bio according to various application areas.

## PRODUCT INFORMATION

Ravaber Ceramic Fibre is a thermal insulation material consisting of long, flexible and interwoven fibres produced by twisting and spinning, for applications requiring insulation between 650 ° C - 1430 ° C. Ceramic fibre consists three elements basically; silica, alumina and zirconium and it is a thermal insulation material for high temperature. Ravaber Ceramic Fibre blanket is used in the industrial furnace insulation, boiler, pipe and chimney's insulation and it also used in all technical insulations, which requires high temperature.

Ravaber Ceramic Fibre is produced in the Turkey's first high-tech ceramic fibre production line that has very low shot (unfiberized) content with the amount of high pure silica and alumina. Since no chemical binder is used in the production of Ravaber Ceramic Wool, it does not produce any smoke during the first combustion and does not generate odour during combustion. Compared to fire and insulating bricks, they provide less energy and therefore provide high energy savings. Does not contain asbestos.

Ravaber Ceramic Wool is not affected by chemicals (except phosphoric and hydrofluoric acid and strong alkalis such as Na<sub>2</sub>O, K<sub>2</sub>O). The thermal and characteristic properties do not change after wetting and drying, but still have the same thermal insulation properties.

Thanks to its production technology, Ravaber Ceramic Wool which has a long fibre structure is produced without the need of any chemical binder. It provides energy saving in industrial uses thanks to its ability to heat insulation up to 1430 ° C in technical insulation.

In addition to its high degree of thermal insulation, it is able to provide excellent sound and fire insulation.

**UN CPC code:** 37990, Non-metallic mineral products n.e.c. (including mineral wool, expanded mineral materials, worked mica, articles of mica, non-electrical articles of graphite or other carbon and articles of peat). HS Code: 6806.

**Geographical scope:** Global.



## Product Description

Ravaber Ceramic Fiber Blanket is a product which produced by the melting the silica and alumina at high temperature and after formed fibers the product obtained by giving the form of a blanket at various thicknesses and densities with the pressure.

## Product Sizes

25 x 610 x 7200mm, 50 x 610 x 3600mm,  
4600 x 610 x 38mm, 9200 x 610 x 19mm,  
14400 x 610 x 13mm

## Product Features

- High tensile strength and high elasticity
- Low thermal conductivity value
- High thermal resistance value
- Good sound absorption property
- Low temperature storage
- Minimal shrinkage at high temperature
- Not affected by thermal shock

## Typical Applications

- Industrial furnace insulation
- Ceramics - Glass industry
- Iron and steel industry
- Casting industry
- Cement industry
- Steel door - Fire door



## TECHNICAL SPECIFICATIONS

Na <sub>2</sub> O (Sodium Oxide)	%0,8 - 1,5
MgO (Magnesium Oxide)	%0,5 - 0,8
Al <sub>2</sub> O <sub>3</sub> (Aluminium Oxide)	%41 - 42
Si <sub>2</sub> O <sub>3</sub> (Silica Oxide)	%51 - 53
ZrO <sub>2</sub> (Zirconium Oxide)	%0,1 - 0,5
CaO (Calcium Oxide)	%0,5 - 1,0
Density	96   128
Classification Temperature	1260°C
Fiber Diameter (Micron)	3,5 - 4,5
Shot Content (%)	≤1
Usage Temperature	1100°C
<b>Thermal Conductivity (W/m.k)</b>	
400°C	0.1
600°C	0.16
800°C	0.24
Tensile Strength (MPa)	0.04

## LCA INFORMATION

Functional unit / declared unit: The functional unit is providing a thermal insulation on 1 sqm of product with a thermal resistance of 1 K.m<sup>2</sup>.W<sup>-1</sup>.

Declared Unit weight for 1 sqm with a thermal resistance of 1 K.m<sup>2</sup>.W<sup>-1</sup>.

Product	Density, kg/m <sup>3</sup>	Thickness, mm	Thermal Conductivity, W/m.K	Weight, kg
Ceramic Fibre Blanket	96	22	0.022	2.59

Conversion factor from functional unit into kg is 2.59

Reference service life: N/A

EPD Type (System Boundary): Cradle-to-gate

Data Collection: Specific data (primary data) was used for the Core Module and was gathered from the RAVABER Manufacturing Plant. The manufacturing data are monitored and recorded in RAVABER data collection system specifically per unit of product. Data represents the period from 1st January 2018 to 31th October 2018. For secondary data Ecoinvent v3.5 datasets was used. LCA was modelled in SimaPro v9.0.0.31.

Allocation: No allocation conducted for input materials and energy consumption was collected specifically per functional unit.

Calculation Methods: All resource use values are calculated from Cumulative Energy Demand V1.11 in SimaPro outputs; water consumption from inventory. Potential environmental impacts are calculated with the CML-IA baseline V 3.05, in SimaPro software.

Cut-off Rules: Cut-off rule of 1% regarding waste and wastewater treatment was applied. Regarding to material and chemical inputs, no cut-off rule has been applied.

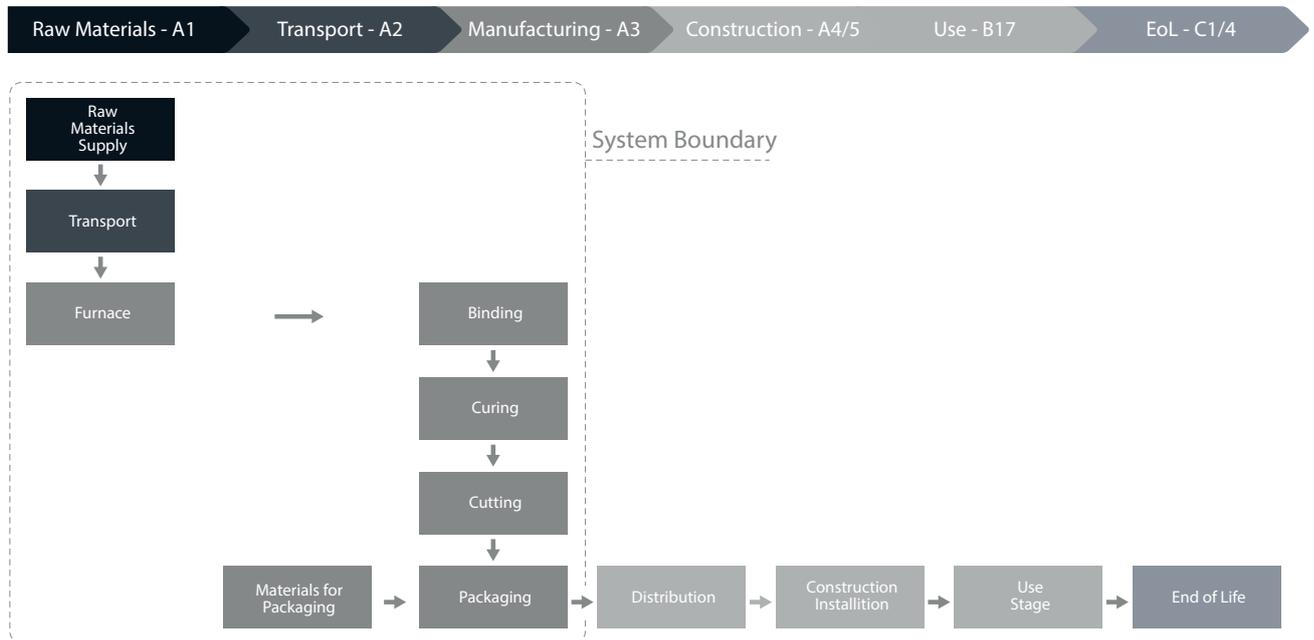
Excluded lifecycle stages: Downstream Processes A4/5, B1/7, C1/4 and module D are not evaluated in this LCA study. The EPD is intended to be as cradle to gate (A1 to A3). This EPD only covers the Cradle to Gate stage because other stages are very dependent on particular scenarios.

### Included life cycle stages per EN 15804:

Product stage			Construction stage		Use stage								End of life stage				Resource recovery stage
Raw materials	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	

MND: Module not declared.

## System Diagram:



### Upstream Processes

A1) Raw material supply:

- Extraction and processing of raw materials (e.g. mining processes)
- Energy generation in the upstream processes

Glass cullet is used as secondary materials in the production system. All elementary flows at resource extraction have been included.

- Packaging materials

### Core Processes

The scope of the core module is defined by the organizational boundaries and includes all activities which the manufacturing organization is in control of. In this LCA Study the core process includes transportation of raw materials to production plant, impacts generated by fuel burned in the core process, impacts due to the electricity production according the country energy mix.

A2) Transportation:

- External transportation to the core processes and internal transport

A3) Manufacturing:

- Manufacturing of the glass wool product
- Packaging materials

## CONTENT DECLARATION

Materials	Percentage, %
Silica, kg	40-70
Alumina, kg	30-60

**Packaging:** PE packaging film is used to cover the end products. Classified as Distribution Packaging: designed for the purposes of transport, handling and/or distribution.

No substances included in the Candidate List of Substances of Very High Concern for authorisation under the REACH regulations are included in composition of RAVABER's products, above the threshold for registration with the European Chemicals Agency or above 0.1 % (wt/wt).

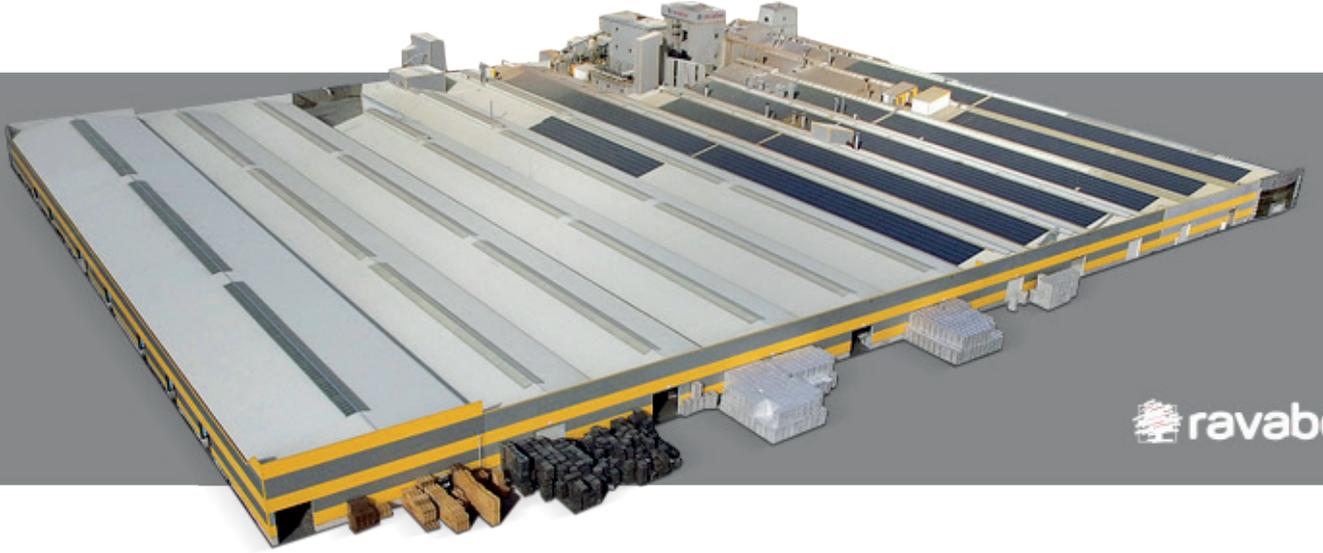
**Silica:** Silicon dioxide, also known as silica, is an oxide of silicon with the chemical formula  $\text{SiO}_2$ , most commonly found in nature as quartz and in various living organisms. In many parts of the world, silica is the major constituent of sand.

**Alumina:** Aluminium oxide or aluminium oxide is also known as Alumina. It is a chemical compound of aluminium and oxygen with the chemical formula  $\text{Al}_2\text{O}_3$ . It is the most commonly occurring of several aluminium oxides, and specifically identified as aluminium (III) oxide.



## ENVIRONMENTAL PERFORMANCE

PARAMETERSX	UNIT	TOTAL A1 to A3	
<b>USE OF RESOURCES</b>			
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	4.90
	Used as raw materials	MJ, net calorific value	0.00
	TOTAL	MJ, net calorific value	4.90
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	51.9
	Used as raw materials	MJ, net calorific value	0.00
	TOTAL	MJ, net calorific value	51.9
Secondary material	kg	0.00	
Renewable secondary fuels	MJ, net calorific value	0.00	
Non-renewable secondary fuels	MJ, net calorific value	0.00	
Net use of fresh water	m <sup>3</sup>	0.017	
<b>POTENTIAL ENVIRONMENTAL IMPACTS</b>			
Global warming potential (GWP)	kg CO <sub>2</sub> eq.	3.85	
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	2.00E-07	
Acidification potential (AP)	kg SO <sub>2</sub> eq.	0.019	
Eutrophication potential (EP)	kg PO <sub>4</sub> <sup>3-</sup> eq.	0.002	
Formation potential of tropospheric ozone (POCP)	kg C <sub>2</sub> H <sub>4</sub> eq.	0.001	
Abiotic depletion potential – Elements	kg Sb eq.	9.97E-07	
Abiotic depletion potential – Fossil resources	MJ, net calorific value	46.4	
<b>WASTE PRODUCTION AND OUTPUT FLOWS</b>			
Hazardous waste disposed	[kg]	0.024	
Non-hazardous waste disposed	[kg]	0.132	
Radioactive waste disposed	[kg]	0.00	
Components for reuse	[kg]	0.00	
Material for recycling	[kg]	0.00	
Materials for energy recovery	[kg]	0.00	
Exported energy, electricity	[MJ]	0.00	



For further information about this EPD or its content, please contact Ms. Sevil Kasap at;  
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Accredited or approved by: The International EPD<sup>®</sup> System

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Owner of the Declaration

Ravaber Yapı Ürünleri San. Tic. A.Ş.  
Organize San. Böl. 20. Cad. No: 54  
Kayseri / TURKEY



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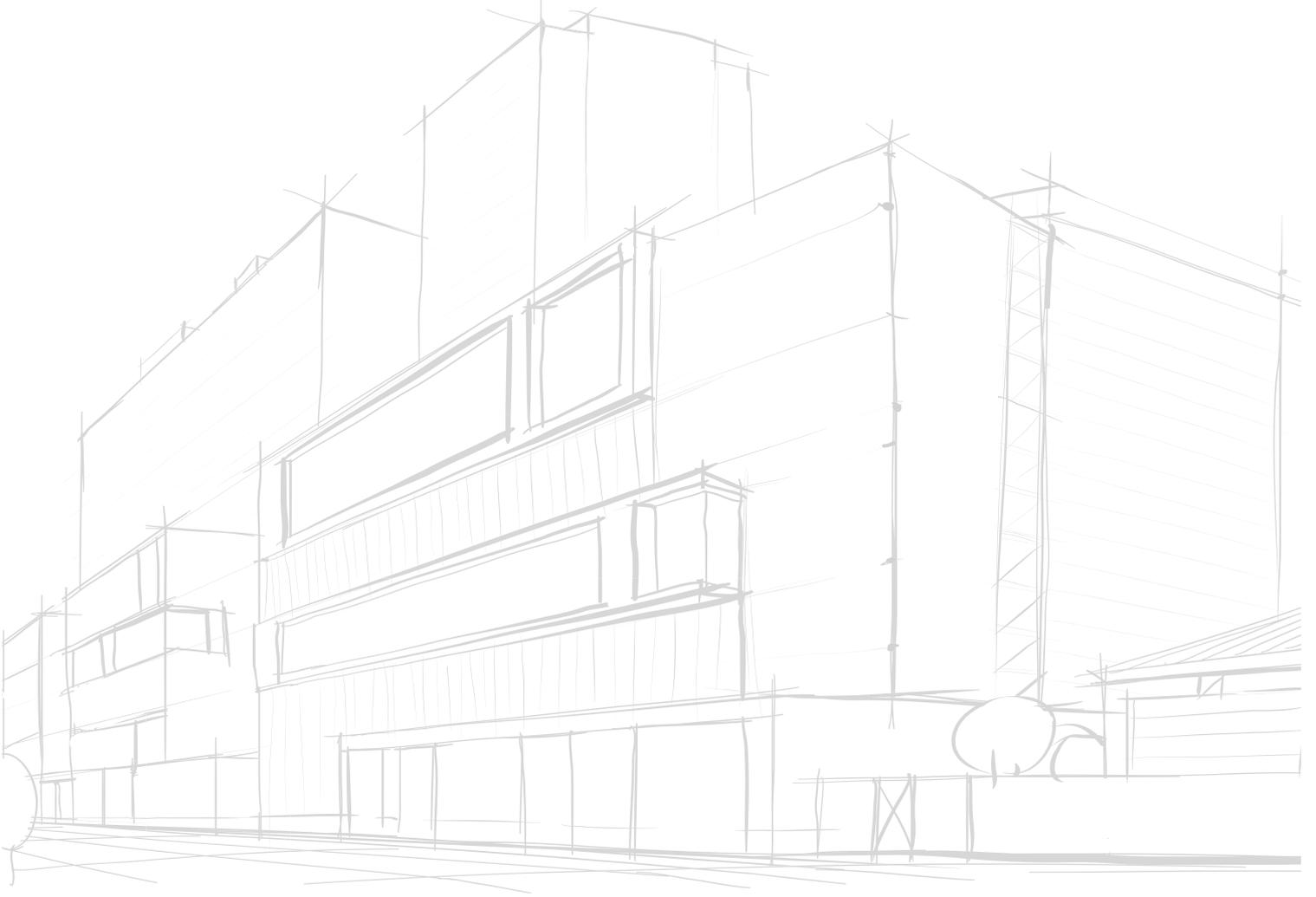
LCA Author & EPD Design

Semtrio Sustainability Consulting  
AND Plaza No:10-12 Kozyatagi  
Istanbul/Turkey  
www.semtrio.com



## References

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- ISO 14025: 2006 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
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- Simapro LCA Software / <https://simapro.com/>
- The International EPD<sup>®</sup> System / [www.environdec.com](http://www.environdec.com)
- The International EPD<sup>®</sup> System / PCR 2012:01 Construction products and construction services (EN 15804:A1) / <https://www.environdec.com/PCR/Detail/?Pcr=%208098>
- The International EPD<sup>®</sup> System / Sub-PCR-I Thermal insulation products (EN 16783) / <https://www.environdec.com/PCR/Detail/?Pcr=12883>



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