

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019

Ceramic Fiber Blanket

from

RBS Ravago



PROGRAMME

The International EPD® System
www.environdec.com

PROGRAMME OPERATOR

EPD International AB & EPD Turkey

GEOGRAPHICAL SCOPE

Global

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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at: environdec.com

PROGRAMME INFORMATION

Programme Information

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<i>CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</i>	
Product category rules (PCR) PCR: PCR 2019:14 Construction products (EN 15804:A2) Version 1.1 c-PCR005 Thermal insulation products (EN 16783: 2017)	
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EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

COMPANY INFORMATION

Owner of the EPD

RBS RAVAGO İNŞAAT YALITIM ÜRÜNLERİ A.Ş.

Organize San. Böl. 20. Cad. No: 54
Kayseri / TURKEY

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The owner of the EPD - RBS RAVAGO - 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. RBS RAVAGO 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. RBS RAVAGO 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, RBS RAVAGO is producing Ceramic Wool and Agro used in soilless agriculture. RBS RAVAGO 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. RBS RAVAGO, the only manufacturer that can produce all mineralwool insulation materials under the same roof, offers a wide range of products with new RBS RAVAGO bio according to various application areas.



Production Site

Kayseri
Organize San. Böl. 20. Cad. No: 54
Kayseri / TURKEY

PRODUCT INFORMATION

Product Name

Ceramic Fiber Blanket

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.

Production

Ceramic Fiber is an insulating material that is used for applications in between 750°C and 1430°C thermal insulation needed, which is consist of (spun technology) long, flexible and combined woven fibers.

Ceramic fiber consists three elements basicly; silica, alumina and it is a thermal insulation material for high temperature. Ceramic Fiber 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.

Ceramic Fiber is produced on the Turkey's first high-tech ceramic fiber production line that has very low shot (unfiberized) content with the amount of high pure silica and aluminum. No chemical binders are used in the production of

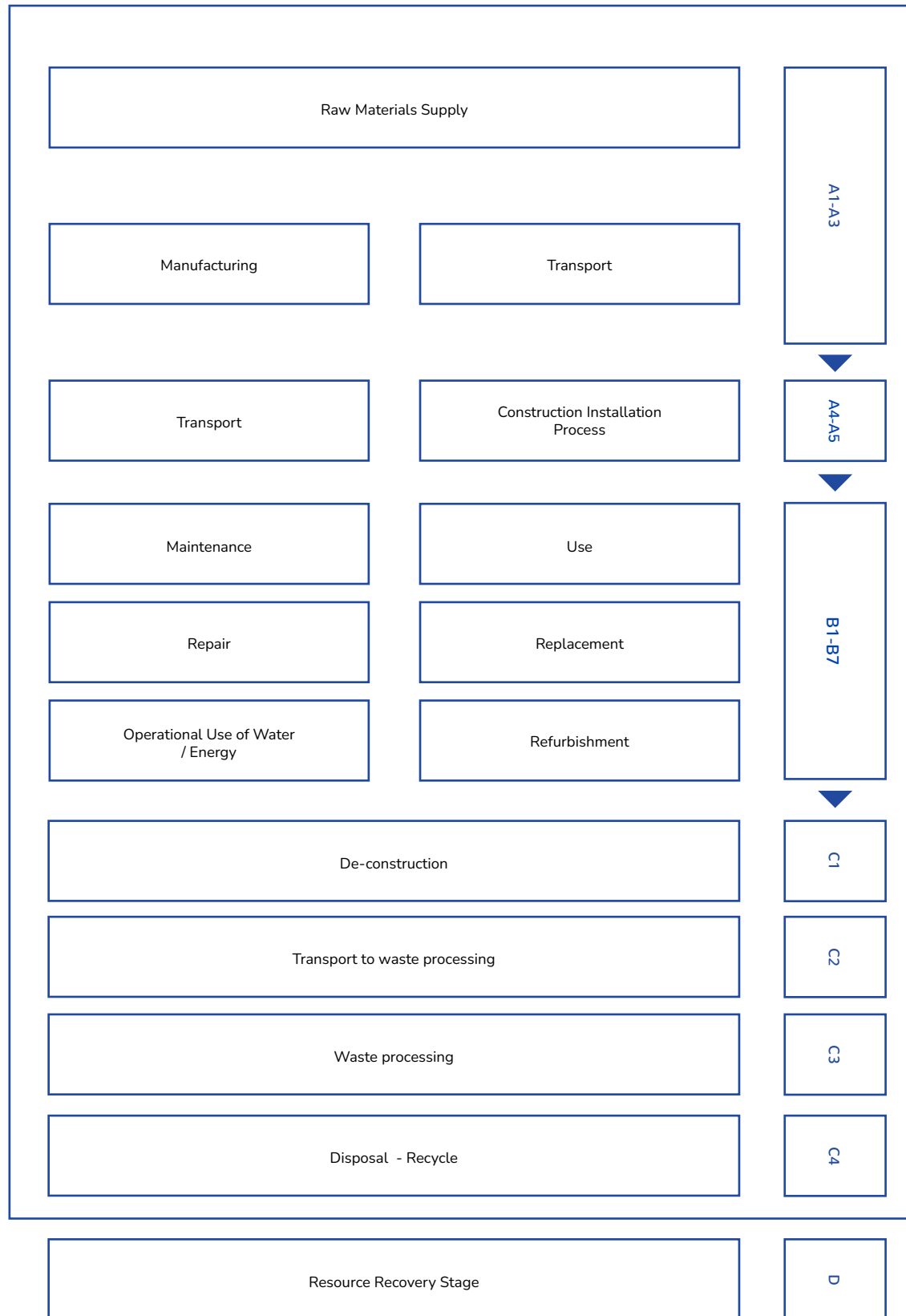
Ceramic Fiber thus during the first combustion it does not smoke and there is no odor during the combustion. It saves more energy rather than fire and insulation bricks due to having less heat in their structure.

Ceramic Fiber is not affected by chemicals (except phosphoric and hydrofluoric acid and strong alkalis such as Na₂O, K₂O). Its thermal and characteristic properties remain the same after being wetted and dried, and it still has the same thermal insulation properties.

Ceramic Fiber which has long fiber structure thanks to its production technology, due to this feature, no chemical binder is needed for It is production. Thanks to its ability to provide thermal insulation up to 1430°C in technical insulation, it provides energy saving in industrial use. It is capable of excellent sound and fire insulation as well as high temperature insulation.



System Diagram



Description of Raw Materials

A1 - Raw Materials Supply

This module takes into account raw material extraction, processing and energy used in the production process.

A2 - Transport to the Manufacturer

This module includes transportation of the raw materials from supplier to factory gate. Transportation types are considered as seaway and roadway.

A3 - Manufacturing

This module includes energy and water consumption during the manufacturing process. Additionally, packaging materials are covered in this module. Followed production processes are as;

- Mixing
- Melting
- Spinning
- Binding
- Curing
- Cutting
- Packaging

A4- Transport to the Construction Site

Transport to the construction site is calculated on the basis of a scenario with the parameters described in the attached table.

Parameters A4 Module	
Average Transport distance (km)	500

Type of fuel and vehicle consumption or type of vehicle used for transport.	Transport, freight, lorry >32 metric ton, EURO6
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A5 - Installation into the Building

Installation into the Building is calculated on the basis of a scenario with the parameters described in the attached table. The treatment of the packaging waste after the installation of the product has been considered.

Parameters A5 Module	
Loss of materials in construction site	2%
Packaging Wooden pallet	100% incinerated
Packaging Plastic sheet	40% recycled, 60% landfill

B1-B7 The Use Stage

- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational Energy Use
- B7: Operational Water Use

After ceramic fiber blanket installation is complete, no actions or technical operations are required during the use stages until the end of life. Therefore, the ceramic fiber blanket has no impact on this stage.

C1 - De-construction

The common manual dismantling impact of ceramic fiber blanket is considered as very small and can be neglected in C1. Given the scenario that is assumed, environmental impact of de-construction process is not considered in this study.

C2 - Transport to Waste Processing

An average distance of 100 km has been assumed for the transport to sorting facility. Transport is calculated on the basis of a scenario with the parameters described in the attached table.

Parameters C2 Module	
Transport by road*	Lorry. 16-32 metric ton
Distance (km)	100
Database	Ecoinvent v3.7.1

C3 - Waste Processing for Reuse, Recovery and/or Recycling

The material and energy expenses required for Module C3 are negligible. It is assumed that there is no sorting or processing required for Ceramic fiber blanket.

C4 - Final disposal

Although Ceramic fiber blanket products are partly recycled at their end-of-life, an established collection system does not yet exist. Therefore, the assumption chosen in this study, 100% landfill after the use phase, is the most conservative approach.

D - Reuse, Recovery or Recycling Potential

Benefits considered in this module originate from ceramic fiber blanket products packaging recycling or incineration.

Information on which life cycle stages are not considered

This EPD covers the cradle to grave and module D stages. After Ceramic Fiber Blanket installation is complete, no actions or technical operations are required during the use stages until the end of life. Therefore, the mineral wool has no impact on B1-B7 modules.



Content Declaration

Content Declaration of Ceramic Fiber Blanket

Product	Silica, weight-%	Aluminium, weight-%	Renewable material, weight-%	Biogenic carbon, weight-%
Ceramic Fiber Blanket	55-60	40-45	0	0

Content Declaration of Packaging Material

Ceramic Fiber Blanket	Weight, %	Biogenic carbon, kg C
Packaging Nylon	<1	-
Paper and Board	<1	0.00045
Wood	<1	0.00063

Environmental Performance

Potential Environmental Impact

Mandatory Indicators According to EN 15804

Results for 1 m2 of Ceramic Fiber Blanket											
Indicator	Unit	Total	A1-3 Total	A4	A5	B1-7	C1	C2	C3	C4	D
							De-construction demolition	Transport	Waste processing	Disposal	Recycling-potential
GWP-fossil	kg CO2 eq	8.73	8.49	0.14	0.06	0	0	0.03	0	0.02	-0.01
GWP-biogenic	kg CO2 eq	5.08	-0.52	2.6E-04	5.60	0	0	5.1E-05	0	5.2E-05	-1.4E-05
GWP-luluc	kg CO2 eq	0.04	0.04	4.4E-05	1.0E-05	0	0	8.8E-06	0	4.6E-06	-2.1E-06
GWP-total	kg CO2 eq	13.9	8.01	0.14	5.66	0	0	0.03	0	0.02	-0.01
ODP	kg CFC11 eq	4.6E-07	4.1E-07	3.4E-08	4.0E-09	0	0	6.8E-09	0	6.9E-09	-1.5E-10
AP	mol H+ eq	6.4E-02	0.06	4.7E-04	6.2E-04	0	0	9.3E-05	0	1.6E-04	-2.3E-05
EP-freshwater	kg PO43-	5.4E-03	0.01	5.1E-05	1.6E-04	0	0	1.0E-05	0	2.1E-05	-1.9E-06
EP-aquatic freshwater	kg P eq	5.3E-04	5.3E-04	1.3E-06	7.9E-07	0	0	2.5E-07	0	1.8E-07	-1.2E-07
EP-marine	kg N eq	0.01	0.01	1.0E-04	3.0E-04	0	0	2.1E-05	0	5.5E-05	-4.4E-06
EP-terrestrial	mol N eq	0.12	0.11	1.1E-03	3.2E-03	0	0	2.3E-04	0	6.1E-04	-4.9E-05
POCP	kg NMVOC eq	0.03	0.03	4.4E-04	7.8E-04	0	0	8.8E-05	0	1.8E-04	-2.1E-05
ADP-minerals & metals	kg Sb eq	1.4E-05	1.4E-05	3.4E-07	1.2E-07	0	0	6.9E-08	0	3.8E-08	-3.7E-08
ADP-fossil*	MJ, net calorific value	84.4	80.9	2.29	0.49	0	0	0.46	0	0.47	-0.18
WDP	m3 world eq. deprived	3.68	3.70	0.01	-0.04	0	0	1.7E-03	0	0.02	-2.7E-03

Acronyms
 GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.



Potential Environmental Impact

Additional Mandatory and Voluntary Indicators

Results according to PCR2019:14 for 1 m2 of Ceramic Fiber Blanket											
Indicator	Unit	Total	A1-3 Total	A4	A5	B1-7	C1	C2	C3	C4	D
							De-construction demolition	Transport	Waste processing	Disposal	Recycling-potential
GWP - GHG ¹	kg CO2 eq	7.47	7.24	0.14	0.06	0	0	0.03	0	0.02	-0.01

Results according to EN 15804+A2 for 1 m2 of Ceramic Fiber Blanket											
Indicator	Unit	Total	A1-3 Total	A4	A5	B1-7	C1	C2	C3	C4	D
							De-construction demolition	Transport	Waste processing	Disposal	Recycling-potential
PM/RI	disease inc.	5.6E-07	5.3E-07	1.2E-08	6.4E-09	0	0	2.5E-09	0	3.1E-09	-2.0E-10
IRP	kBq U-235 eq	0.14	0.13	0.01	7.2E-04	0	0	1.9E-03	0	1.9E-03	-8.6E-05
ET-freshwater	CTUe	83.7	80.3	1.91	0.86	0	0	0.38	0	0.30	-0.06
HT-cancer	CTUh	6.7E-09	6.4E-09	5.4E-11	1.8E-10	0	0	1.1E-11	0	8.8E-12	1.8E-11
HT-non-cancer	CTUh	6.4E-08	5.3E-08	1.8E-09	8.0E-09	0	0	3.7E-10	0	1.8E-10	5.2E-10
SQP	Pt	88.5	84.3	2.60	0.17	0	0	0.52	0	0.99	-0.01

Acronyms GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology; IRP = Ionizing radiation, human health; ET-freshwater = Eco-toxicity (freshwater); HT-cancer = Human toxicity, cancer effects; HT-non-cancer = Human toxicity, non-cancer effects; SQP = Potential soil quality index (SQP)

¹ The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of Resources

Results for 1 m2 of Ceramic Fiber Blanket											
Indicator	Unit	Total	A1-3 Total	A4	A5	B1-7	C1	C2	C3	C4	D
							De-construction demolition	Transport	Waste processing	Disposal	Recycling-potential
PERE	MJ	26.0	26.0	0.02	0.01	0	0	5.0E-03	0	3.8E-03	-2.5E-03
PERM	MJ	0.0	0	0	0	0	0	0	0	0	0
PERT	MJ	26.0	26.0	0.02	0.01	0	0	5.0E-03	0	3.8E-03	-2.5E-03
PENRE	MJ	47.5	43.8	2.43	0.53	0	0	0.49	0	0.50	-0.20
PENRM	MJ	44.3	44.3	0	0	0	0	0	0	0	0
PENRT	MJ	91.8	88.1	2.43	0.53	0	0	0.49	0	0.50	-0.20
SM	kg	0.6	0.61	0	0	0	0	0	0	0	0
RSF	MJ	0.0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0.0	0	0	0	0	0	0	0	0	0
FW	m ³	0.5	0.47	2.0E-03	2.5E-03	0	0	3.9E-04	0	7.5E-04	-2.3E-04

Acronyms 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

Waste Production

Results for 1 m ² of Ceramic Fiber Blanket											
Indicator	Unit	Total	A1-3 Total	A4	A5	B1-7	C1	C3	C3	C4	D
							De-construction demolition	Transport	Waste processing	Disposal	Recycling-potential
Hazardous waste disposed	kg	0.01	0.01	0	0	0	0	0	0	0	0
Non-hazardous waste disposed	kg	1.00	0	0	8.8E-04	0	0	0	0	1.00	0
Radioactive waste disposed	kg	0	0	0	0	0	0	0	0	0	0

Output Flows

Results for 1 m ² of Ceramic Fiber Blanket											
Indicator	Unit	Total	A1-3 Total	A4	A5	B1-7	C1	C3	C3	C4	D
							De-construction demolition	Transport	Waste processing	Disposal	Recycling-potential
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0	5.9E-04	0	0	0	0	0	-5.9E-04
Materials for energy recovery	kg	2.93	0	0	2.93	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0	0

References

ISO 14040: 2021

Environmental management - Life cycle assessment - Principles and framework

ISO 14044: 2021

Environmental management - Life cycle assessment - Requirements and guidelines

ISO 14025: 2010

Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 14020: 2000

Environmental labels and declarations - General principles

EN 15804:2012+A2: 2019

Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

c-PCR005

Thermal insulation products

EN 16783: 2017

Thermal insulation products — Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations

The International EPD® System

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The General Programme Instructions v4.0

The International EPD® System

PCR 2019:14 Construction products v1.1 (EN 15804:A2)

Ecoinvent 3.7.1

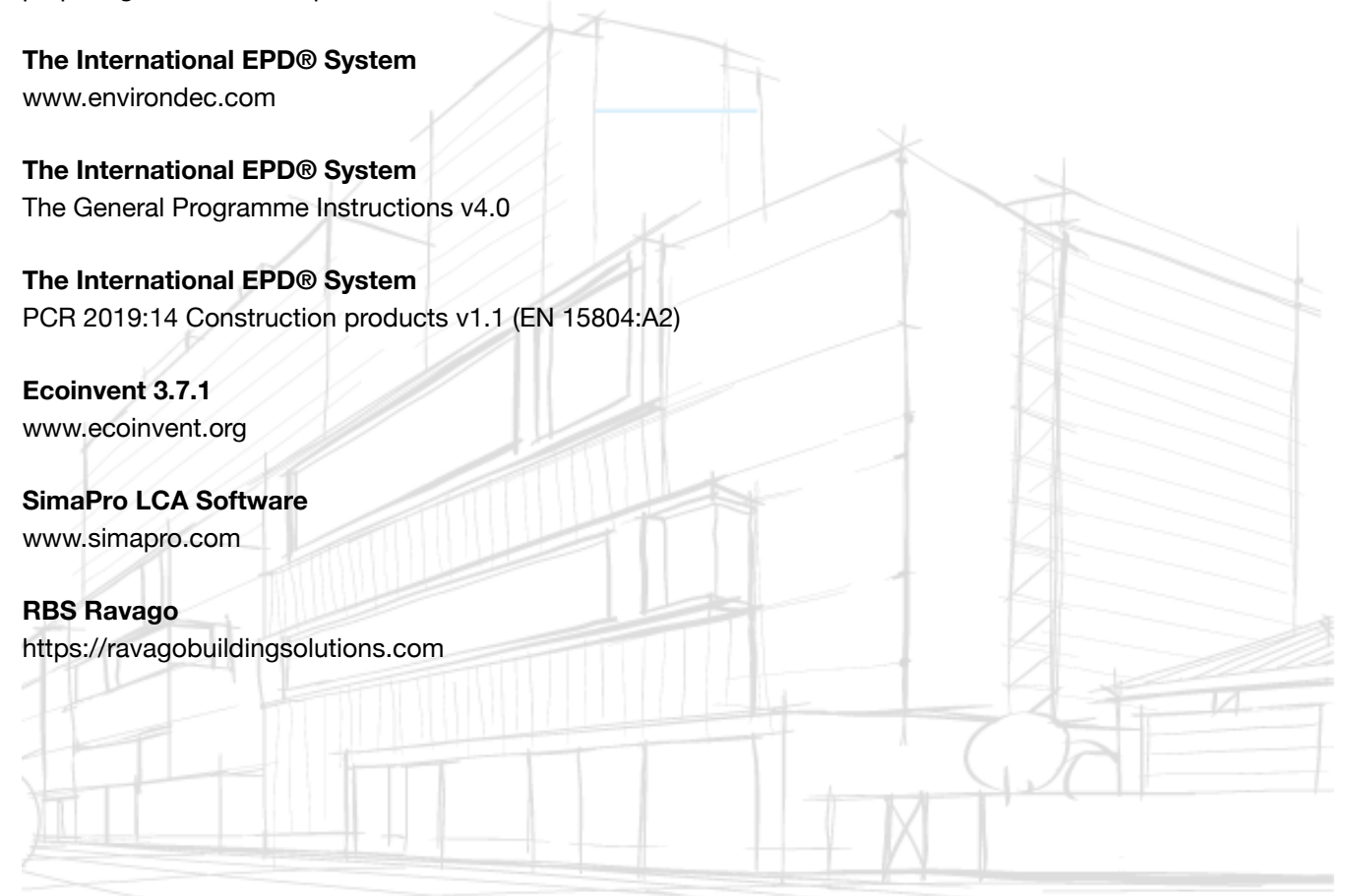
www.ecoinvent.org

SimaPro LCA Software

www.simapro.com

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