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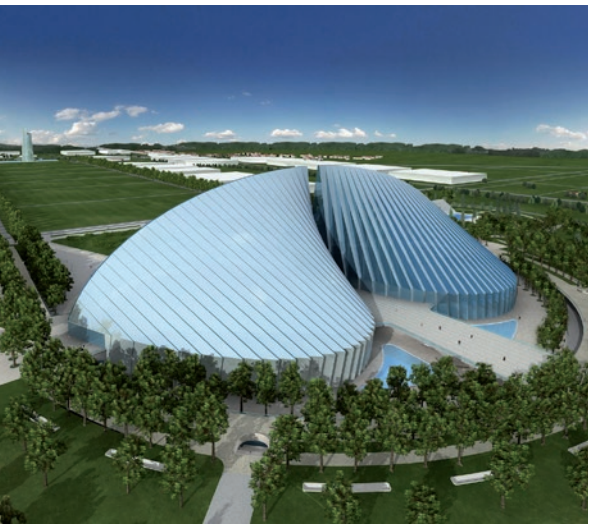

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 for

Expancrete
Mapecrete SRA-N
Mapecure SRA-25

Programme:	Programme operator:	EPD registration number:	Publication date:	Valid until:	Geographical scope:	Revision:
The International EPD® System; www.environdec.com	**EPD International AB**	**S-P-01013**	**2017-10-20**	**2022-10-19**	**International**	**2019-01-22**

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MAPEI®

ADHESIVES · SEALANTS · CHEMICAL PRODUCTS FOR BUILDING

1. COMPANY DESCRIPTION / GOAL & SCOPE

Founded in 1937 in Milan, Italy, Mapei produces adhesives and complementary products for laying all types of floor, wall and coating materials, and is also specialized in other chemical products used in the building industry, such as waterproofing products, special mortars, admixtures for concrete, products for underground constructions and for the restoration of concrete and historical buildings.

There are currently 85 subsidiaries in Mapei Group, with a total of 80 production facilities located around the world in 35 different countries and in 5 different continents. Mapei has also 31 research centres. Most locations are ISO 9001 and ISO 14001 or EMAS-certified.

Mapei's strategy of internationalization is based on two main objectives: being closer to local needs and the lowest transport costs possible. With the declared objective of being close to buyers and clients, the strength of Mapei in the five continents is to comply the requirements of each single country, and to use only locally-based managers and qualified personnel, without changing the approach of the Company.

Mapei invests 12% of its company's total work-force and 5% of its turnover in Research & Development; in particular, 70% of its R&D efforts are directed to develop eco-sustainable and environmentally friendly products which give important contribution to all main green rating for eco-sustainable buildings such as LEED and BREEAM.

Furthermore, Mapei has developed a sales and technical service network with offices all over the world and offers an efficient Technical Assistance Service that is valued by architects, engineers, contractors and owners.

The goal of the study is to provide necessary data and documentation to produce an EPD according to the requirements of PCR according to EN 15804:2014 and PCR Environdec, version 2.2, date 2017-05-30 and to have more comprehension about the environmental impacts related to **Expancrete**, **Mapecrete SRA-N** and **Mapecure SRA-25** manufactured in Mapei AS located in Sagstua (Norway), Mapei SpA located in Mediglia or Latina (Italy), in year 2017, including packaging of the finished products.

Target audiences of the study are customers and other parties with an interest in the environmental impacts of **Expancrete**, **Mapecrete SRA-N**, **Mapecure SRA-25**. This analysis shall not support comparative assertions intended to be disclosed to the public.

2. PRODUCT DESCRIPTION

Expancrete is a powdered product to be added to the other ingredients of concrete to compensate drying shrinkage. This product is manufactured in Robbiano di Mediglia (IT) and Latina (IT).

Mapecrete SRA-N is a shrinkage reducing admixture with the property of reducing hydraulic shrinkage and the formation of micro-cracks. The specific weight of the product is: 0,91 kg/m^3. This product is manufactured in Sagstua (NO).

Mapecure SRA-25 is a liquid admixture for reducing the shrinkage of concrete (chloride-free liquid admixture. The specific weight of the product is: 0,99 kg/m^3. This product is manufactured in Robbiano di Mediglia (IT).

3. CONTENT DECLARATION

The main components and ancillary materials of **Expancrete**, **Mapecrete SRA-N** and **Mapecure SRA-25**, are the following:

Table 1: Composition

Materials	Percentage (%)
Binders	< 50
Fillers	< 50
Other (additives,water,packaging)	< 50

The products contain neither carcinogenic substances nor substances of very high concern (SVHC) on the REACH Candidate List published by the European Chemicals Agency, in a concentration greater than 0,1 % (by unit weight).

4. DECLARED UNIT AND REFERENCE SERVICE LIFE

The declared unit is 1 kg of powder (packaging included).

The three finished products studied are delivered in different ways:

Expancrete:

- 20 kg multiply bags (paper/PE/paper)
- PP (big-bags 1000 kg)
- LDPE (wrapping material)
- Wooden pallet

or

- Delivered in bulk

Mapecrete SRA-N & **Mapecure SRA-25**:

- HDPE (25L tank or 200L drum)
- LDPE (wrapping material)
- Wooden pallet

or

- 1000L IBC tank (HDPE + metal scaffold), re-used by the manufacturing plant

or

- Delivered in bulk

Due to the selected system boundary, the reference service life of the products is not specified.

Figure 2: Sagstua Plant

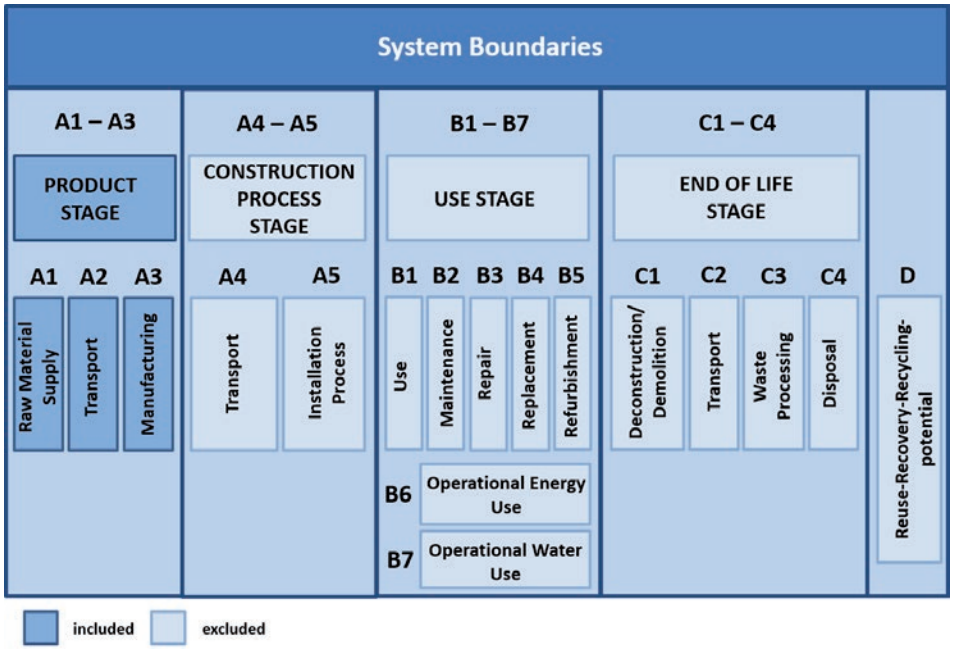
5. SYSTEM BOUNDARIES AND ADDITIONAL TECHNICAL INFORMATION

The approach is a “cradle to gate”.

The following modules have been considered:

- · A1 – A3 (Product stage): extraction and transport of raw materials, packaging included, production process.

Table 2: System boundaries



A brief description of production process is the following:

The production process starts from raw materials, which are purchased from external and intercompany suppliers and stored in the plant. Bulk raw materials are stored in specific silos and added automatically in the production mixer, according to the formula of the product. Other raw materials, supplied in bags, big bags or tanks, are stored in the warehouse and added automatically or manually in the mixer. The production is a discontinuous process, in which all the components are mechanically mixed in batches. The semi-finished product is then packaged, put on wooden pallets, covered by stretched hoods and stored in the finished products warehouse. The quality of final product is controlled before the sale.

Figure 2: Production process detail - © Photo Halvor Gudim

6. CUT-OFF RULES & ALLOCATION

Criteria for the exclusion of inputs and outputs (cut-off rules) in the LCA, information modules and any additional information are intended to support an efficient calculation procedure. They are not applied in order to hide data.

The following procedure is followed for the exclusion of inputs and outputs:

- All inputs and outputs to a unit process, for which data are available, are included in the calculation.
- Cut-off criteria, where applied, are described in Table 3.

Input flows are covered for the whole formula.

Table 3: Cut-off criteria

Process excluded from study	Cut-off criteria	Quantified contribution from process
A3: production (auxiliary materials)	Less than 10^{-5} kg/kg of finished product	Sensitivity study demonstrates a relative contribution lower than 0,5%
A3: waste and particle emission	Less than 10^{-5} kg/kg of finished product	Sensitivity study demonstrates a relative contribution lower than 0,5%

For the allocation procedure and principles, consider the following table:

Table 4: Allocation procedure and principles

Module	Allocation Principle
A1	All data are referred to 1 kg of product • A1: electricity is allocated to the mortars plant (Sagstua plant) • A1: electricity is allocated to the whole plant (Italian plants)
A3	All data are referred to 1 kg of packaged product • A3-wastes: all data are allocated to the mortars plant (Sagstua plant) • A3-wastes: all data are allocated to the whole plant (Italian plants)

7. ENVIRONMENTAL PERFORMANCE & INTERPRETATION

GWP_{100}
Global Warming Potential refers to the emission/presence of GHGs (greenhouse gases) in the atmosphere (mainly CO_2, N_2O, CH_4) which contribute to the increase in the temperature of the planet.

AP
Acidification Potential refers to the emission of specific acidifying substances (i.e. NOx, SOx) in the air. These substances decrease the pH of the rainfall with predictable damages to the ecosystem.

EP
Eutrophication Potential refers to the nutrient enrichment of flowing water, which determines unbalance in aquatic ecosystems and causes the death of the aquatic fauna.

ODP
Ozone Depletion Potential refers to the degradation of the stratospheric layer of the ozone involved in blocking the UV component of sunrays. Depletion is due to particularly reactive components that originate from chlorofluorocarbon (CFC) or chlorofluoromethanes (CFM).

POCP
The Photochemical Ozone Creation Potential is the ozone formation in low atmosphere. This is quite common in the cities where a great amount of pollutants (like VOC and NOx) are emitted every day (industrial emissions and vehicles). It is mainly diffused during the summertime.

ADP_e (elements)
Abiotic Depletion Potential elements refers to the depletion of the mineral resources.

ADP_f (fossil fuel)
Abiotic Depletion Potential fossil fuel refers to the depletion of the fossil fuel resources.

Following tables show environmental impacts for the products considered according to CML methodology (2001 – Jan. 2016, ver. 4.7). All the results are referred to the declared unit (see chapter § 4).

Expancrete

(1000 kg bigbags)

*Table 5: **Expancrete** (packaged in 1000 kg bigbags): Environmental categories referred to the declared unit*

Environmental category	Unit	A1 – A3
GWP_{100}	(kg CO_2 eq.)	6,32E-01
ADPe (element)	(kg Sb eq.)	3,78E-08
ADPf (fossil)	(MJ)	2,17E+00
AP	(kg SO_2 eq.)	2,51E-04
EP	(kg $(PO_4)^{3-}$ eq.)	4,62E-05
ODP	(kg R-11 eq.)	1,18E-13
POCP	(kg ethylene eq.)	-1,98E-06

GWP_{100}: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)

*Table 6: **Expancrete** (packaged in 1000 kg bigbags): other environmental indicators referred to the declared unit*

Environmental Indicator	Unit	A1-A3
RPEE	MJ	4,46E-01
RPEM	MJ	-
TPE	MJ	4,46E-01
NRPE	MJ	2,33E+00
NRPM	MJ	-
TRPE	MJ	2,33E+00
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m^3	1,56E-03

RPEE Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

*Table 7: **Expancrete** (packaged in 1000 kg bigbags): waste production and other output flows referred to the declared unit*

Output flow	Unit	A1-A3
NHW	kg	4,28E-03
HW	kg	4,21E-06
RW	kg	0,00E+00
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

HW Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

Expancrete

(20 kg multiply bags)

Table 8: ***Expancrete*** *(packaged in 20 kg multiply bags): Environmental categories referred to the declared unit*

Environmental category	Unit	A1 – A3
 **GWP_{100}**	(kg CO_2 eq.)	6,28E-01
 **ADPe (element)**	(kg Sb eq.)	4,87E-08
 **ADPf (fossil)**	(MJ)	2,10E+00
 **AP**	(kg SO_2 eq.)	2,39E-04
 **EP**	(kg $(PO_4)^{3-}$eq.)	4,63E-05
 **ODP**	(kg R-11 eq.)	1,82E-13
 **POCP**	(kg ethylene eq.)	-2,60E-06

GWP_{100}: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)

*Table 9: **Expancrete** (packaged in 20 kg multiply bags): other environmental indicators referred to the declared unit*

Environmental Indicator	Unit	A1-A3
RPEE	MJ	6,24E-01
RPEM	MJ	-
TPE	MJ	6,24E-01
NRPE	MJ	2,26E+00
NRPM	MJ	-
TRPE	MJ	2,26E+00
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m^3	1,59E-03

RPEE Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

*Table 10: **Expancrete** (packaged in 20 kg multiply bags): waste production & other output flows referred to the declared unit*

Output flow	Unit	A1-A3
NHW	kg	1,07E-03
HW	kg	0,00E+00
RW	kg	0,00E+00
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

HW Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

Expancrete
(bulk)

The delivery mode which has highlighted the lowest values for all environmental categories, is in bulk and the results are the following:

*Table 11: **Expancrete** (packaged in bulk): Environmental categories referred to the declared unit*

Environmental category	Unit	A1 – A3
GWP_{100}	(kg CO_2 eq.)	6,20E-01
ADPe (element)	(kg Sb eq.)	3,74E-08
ADPf (fossil)	(MJ)	1,93E+00
AP	(kg SO_2 eq.)	2,06E-04
EP	(kg $(PO_4)^{3-}$eq.)	4,21E-05
ODP	(kg R-11 eq.)	7,60E-14
POCP	(kg ethylene eq.)	-6,04E-06

GWP_{100}: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)

*Table 12: **Expancrete** (packaged in bulk): other environmental indicators referred to the declared unit*

Environmental Indicator	Unit	A1-A3
RPEE	MJ	3,42E-01
RPEM	MJ	-
TPE	MJ	3,42E-01
NRPE	MJ	2,07E+00
NRPM	MJ	-
TRPE	MJ	2,07E+00
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m^3	1,40E-03

RPEE Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

*Table 13: **Expancrete** (packaged in bulk): waste production & other output flows referred to the declared unit*

Output flow	Unit	A1-A3
NHW	kg	4,28E-03
HW	kg	4,21E-06
RW	kg	0,00E+00
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

HW Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

Mapecrete SRA-N

(25 l tank or 200 l drum)

Mapecrete SRA-N is delivered in 25 l plastic tank or 200 l plastic drum. Both packaging materials have similar environmental loads (differences are lower than 0,5%).

Indeed final results are included inside a unique table calculating an average value for each environmental category.

*Table 14: **Mapecrete SRA-N** (delivered in 25 l tank or 200 l drum): Environmental categories referred to the declared unit*

Environmental category	Unit	A1 – A3
GWP_{100}	(kg CO_2 eq.)	4,99E+00
ADPe (element)	(kg Sb eq.)	5,02E-05
ADPf (fossil)	(MJ)	9,05E+01
AP	(kg SO_2 eq.)	2,90E-02
EP	(kg $(PO_4)^{3-}$eq.)	1,59E-02
ODP	(kg R-11 eq.)	1,76E-06
POCP	(kg ethylene eq.)	3,47E-03

GWP_{100}: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)

*Table 15: **Mapecrete SRA-N** (delivered in 25 l tank or 200 l drum): other environmental indicators referred to the declared unit*

Environmental Indicator	Unit	A1-A3
RPEE	MJ	5,23E+00
RPEM	MJ	-
TPE	MJ	5,23E+00
NRPE	MJ	1,01E+02
NRPM	MJ	-
TRPE	MJ	1,01E+02
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m^3	1,21E-01

RPEE Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

*Table 16: **Mapecrete SRA-N** (delivered in 25 l tank or 200 l drum): waste production & other output flows referred to the declared unit*

Output flow	Unit	A1-A3
NHW	kg	8,62E-03
HW	kg	0,00E+00
RW	kg	0,00E+00
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

HW Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

Mapecrete SRA-N

(IBC tank 1000 l)

For **Mapecrete SRA-N**, the delivery mode which has highlighted the lowest values for all environmental categories, is the IBC tank (1000 l) which is re-used from the manufacturing plant. The results are the following:

*Table 17: **Mapecrete SRA-N** (delivered in 1000 l IBC tank): Environmental categories referred to the declared unit*

Environmental category	Unit	A1 – A3
GWP_{100}	(kg CO_2 eq.)	4,84E+00
ADPe (element)	(kg Sb eq.)	5,02E-05
ADPf (fossil)	(MJ)	8,63E+01
AP	(kg SO_2 eq.)	2,82E-02
EP	(kg $(PO_4)^{3-}$eq.)	1,58E-02
ODP	(kg R-11 eq.)	1,76E-06
POCP	(kg ethylene eq.)	3,38E-03

GWP_{100}: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)

*Table 18: **Mapecrete SRA-N** (delivered in 1000 l IBC tank): other environmental indicators referred to the declared unit*

Environmental Indicator	Unit	A1-A3
RPEE	MJ	4,80E+00
RPEM	MJ	-
TPE	MJ	4,80E+00
NRPE	MJ	9,69E+01
NRPM	MJ	-
TRPE	MJ	9,69E+01
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m^3	1,19E-01

RPEE Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

*Table 19: **Mapecrete SRA-N** (delivered in 1000 l IBC tank): waste production & other output flows referred to the declared unit*

Output flow	Unit	A1-A3
NHW	kg	8,62E-03
HW	kg	0,00E+00
RW	kg	0,00E+00
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

HW Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

Mapecure SRA-25

(25 l tank)

*Table 20: **Mapecure SRA-25** (delivered in 25 l tank): Environmental categories referred to the declared unit*

Environmental category	Unit	A1 – A3
GWP_{100}	(kg CO_2 eq.)	3,13E+00
ADPe (element)	(kg Sb eq.)	2,53E-05
ADPf (fossil)	(MJ)	6,43E+01
AP	(kg SO_2 eq.)	1,57E-02
EP	(kg $(PO_4)^{3-}$eq.)	8,04E-03
ODP	(kg R-11 eq.)	8,78E-07
POCP	(kg ethylene eq.)	1,89E-03

GWP_{100}: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)

*Table 21: **Mapecure SRA-25** (delivered in 25 l tank): other environmental indicators referred to the declared unit*

Environmental Indicator	Unit	A1-A3
RPEE	MJ	3,03E+00
RPEM	MJ	-
TPE	MJ	3,03E+00
NRPE	MJ	7,01E+01
NRPM	MJ	-
TRPE	MJ	7,01E+01
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m^3	6,39E-02

RPEE Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

*Table 22: **Mapecure SRA-25** (delivered in 25 l tank): waste production & other output flows referred to the declared unit*

Output flow	Unit	A1-A3
NHW	kg	4,28E-03
HW	kg	4,21E-06
RW	kg	0,00E+00
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

HW Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

Mapecure SRA-25

(200 l drum)

Table 23: ***Mapecure SRA-25*** *(delivered in 200 l drum): Environmental categories referred to the declared unit*

Environmental category	Unit	A1 – A3
GWP_{100}	(kg CO_2 eq.)	3,15E+00
ADPe (element)	(kg Sb eq.)	2,53E-05
ADPf (fossil)	(MJ)	6,23E+01
AP	(kg SO_2 eq.)	1,52E-02
EP	(kg $(PO_4)^{3-}$eq.)	8,04E-03
ODP	(kg R-11 eq.)	8,78E-07
POCP	(kg ethylene eq.)	1,82E-03

GWP_{100}: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)

Table 24: ***Mapecure SRA-25*** *(delivered in 200 l drum): other environmental indicators referred to the declared unit*

Environmental Indicator	Unit	A1-A3
RPEE	MJ	3,60E+00
RPEM	MJ	-
TPE	MJ	3,60E+00
NRPE	MJ	6,82E+01
NRPM	MJ	-
TRPE	MJ	6,82E+01
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m^3	6,51E-02

RPEE Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

Table 25: ***Mapecure SRA-25*** *(delivered in 200 l drum): waste production & other output flows referred to the declared unit*

Output flow	Unit	A1-A3
NHW	kg	4,28E-03
HW	kg	4,21E-06
RW	kg	0,00E+00
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

HW Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

Mapecure SRA-25

(IBC tank 1000 l)

Mapecure SRA-25 is mostly delivered in IBC tank (1000 l), which are then re-used by the manufactoring plant. The results are the following:

*Table 26: **Mapecure SRA-25** (delivered in 1000 l IBC tank): Environmental categories referred to the declared unit*

Environmental category	Unit	A1 – A3
GWP_{100}	(kg CO_2 eq.)	2,99E+00
ADPe (element)	(kg Sb eq.)	2,53E-05
ADPf (fossil)	(MJ)	6,06E+01
AP	(kg SO_2 eq.)	1,50E-02
EP	(kg $(PO_4)^{3-}$eq.)	8,01E-03
ODP	(kg R-11 eq.)	8,78E-07
POCP	(kg ethylene eq.)	1,81E-03

GWP_{100}: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)

*Table 27: **Mapecure SRA-25** (delivered in 1000 l IBC tank): other environmental indicators referred to the declared unit*

Environmental Indicator	Unit	A1-A3
RPEE	MJ	2,79E+00
RPEM	MJ	-
TPE	MJ	2,79E+00
NRPE	MJ	6,61E+01
NRPM	MJ	-
TRPE	MJ	6,61E+01
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m^3	6,24E-02

RPEE Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

*Table 28: **Mapecure SRA-25** (delivered in 1000 l IBC tank): waste production & other output flows referred to the declared unit*

Output flow	Unit	A1-A3
NHW	kg	4,28E-03
HW	kg	4,21E-06
RW	kg	0,00E+00
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

HW Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

Tables from 5 to 28 show absolute results for all the environmental categories considered. Calculations point out that **module A1** has the highest contribution for most environmental indicators.

Raw materials extraction and processing show the most relevant environmental load considering the whole life cycle of the finished product.

Considering **Mapecrete SRA-N** and **Mapecure SRA-25**, the formula (module **A1**) hightlights an important contribution for all the environmental categories considered (> 97%). This relative contribution rises above the others (Table 29). As result, transportation module (**A2**) and production process (**A3**) are virtually undetectable.

As regards **Expancrete**, it has a module **A1** with lower absolute contribution then Mapecrete and Mapecure. **Module A2** (transport of raw materials) gives a negative contribution to POCP, due to NO_2 and NO emission factors, (for more details, see the methodology used: HBEFA -Handbook Emission Factors for Road Transport).

*Table 29: Environmental Impact as percentage - **Mapecrete SRA-N** & **Mapecure SRA-25***

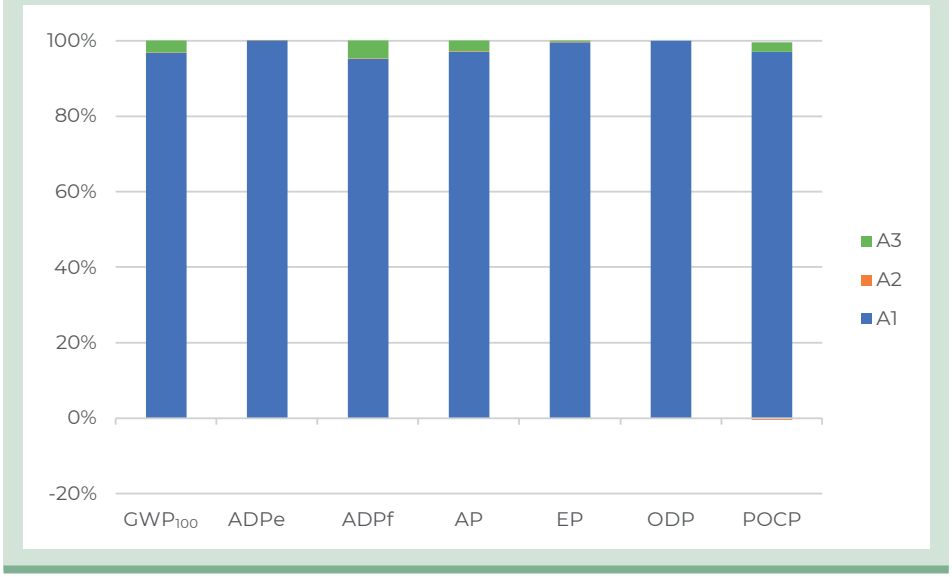


*Table 30: Environmental Impact as percentage - **Expancrete***

More details about electrical mix used in this EPD (Italian grid mix – 2014), is shown below:

	Data source	Amount	Unit
Electricity grid mix (IT) – 2014	GaBi database	0,4020	kg CO_2-eqv/kWh
Electricity from photovoltaic (IT) – 2014	GaBi database	0,0641	kg CO_2-eqv/kWh
Electricity grid mix (NO) – 2014	GaBi database	0,0291	kg CO_2-eqv/kWh

8. DATA QUALITY

Table 31: Data quality

Dataset & Geographical reference	Database (source)	Temporary reference
A1; A3		
Binders (EU)	GaBi Database	2017
Fillers (EU)	GaBi Database	2017
Electricity grid mix (NO)	GaBi Database	2014
Electricity grid mix (IT)	GaBi Database	2014
Electricity from photovoltaic (IT)	GaBi Database	2014
Additives & others (Packaging components)	GaBi Database, PlasticEurope, Ecoinvent v 3.3	2005 – 2017
A2		
Truck transport (euro 3, 27ton payload – GLO)	GaBi Database	2017
Light Train (Gross Ton Weight 500 Tons - GLO)	GaBi Database	2017
Electricity mix (EU)	GaBi Database	2014
Diesel for transport (EU)	GaBi Database	2014

All data included in table above refer to a period between 2005 and 2017; the most relevant ones are specific from supplier, while the others (i.e. transport and minor contribution dataset), come from European and global databases.
All dataset are not more than 10 years old according to EN 15804 § 6.3.7 “Data quality requirements”. The only exception is represented by raw materials coming from PlasticEurope database.
Primary data concern the year 2017 and represent the whole annual production.

9 SIGNIFICANT CHANGES FROM THE PREVIOUS VERSION

In this revision new primary data have been adopted (referred to the reference year 2017) and the last update of the CML methodology (version 4.7) has been used for calculation. Due to these updates, some environmental categories have changed more than ±10% (ADPe, ODP and POCP).

10. VERIFICATION AND REGISTRATION

EPD of construction products may not be comparable if they do not comply with EN 15804
Environmental product declarations within the same product category from different programs may not be comparable.

CEN standard EN15804 served as the core PCR	
PCR:	PCR 2012:01 Construction products and Construction services, Version 2.2, 2017-05-30
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino Contact via **info@environdec.com**
Independent verification of the declaration and data, according to ISO 14025	☒ EPD Process Certification (Internal) ☐ EPD Verification (external)
Third party verifier:	Certiquality S.r.l. Number of accreditation: 003H rev14
Accredited or approved by:	Accredia
Procedure for follow-up of data during EPD validity involves third-party verifier	☒ Yes ☐ No

11. REFERENCES

- EN 15804:2014 SUSTAINABILITY OF CONSTRUCTION WORKS - ENVIRONMENTAL PRODUCT DECLARATIONS – CORE RULES FOR THE PRODUCT CATEGORY OF CONSTRUCTION PRODUCTS
- GENERAL PROGRAMME INSTRUCTIONS OF THE INTERNATIONAL EPD® SYSTEM. VERSION 3.0
- HBEFA: HANDBOOK EMISSION FACTORS FOR ROAD TRANSPORT
- ISO 14025 ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE III ENVIRONMENTAL DECLARATIONS - PRINCIPLES AND PROCEDURES
- ISO 14044 ENVIRONMENTAL MANAGEMENT – LIFE CYCLE ASSESSMENT – REQUIREMENTS AND GUIDELINES
- PCR 2012:01; "PRODUCT GROUP CLASSIFICATION: MULTIPLE UN CPC CODES CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES"; VERSION 2.2

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