

ENVIRONMENTAL PRODUCT DECLARATION

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

Ravatherm Bio Mineral Wool with Formaldehyde

from

RBS Ravago



PROGRAMME

The International EPD® System
www.environdec.com

PROGRAMME OPERATOR

EPD International AB & EPD Turkey

GEOGRAPHICAL SCOPE

Global

EPD REGISTRATION NUMBER

S-P-04884

PUBLICATION DATE

2022-10-13

VALID UNTIL

2027-10-12



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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Information about verification and reference PCR:

<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)	
PCR review was conducted by The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact .	
Independent third-party verification of the declaration and data, according to ISO 14025:2010:	
<input type="checkbox"/> EPD process verification	<input checked="" type="checkbox"/> EPD verification
Third party verifier Ing. Luca Giacomello. PMP® Via Leonardo Fea 35 10148 Torino - Italy	Approved by International EPD System Technical Commiee, supported by the Secretariat
Procedure for follow-up of data during EPD validity involves third party verifier:	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

LCA Study & EDP Design Conducted by

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RBS Ravago has the sole ownership, liability, and responsibility for the EPD.

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

Contact

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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 Ravatherm Bio Mineral Wool with Formaldehyde 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 mineral wool 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

Ravatherm Bio Mineral Wool with Formaldehyde

Glasswool is a thermal insulation material consisting of 98% natural fibers, formed by melting mineral and inorganic stones obtained from volcanic rock and minerals in nature.



Production

Glasswool is a thermal insulation material consisting mineral and inorganic stones obtained from volcanic rock and minerals in nature between 1150-1300 degrees and becoming fibers.

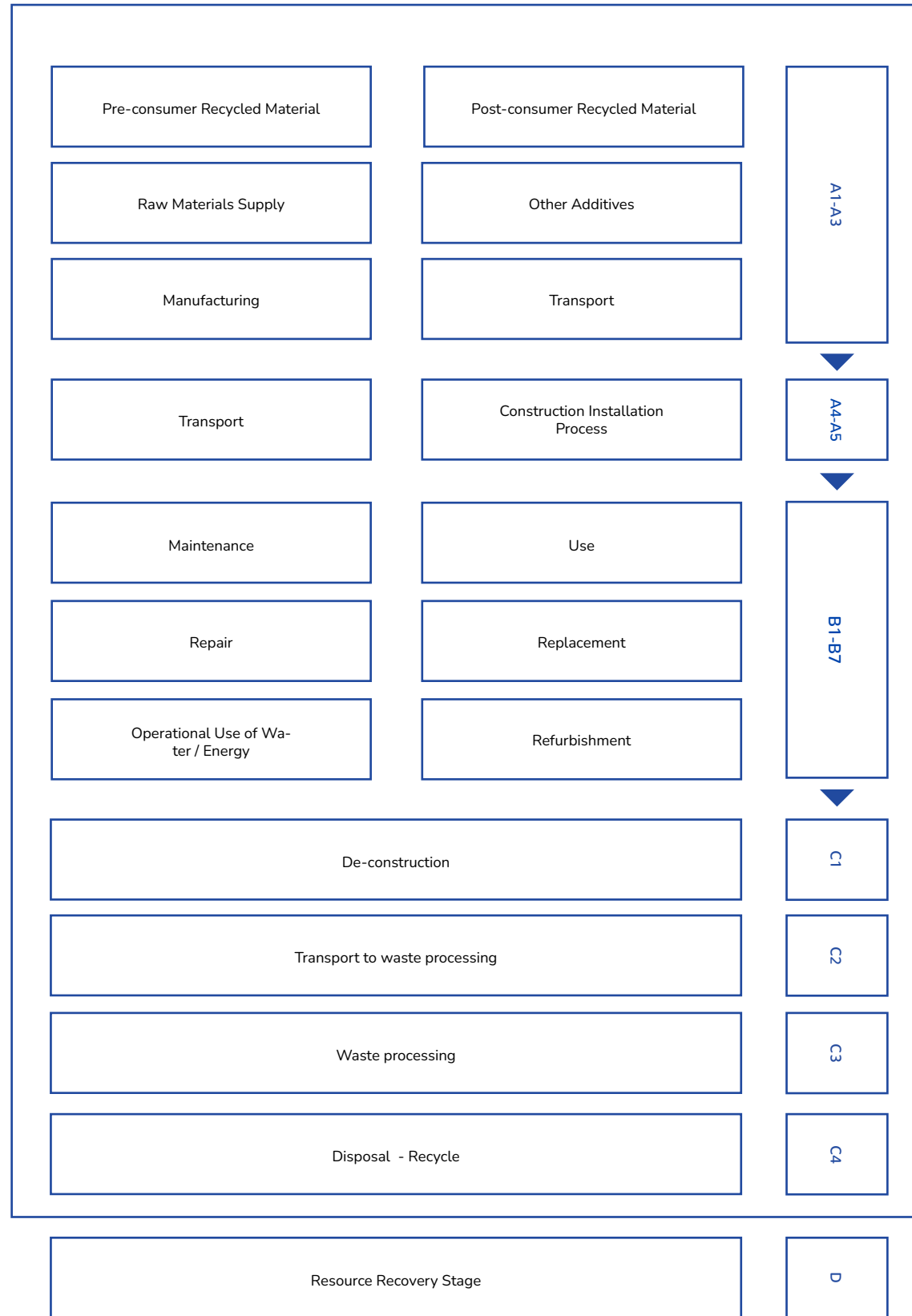
It has a high level of insulation ability on the roofs of buildings, partition walls, ovens, steel doors, shipbuilding, electrical appliances, entertainment venues and cinemas etc. wherever heat, sound, moisture insulation and fire safety are required. Thanks to its inorganic structure, it does not produce bacteria and microorganisms. It is an ecological and environment friendly product made of natural raw materials.

Glass wool has a water-repellent feature thanks to its saturated structure. It does not contain steam since it has vapor permeability.

Use of glass wool reduces the need for fossil fuels. Therefore, it will help to reduce carbon dioxide emissions, thereby easing ecological events such as climate change. While preventing fire from spreading, it saves time for firefighters in life saving and evacuation operations.

Glass wool provides a tranquil environment as it eliminates negative external factors such as noise and rumble thanks to its fibers.

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
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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 Ravatherm Bio Mineral Wool with Formaldehyde installation is complete, no actions or technical operations are required during the use stages until the end of life. Therefore, the Ravatherm Bio Mineral Wool with Formaldehyde has no impact on this stage.

C1 - De-construction

The common manual dismantling impact of Ravatherm Bio Mineral Wool with Formaldehyde 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 Ravatherm Bio Mineral Wool with Formaldehyde.

C4 - Final disposal

Although Ravatherm Bio Mineral Wool with Formaldehyde 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 Ravatherm Bio Mineral Wool with Formaldehyde 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 Ravatherm Bio Mineral Wool with Formaldehyde 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 Ravatherm Bio Mineral Wool with Formaldehyde

Product	Silica, weight-%	Post-Consumer, weight-%	Pre-Consumer, weight-%	Soda Ash, weight-%	Additives, weight-%	Renewable material, weight-%	Biogenic carbon, weight-%
Ravatherm Bio Mineral Wool with Formaldehyde	50-55	25-30	1-5	15-20	5-10	0	0

Content Declaration of Packaging Material

Ravatherm Bio Mineral Wool with Formaldehyde	Weight, %	Biogenic carbon, kg C
Packaging Nylon	<1	-
Wood	<1	0.00001

Environmental Performance

Potential Environmental Impact

Mandatory Indicators According to EN 15804

Results for 1 m ² of Ravatherm Bio Mineral Wool with Formaldehyde											
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	5.46	5.40	0.04	0.01	0	0	0.01	0	4.2E-03	-3.7E-04
GWP-biogenic	kg CO2 eq	1.43	0.03	6.4E-05	1.40	0	0	1.3E-05	0	1.3E-05	-9.1E-07
GWP-luluc	kg CO2 eq	0.03	0.03	1.1E-05	2.6E-06	0	0	2.2E-06	0	1.1E-06	-1.3E-07
GWP-total	kg CO2 eq	6.93	5.47	0.04	1.42	0	0	0.01	0	4.2E-03	-3.7E-04
ODP	kg CFC11 eq	2.6E-07	2.5E-07	8.5E-09	9.9E-10	0	0	1.7E-09	0	1.7E-09	-9.3E-12
AP	mol H+ eq	0.04	0.04	1.2E-04	1.6E-04	0	0	2.3E-05	0	4.0E-05	-1.5E-06
EP-freshwater	kg PO43-	3.4E-03	3.3E-03	1.3E-05	4.0E-05	0	0	2.6E-06	0	5.3E-06	-1.2E-07
EP-aquatic freshwater	kg P eq	4.5E-04	4.5E-04	3.2E-07	2.0E-07	0	0	6.3E-08	0	4.4E-08	-7.2E-09
EP-marine	kg N eq	4.9E-03	4.8E-03	2.6E-05	7.4E-05	0	0	5.2E-06	0	1.4E-05	-2.8E-07
EP-terrestrial	mol N eq	0.06	0.06	2.9E-04	7.9E-04	0	0	5.7E-05	0	1.5E-04	-3.1E-06
POCP	kg NMVOC eq	0.01	0.01	1.1E-04	1.9E-04	0	0	2.2E-05	0	4.4E-05	-1.3E-06
ADP-minerals & metals	kg Sb eq	1.3E-05	1.3E-05	8.6E-08	3.0E-08	0	0	1.7E-08	0	9.4E-09	-2.3E-09
ADP-fossil*	MJ, net calorific value	56.9	56.0	0.57	0.12	0	0	0.11	0	0.12	-0.01
WDP	m3 world eq. deprived	1.91	1.91	2.12E-03	-0.01	0	0	4.2E-04	0	0.01	-1.7E-04

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 m ² of Ravatherm Bio Mineral Wool with Formaldehyde											
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	5.41	5.35	0.04	0.01	0	0	0.01	0	4.1E-03	-3.5E-04

Results according to EN 15804+A2 for 1 m ² of Ravatherm Bio Mineral Wool with Formaldehyde											
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.	2.1E-07	2.1E-07	3.1E-09	1.6E-09	0	0	6.2E-10	0	7.8E-10	-1.3E-11
IRP	kBq U-235 eq	0.03	0.03	2.4E-03	1.8E-04	0	0	4.8E-04	0	4.8E-04	-5.4E-06
ET-freshwater	CTUe	53.6	52.8	0.48	0.22	0	0	0.10	0	0.07	-3.9E-03
HT-cancer	CTUh	2.6E-09	2.6E-09	1.4E-11	4.4E-11	0	0	2.7E-12	0	2.2E-12	4.8E-12
HT-non-cancer	CTUh	4.1E-08	3.9E-08	4.6E-10	2.0E-09	0	0	9.2E-11	0	4.6E-11	1.4E-10
SQP	Pt	8.01	6.9	0.65	0.04	0	0	0.13	0	0.25	-5.4E-04

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 m ² of Ravatherm Bio Mineral Wool with Formaldehyde											
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	10.7	10.7	0.01	2.9E-03	0	0	1.2E-03	0	9.5E-04	-1.5E-04
PERM	MJ	0.0	0	0	0	0	0	0	0	0	0
PERT	MJ	10.7	10.7	0.01	2.9E-03	0	0	1.2E-03	0	9.5E-04	-1.5E-04
PENRE	MJ	62.2	61.3	0.61	0.13	0	0	0.12	0	0.12	-0.01
PENRM	MJ	0.0	0	0	0	0	0	0	0	0	0
PENRT	MJ	62.2	61.3	0.61	0.13	0	0	0.12	0	0.12	-0.01
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
NRSF	MJ	0	0	0	0	0	0	0	0	0	0
FW	m ³	0.34	0.34	4.9E-04	6.2E-04	0	0	9.8E-05	0	1.9E-04	-1.4E-05

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 Ravatherm Bio Mineral Wool with Formaldehyde											
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 Ravatherm Bio Mineral Wool with Formaldehyde											
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

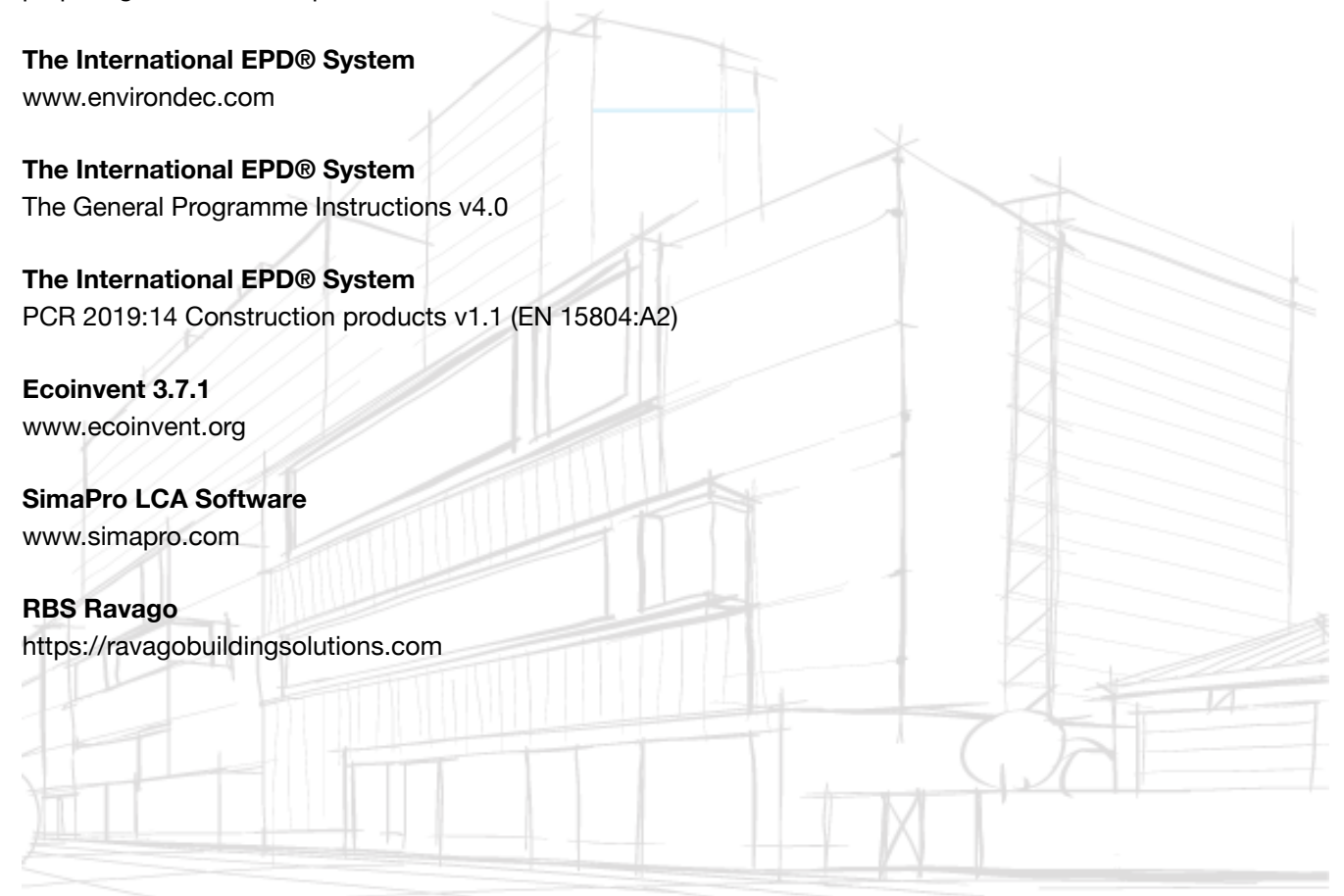
www.ecoinvent.org

SimaPro LCA Software

www.simapro.com

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