Environmental Product Declaration

In accordance with ISO 14025 and EN 15804+A1 for:

Self-levelling compounds

From

Combimix AB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD owner:	Combimix AB, Verkstadsvägen 6, 746 40, Bålsta, Sverige
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Geographical scope:	Nordic countries
PCR used	PCR 2012:01. Construction products and construction services. Version 2.3. of 2018-11-15
Sub-PCR used	

ECO EPD 00001133

General information

Owner of the EPD:

Combimix AB
Adress: Verkstadsvägen 6, 74640 Bålsta (Sweden)
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Name and location of production site:

Location of the Bålsta production site: Verkstadsvägen 6, 74640 Bålsta (Sweden)
Location of the Backamo production site: Backamo 620, 459 91 Ljungskile (Sweden)

About the company

Combimix develops and manufactures mineral-based products for the construction industry. Their product range includes products for floor levelling, façade plastering, rendering, concrete resurfacing and restoration mortar for cultural buildings. Combimix conducts sales in Europe and USA.

Product information

Product name

Self-levelling compounds (900-series)

Product description

The products included are a series of self-levelling compounds for use internally in buildings, produced and supplied as a dry powder with water added at the work site. The purpose of the products is to provide a level and durable wearing surface with the ability to sustain industrial loads. The products are designed to be used as wearing surfaces but can also be used as underlayments, under e.g. epoxy floorings.

The Combimix products included in this study are manufactured in two production sites; one located in Backamo and another located in Bålsta, both locations in Sweden. The products are manufactured through a dry-mix process in a plough-shear mixer. Raw materials are fed automatically from silos, additives are premixed and added automatically as a compound or added without premixing through automatic or manual addition based on the type of additive. The ready-mixed product is filled in small bags, big bags or supplied in bulk depending on the intended use or application.

Technical information

Technical specifications about the products included in the EPD for the self-levelling compounds series can be found in the table below.

Product	Compressive strength (class according to EN 13813)	Flexural strength (class according to EN 13813)	Layer thickness range
CM 900*	C25	F5	5-50 mm
CM 920	C30	F8	5-30 mm
CM 940	C30	F7	3-15 mm

Product	Compressive strength (class according to EN 13813)	Flexural strength (class according to EN 13813)	Layer thickness range
CM 960	C25	F7	6-20 mm

Product content

The approximate material content (in weight %) of the product is: sand (45%), slag from steel production (20%), cement (17%), gypsum (13%) and others (2%). This composition is a weighted average of the product series, as each product has a specific composition.

Picture of the product

UN CPC code

375 – Articles of concrete, cement and plaster

Geographical scope

Nordic countries

LCA information

PCR used

The PCR (Product category rules) that has been used in this EPD is PCR 2012:01. Construction products and construction services. Version 2.3. of 2018-11-15.

Declared unit

1 ton of self-levelling compounds product mix in dry form, delivered to the customer.

Service life

The estimated service life of the products is at least 100 years according to the manufacturer, as in principle the product is not affected at all by ageing.

Time representativeness

The data used to model product manufacturing corresponds to 2018. The data from generic databases are from 2011 – 2018. No data used is older than 10 years.

Database(s) and LCA software used

Databases used are mainly Ecoinvent 3.4 and Thinkstep´s own database from 2018. The LCA software used is GaBi.

Data quality

The quality of the data is judged to be good. The data is recent and the data to model the core process was collected directly from the production sites.

System diagram

A basic flowchart of the system is presented in the figure below.

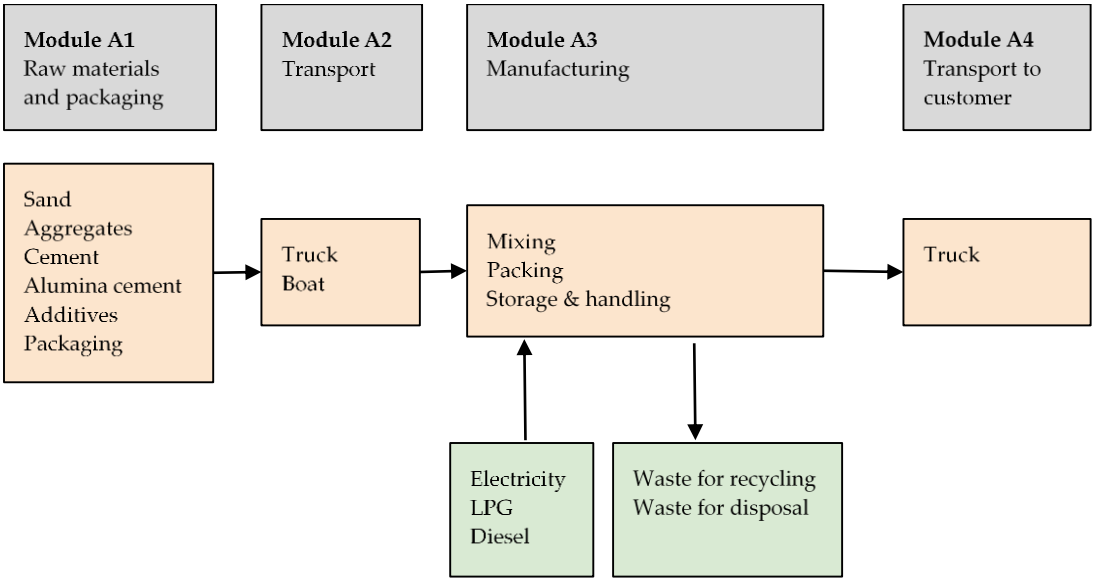

Figure 1 – Flow chart of the system

- Module A1: Raw materials are produced, including packaging material.
- Module A2: Raw material and packaging are transported to the production sites

- Module A3: Production activities.
- Module A4: Transport of manufactured product to customer.

Description of system boundaries and delimitations

This study is a so-called *cradle-to-gate with options* according to the definition in the PCR followed. All life cycle impacts until the transport to the customer are included, as the flowchart above shows. Also, in accordance to the PCR followed, the Polluter Pays Principle was applied. The life cycle starts by extracting raw materials used for the products, which is defining the boundary towards the nature. No infrastructure products are used for the manufacturing of the product.

The products are manufactured at two production sites located in Backamo and Bålsta, Sweden.

Life cycle stages, included and excluded

The life cycle stages included are A1-A4.
The life cycle stages excluded are A5, B1-B7, C1-C4 and D.

Allocations made

Co-product allocation was not necessary in the studied system. A small amount of process waste is produced that is reprocessed as filling material. A conservative assumption has been made that all the environmental impact is allocated to the product and not the co-product (i.e. the filling material). The amount of filling materials differs between the products included. No other co-products are produced.

Scenarios

The analysis is carried out using factory-specific data for use of energy and utilities and waste generation, as well as product-specific data for use of raw materials. Therefore, the results represent the product system and no other scenarios were applied.

Data used

Site-specific production data has been retrieved for 2018 from the production sites. Some of the data is modelled by using EPDs in the model calculations (for cement and aluminate cement). In most cases generic data from databases (Ecoinvent 3.4 and Thinkstep's) has been used.

Cut-off

The study applies a cut-off criterion of 1%.

Main raw materials

The main raw materials used in the product can be seen in the flowchart in Figure 1.

Packaging

Most of the raw materials used for the production process are transported in plastic and paper bags, depending of the specific product concern. The products are transported to the customers in three ways: paper sacks with internal plastic bags (33%), big polypropylene bags (2%) and in bulk which require no packaging (66%). Wooden palls are used for the transport of the product in paper sacks.

Transportation

Three types of transportation processes are included in this document; the transport of raw materials and its packaging to the production sites, the transport of the final products to the customers and the transport of waste materials from the production sites to the disposal. The transport is mainly carried out by trucks and in some cases the raw materials are transported to the production site by boat.

Energy utilities

Both electricity and heat are used at the production sites. The electricity is based on 100% hydropower production from Eneas och Hafslund Energi AB from the Solbergfoss hydropower plant. Data from the Thinkstep database has been used to model the production of electricity from hydropower in Sweden. As for the heat, an LPG-powered boiler is used to dry the raw material raw sand.

Recycled materials

The only secondary material used in the product is blast furnace slag. Following the polluter pays principle, only the transport of the slag to the production sites is accounted for in the calculations. The amount of slag used depends on the specific product and varies between 160-280 kg per declared unit.

Secondary energy

No secondary energy is used for the manufacturing of the product.

Direct emissions from production site

The only direct emissions generated at the production site are those from the combustion of diesel for internal transport in the factories and from local production of heat with an LPG-powered boiler for drying of raw sand.

Waste

Wastes are generated during the manufacturing process in both production sites. These are transported to a sorting facility. The main waste streams from production are hazardous waste (sent to incineration), inert waste (to landfill), waste sent to recycling and industrial waste sent to incineration.

Scenario for module A4

The table below presents the details on the scenario used to model the transport of the product to the customers.

Vehicle type used for transport	Vehicle load capacity	Fuel type and consumption	Capacity utilisation (%)	Average distance to customer (km)
Euro V truck with trailer	20 tonnes	Diesel, 3.7 l/10 km.	85 Assumed	294 Weighted average

More information

This Environmental Product Declaration (EPD) has been carried out by IVL Swedish Environmental Research Institute. This EPD is in accordance with ISO 14025 and EN 15804. It is a third party externally verified document that reports environmental data of products based on Life Cycle Assessment (LCA) and other relevant information.

Product system

The life cycle stages included in the analysis is illustrated in the table below, according to EN15804. If a module is included, it is indicated with “X” and if it is excluded with a “ND” (Not Declared).

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
Raw material	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction, demolition	Transport	Waste processing	Disposal	Reuse, recycling or energy recovery potentials
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Inventory and Impact categories

In accordance with the International EPD system programme instructions and the specific PCR used, the following characterization factors are used:

PARAMETER	UNIT	Characterization factors
Global warming potential (GWP)	kg CO_2 eq.	CML2001 – Jan. 2016, baseline method.
Acidification potential (AP)	kg SO_2 eq.	
Eutrophication potential (EP)	kg PO_4^{3-} eq.	
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	
Ozone layer depletion potential (ODP)	kg R11-e	
Abiotic depletion potential – Elements	kg Sb eq.	
Abiotic depletion potential – Fossil resources	MJ, net calorific value	

PARAMETER		UNIT
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value
	Used as raw materials	MJ, net calorific value
	TOTAL	MJ, net calorific value
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value
	Used as raw materials	MJ, net calorific value
	TOTAL	MJ, net calorific value
Secondary material		kg
Renewable secondary fuels		MJ, net calorific value
Non-renewable secondary fuels		MJ, net calorific value
Net use of fresh water		m^3

PARAMETER	UNIT
Hazardous waste disposed	kg
Non-hazardous waste disposed	kg
Radioactive waste disposed	kg

PARAMETER	UNIT
Components for reuse	kg

Content declaration

No substances that appear in the REACH candidate list of SVHC (Candidate List of Substances of Very High Concern) are present or used in the product concerning this EPD.

Environmental performance of CM 900

Potential environmental impact per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Global warming potential (GWP)	kg CO_2 eq.	2,69E+02	2,08E+01	2,90E+02
Acidification potential (AP)	kg SO_2 eq.	1,49E+00	5,01E-02	1,54E+00
Eutrophication potential (EP)	kg PO_4^{3-} eq.	3,25E-01	1,21E-02	3,38E-01
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	5,45E-02	-1,71E-02	3,74E-02
Ozone layer depletion potential (ODP)	kg R11-e	2,00E-05	3,40E-15	2,00E-05
Abiotic depletion potential – Elements	kg Sb eq.	1,95E-04	1,46E-06	1,97E-04
Abiotic depletion potential – Fossil resources	MJ, net calorific value	3,44E+03	2,79E+02	3,72E+03

* Additional information

Use of resources per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Renewable primary energy used as energy carrier	MJ, net calorific value	3,26E+02	1,63E+01	3,42E+02
Renewable primary energy used as raw materials	MJ, net calorific value	5,17E-01	0,00E+00	5,17E-01
Total renewable primary energy	MJ, net calorific value	3,26E+02	1,63E+01	3,43E+02
Non-renewable primary energy used as energy carrier	MJ, net calorific value	3,51E+03	2,80E+02	3,79E+03
Non-renewable primary energy used as raw materials	MJ, net calorific value	4,13E-02	1,47E-02	5,60E-02
Total non-renewable primary energy	MJ, net calorific value	3,51E+03	2,80E+02	3,79E+03
Secondary material	MJ, net calorific value	1,60E+02	0,00E+00	1,60E+02
Renewable secondary fuels	MJ, net calorific value	8,74E+00	0,00E+00	8,74E+00
Non-renewable secondary fuels	MJ, net calorific value	1,20E+01	0,00E+00	1,20E+01
Net use of fresh water	m^3	1,09E+00	2,75E-02	1,12E+00

* Additional information

Waste production per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Hazardous waste disposed	kg	8,33E-04	1,56E-05	8,49E-04
Non-hazardous waste disposed	kg	3,00E+00	2,28E-02	3,02E+00
Radioactive waste disposed	kg	3,06E-03	0,00E+00	3,06E-03

* Additional information

Output flows per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Components for reuse	kg	-	-	-

* Additional information

Environmental performance of CM 920

Potential environmental impact per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Global warming potential (GWP)	kg CO_2 eq.	2,79E+02	2,08E+01	3,00E+02
Acidification potential (AP)	kg SO_2 eq.	1,53E+00	5,01E-02	1,58E+00
Eutrophication potential (EP)	kg PO_4^{3-} eq.	3,63E-01	1,21E-02	3,75E-01
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	6,50E-02	-1,71E-02	4,78E-02
Ozone layer depletion potential (ODP)	kg R11-e	2,13E-05	3,40E-15	2,13E-05
Abiotic depletion potential – Elements	kg Sb eq.	2,39E-04	1,46E-06	2,40E-04
Abiotic depletion potential – Fossil resources	MJ, net calorific value	3,70E+03	2,79E+02	3,98E+03

* Additional information

Use of resources per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Renewable primary energy used as energy carrier	MJ, net calorific value	3,35E+02	1,63E+01	3,51E+02
Renewable primary energy used as raw materials	MJ, net calorific value	5,17E-01	0,00E+00	5,17E-01
Total renewable primary energy	MJ, net calorific value	3,35E+02	1,63E+01	3,51E+02
Non-renewable primary energy used as energy carrier	MJ, net calorific value	3,80E+03	2,80E+02	4,08E+03
Non-renewable primary energy used as raw materials	MJ, net calorific value	4,23E-02	1,47E-02	5,70E-02
Total non-renewable primary energy	MJ, net calorific value	3,80E+03	2,80E+02	4,08E+03
Secondary material	MJ, net calorific value	1,60E+02	0,00E+00	1,60E+02
Renewable secondary fuels	MJ, net calorific value	8,74E+00	0,00E+00	8,74E+00
Non-renewable secondary fuels	MJ, net calorific value	1,20E+01	0,00E+00	1,20E+01
Net use of fresh water	m^3	1,34E+00	2,75E-02	1,37E+00

* Additional information

Waste production per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Hazardous waste disposed	kg	8,27E-04	1,56E-05	8,43E-04
Non-hazardous waste disposed	kg	2,27E+00	2,28E-02	2,29E+00
Radioactive waste disposed	kg	3,06E-03	0,00E+00	3,06E-03

* Additional information

Output flows per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Components for reuse	kg	-	-	-

* Additional information

Environmental performance of CM 940

Potential environmental impact per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Global warming potential (GWP)	kg CO_2 eq.	4,15E+02	2,08E+01	4,36E+02
Acidification potential (AP)	kg SO_2 eq.	2,26E+00	5,01E-02	2,31E+00
Eutrophication potential (EP)	kg PO_4^{3-} eq.	7,05E-01	1,21E-02	7,17E-01
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	1,54E-01	-1,71E-02	1,37E-01
Ozone layer depletion potential (ODP)	kg R11-e	3,65E-05	3,40E-15	3,65E-05
Abiotic depletion potential – Elements	kg Sb eq.	5,79E-04	1,46E-06	5,81E-04
Abiotic depletion potential – Fossil resources	MJ, net calorific value	6,41E+03	2,79E+02	6,69E+03

* Additional information

Use of resources per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Renewable primary energy used as energy carrier	MJ, net calorific value	4,39E+02	1,63E+01	4,55E+02
Renewable primary energy used as raw materials	MJ, net calorific value	5,17E-01	0,00E+00	5,17E-01
Total renewable primary energy	MJ, net calorific value	4,40E+02	1,63E+01	4,56E+02
Non-renewable primary energy used as energy carrier	MJ, net calorific value	6,63E+03	2,80E+02	6,91E+03
Non-renewable primary energy used as raw materials	MJ, net calorific value	5,46E-02	1,47E-02	6,93E-02
Total non-renewable primary energy	MJ, net calorific value	6,63E+03	2,80E+02	6,91E+03
Secondary material	MJ, net calorific value	2,04E+02	0,00E+00	2,04E+02
Renewable secondary fuels	MJ, net calorific value	8,72E+00	0,00E+00	8,72E+00
Non-renewable secondary fuels	MJ, net calorific value	1,20E+01	0,00E+00	1,20E+01
Net use of fresh water	m^3	3,24E+00	2,75E-02	3,26E+00

* Additional information

Waste production per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Hazardous waste disposed	kg	1,09E-03	1,56E-05	1,11E-03
Non-hazardous waste disposed	kg	1,11E+00	2,28E-02	1,13E+00
Radioactive waste disposed	kg	3,05E-03	0,00E+00	3,05E-03

* Additional information

Output flows per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Components for reuse	kg	-	-	-

* Additional information

Environmental performance of CM 960

Potential environmental impact per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Global warming potential (GWP)	kg CO_2 eq.	3,49E+02	2,08E+01	3,70E+02
Acidification potential (AP)	kg SO_2 eq.	1,59E+00	5,01E-02	1,64E+00
Eutrophication potential (EP)	kg PO_4^{3-} eq.	6,12E-01	1,21E-02	6,24E-01
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	9,84E-02	-1,71E-02	8,12E-02
Ozone layer depletion potential (ODP)	kg R11-e	2,65E-05	3,40E-15	2,65E-05
Abiotic depletion potential – Elements	kg Sb eq.	5,92E-04	1,46E-06	5,93E-04
Abiotic depletion potential – Fossil resources	MJ, net calorific value	5,70E+03	2,79E+02	5,98E+03

* Additional information

Use of resources per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Renewable primary energy used as energy carrier	MJ, net calorific value	4,01E+02	1,63E+01	4,17E+02
Renewable primary energy used as raw materials	MJ, net calorific value	5,17E-01	0,00E+00	5,17E-01
Total renewable primary energy	MJ, net calorific value	4,01E+02	1,63E+01	4,17E+02
Non-renewable primary energy used as energy carrier	MJ, net calorific value	5,93E+03	2,80E+02	6,21E+03
Non-renewable primary energy used as raw materials	MJ, net calorific value	7,73E-02	1,47E-02	9,20E-02
Total non-renewable primary energy	MJ, net calorific value	5,93E+03	2,80E+02	6,21E+03
Secondary material	MJ, net calorific value	2,00E+02	0,00E+00	2,00E+02
Renewable secondary fuels	MJ, net calorific value	8,74E+00	0,00E+00	8,74E+00
Non-renewable secondary fuels	MJ, net calorific value	1,20E+01	0,00E+00	1,20E+01
Net use of fresh water	m^3	3,63E+00	2,75E-02	3,66E+00

* Additional information

Waste production per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Hazardous waste disposed	kg	9,18E-04	1,56E-05	9,34E-04
Non-hazardous waste disposed	kg	1,54E+01	2,28E-02	1,54E+01
Radioactive waste disposed	kg	3,06E-03	0,00E+00	3,06E-03

* Additional information

Output flows per tonne of product to the customer

PARAMETER	UNIT	A1-A3	A4	A1-A4*
Components for reuse	kg	-	-	-

* Additional information

Programme-related information and verification

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Environmental product declarations within the same product category from different programs may not be comparable. Environmental product declarations of construction products may not be comparable if they do not comply with EN 15804.

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
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Product Category Rules:	PCR 2012:01. Construction products and construction services. Version 2.3. of 2018-11-15
Sub-PCR used:	None
Product group classification:	3751 – Non-refractory mortars and concretes
Reference year for data:	2018
Geographical scope:	Nordic countries

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2012:01. Construction products and construction services. Version 2.3 of 2018-11-15. UN CPC code 3751 – Non-refractory mortars and concretes.
PCR review was conducted by: The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Carl-Otto Nevén Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

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