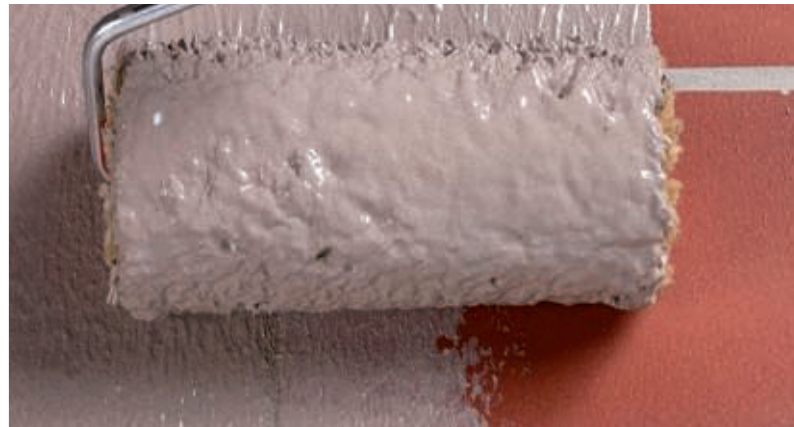




ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 for

***Mapelastic,
Mapelastic Smart,
Mapelastic Foundation,
Mapelastic Turbo***



Programme:
**The International
EPD[®] System;**
www.environdec.com

Programme
operator:
EPD International AB

EPD registration
number:
S-P-00912

Publication
date:
2016-10-14

Valid until:
2024-02-19

Geographical
scope:
International

Revision:
2019-11-15





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 also specializes in other chemical products used in the building industry, such as waterproofing products, specialty mortars, admixtures for concrete, products for underground constructions and for the restoration of concrete and historical buildings.

There are currently 85 subsidiaries in the Mapei Group, with a total of 80 production facilities located around the world in 35 different countries and in 5 different continents. Mapei also has 31 central laboratories. 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 lowering transportation costs. With the declared objective of being close to buyers and clients, Mapei's presence in the five continents enables the company to comply with the requirements of each location, and to use only locally-based managers and qualified personnel, without changing the approach of Mapei.

Mapei invests 12% in 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 major green rating systems 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 Environdec (version 2.3, 2018-11-15) under EN 15804:2014 and to have more comprehension about the environmental impacts related to **Mapelastic** (powder + latex), **Mapelastic Smart** (powder + latex), **Mapelastic Foundation** (powder + latex) and **Mapelastic Turbo** (powder + latex), all of them in the grey version, manufactured in Mapei S.p.A. located in Robbiano di Mediglia (IT), Latina (IT) and Sassuolo (IT) including packaging of the finished products.

Target audiences of the study are customers and other parties with an interest in the environmental impacts of the products studied.

This analysis shall not support comparative assertions intended to be disclosed to the public.

2. PRODUCT DESCRIPTION

Mapelastic (A+B) is a two-component mortar based on cementitious binders, fine-grained selected aggregates, special admixtures and synthetic polymers dispersed in water, used for waterproofing and protection of concrete structures, renders and cementitious screeds.

The product contains around 2,5% of recycled material in the powder (part A).

Mapelastic Smart (A+B) is a two-component waterproofing mortar based on cementitious binders, fine-grained selected aggregates, special admixtures and synthetic polymers dispersed in water, used to protect concrete structures, renders and cementitious screeds. Particularly suitable for waterproofing irregular surfaces.

The product contains around 2% of recycled material in the powder (part A).

Mapelastic Foundation (A+B) is a two-component mortar based on cementitious binders, fine-grained selected aggregates, special admixtures and synthetic polymers dispersed in water, used for waterproofing concrete and masonry structures. It is recommended for foundation walls, car-parks and underground environments, basins, channels and swimming pools.

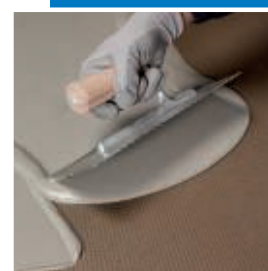
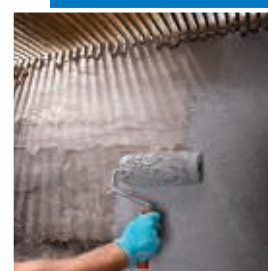
The product contains around 17% of recycled material in the powder (part A).

Mapelastic Turbo (A+B) is a cementitious mortar for waterproofing terraces and balconies, also at low temperatures and on substrates not completely dry, used for rapid waterproofing product for concrete structures, cementitious screeds and old floor and wall covering.

All products are compliant with EN 1504-2 (Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - Part 2: Surface protection systems for concrete) and EN 14891 (Liquid-applied water impermeable products for use beneath ceramic tiling bonded with adhesives. Requirements, test methods, evaluation of conformity, classification and designation).

Products are supplied as follows:

- **Mapelastic (kit A+B):** 24 kg multiplybags for powder and 8 kg HDPE tank for latex
- **Mapelastic Smart (kit A+B):** 20 kg multiplybags for powder and 10 kg HDPE tank for latex
- **Mapelastic Foundation (kit A+B):** 22 kg multiplybags for powder and 10 kg HDPE tank for latex
- **Mapelastic Turbo (kit A+B):** 20 kg multiplybags for powder and 16 kg HDPE tank for latex



Mapelastic
Mapelastic Smart
Mapelastic Foundation
Mapelastic Turbo



3. CONTENT DECLARATION

The main components and ancillary materials of **Mapelastic**, **Mapelastic Smart**, **Mapelastic Foundation** and **Mapelastic Turbo** (grey versions) are the following:

Table 1: Composition

| Materials | Percentage (%) by mass |
|-----------------------------------|------------------------|
| Inorganic binders | < 30 |
| Fillers | < 70 |
| Recycled material | < 17 |
| Other (Additives, Packaging, ...) | < 3 |

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 more than 0,1 % (by unit weight).

4. DECLARED UNIT AND REFERENCE SERVICE LIFE

The declared unit is 1 kg of powder (part A) with packaging and the requested weight for the latex (part B) with packaging, as follows:

- **Mapelastic**: 1 kg powder + 330 g latex + packaging
- **Mapelastic Smart**: 1 kg powder + 500 g latex + packaging
- **Mapelastic Foundation**: 1 kg powder + 450 g latex + packaging
- **Mapelastic Turbo**: 1 kg powder + 800 g latex + packaging

Packaging materials (for both powder and latex) include:

- Wooden pallet
- Paper/PE/paper (used for powders bags)
- HDPE + PP (used for latex)
- LDPE used as wrapping material

The reference service life of the mortar, if professionally installed and properly used, is estimated to be the same as the building one.

5. SYSTEM BOUNDARIES AND ADDITIONAL TECHNICAL INFORMATION

The approach is “cradle to gate” with options.

The following modules have been considered:

- A1, A2, A3 (Product Stage): extraction and transport of raw materials and packaging, manufacturing process.
- A4 (Construction Process Stage): transport of the finished product to final customers.

Table 2: System boundaries

| System Boundaries | | | | | | | | | | | | | | |
|---------------------|-----------|---------------|----------------------------|----------------------|-----------|------------------------|--------|-------------|---------------|----------------------------|-----------|------------------|----------|-------------------------------------|
| A1 – A3 | | | A4 – A5 | | B1 – B7 | | | | | C1 – C4 | | | | D |
| PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | END OF LIFE STAGE | | | | |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | C1 | C2 | C3 | C4 | |
| Raw Material Supply | Transport | Manufacturing | Transport | Installation Process | Use | Maintenance | Repair | Replacement | Refurbishment | Deconstruction/ Demolition | Transport | Waste Processing | Disposal | Reuse-Recovery- Recycling-potential |
| | | | | | B6 | Operational Energy Use | | | | | | | | |
| | | | | | B7 | Operational Water Use | | | | | | | | |

Included
 excluded

A brief description of production process is the following:

The production process starts from raw materials, that 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 or big bags, are stored in their warehouse and added automatically or manually in the mixer. During the production of the powder, all the components are mechanically mixed in batches. Raw materials of latexes are mixed, properly diluted and packed into drums. The semi-finished products are then packaged, put on wooden pallets, covered by stretched hoods and stored in the Finished Products' warehouse. The quality of final products is controlled before the sale.



Figure 1: Production process detail



Table 3: Transport to the building site (A4)

| Name | Value | Unit |
|---|-------------|-------------------|
| Means of transport : truck euro 3 with 27 tons of payload & Ocean ship with 27500 DWT | | |
| Litres of fuel (truck) | ~ 2E-03 | l/DU*100km |
| Litres of fuel (ship) | ~ 4E-04 | l/DU*100km |
| Transport distance (weighted average) | ~ 400 | km |
| Capacity utilisation (including empty runs) | 85 | % |
| Gross density of powder products transported | 1300 ÷ 1400 | kg/m ³ |
| Gross density of liquid products transported | ~ 1000 | kg/m ³ |
| Capacity utilisation volume factor | 100 | % |

DU: declared unit

6. CUT-OFF RULES AND 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 4.

Table 4: Cut-off criteria

| Process excluded from the 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 5: Allocation procedure and principles

| Module | Allocation Principle |
|--------|---|
| A1 | All data are referred to 1 kg of powder product • A1: electricity is allocated to the whole plant production |
| A3 | All data are referred to 1 kg of powder packaged product • A3-wastes: all data are allocated to the whole plant production |



7. ENVIRONMENTAL PERFORMANCE & INTERPRETATION



GWP₁₀₀

Global Warming Potential refers to the emission/presence of GHGs (greenhouse gases) in the atmosphere (mainly CO₂, N₂O, CH₄) which contribute to the increase in the temperature of the planet.



AP

Acidification Potential refers to the emission of specific acidifying substances (i.e. NO_x, SO_x) 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 NO_x) 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, version 4.7). All the results are referred to the declared unit (see § 4).

Mapelastic

Table 6: **Mapelastic**: Environmental categories referred to the declared unit

| Environmental category | Unit | A1-A3 | A4 |
|--|---|----------|-----------|
|  GWP₁₀₀ | (kg CO ₂ eq.) | 7,01E-01 | 2,93E-02 |
|  ADPe (element) | (kg Sb eq.) | 4,13E-03 | 2,42E-09 |
|  ADPf (fossil) | (MJ) | 1,28E+01 | 3,97E-01 |
|  AP | (kg SO ₂ eq.) | 2,34E-03 | 1,75E-04 |
|  EP | (kg (PO ₄) ³ -eq.) | 2,30E-04 | 4,45E-05 |
|  ODP | (kg R-11 eq.) | 1,65E-08 | 7,97E-16 |
|  POCP | (kg ethylene eq.) | 3,39E-04 | -7,71E-05 |

GWP₁₀₀: 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)

Mapelastic
Mapelastic Smart
Mapelastic Foundation
Mapelastic Turbo



Table 7: **Mapelastic**: other environmental indicators referred to the declared unit

| Environmental Indicator | Unit | A1-A3 | A4 |
|-------------------------|----------------|-----------|----------|
| RPEE | MJ | 5,65E-01 | 2,19E-02 |
| RPEM | MJ | - | - |
| TPE | MJ | 5,65E-01 | 2,19E-02 |
| NRPE | MJ | 1,30E+01 | 3,99E-01 |
| NRPM | MJ | - | - |
| TRPE | MJ | 1,30E+01 | 3,99E-01 |
| SM | kg | 2,43E-02* | - |
| RSF | MJ | - | - |
| NRSF | MJ | - | - |
| W | m ³ | 1,69E-03 | 4,99E-04 |

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

*The value is referred only to the powder component.








Table 8: **Mapelastic**: waste production and other output flows referred to the declared unit

| Output flow | Unit | A1-A3 | A4 |
|-------------------------------|------|----------|----|
| NHW | kg | 3,41E-03 | - |
| HW | kg | 4,59E-04 | - |
| RW | kg | 0,00E+00 | - |
| Components for re-use | kg | - | - |
| Materials for recycling | kg | 5,38E-03 | - |
| Materials for energy recovery | kg | - | - |
| Exported energy | MJ | - | - |

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

Mapelastic Smart

Table 9: **Mapelastic Smart**: Environmental categories referred to the declared unit

| Environmental category | Unit | A1-A3 | A4 |
|--|---|----------|-----------|
|  GWP₁₀₀ | (kg CO ₂ eq.) | 8,62E-01 | 3,89E-02 |
|  ADPe (element) | (kg Sb eq.) | 5,77E-03 | 3,22E-09 |
|  ADPf (fossil) | (MJ) | 1,68E+01 | 5,29E-01 |
|  AP | (kg SO ₂ eq.) | 3,14E-03 | 2,31E-04 |
|  EP | (kg (PO ₄) ³⁻ eq.) | 2,73E-04 | 5,94E-05 |
|  ODP | (kg R-11 eq.) | 1,79E-08 | 1,06E-15 |
|  POCP | (kg ethylene eq.) | 4,12E-04 | -1,04E-04 |

GWP₁₀₀: 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)

Mapelastic
Mapelastic Smart
Mapelastic Foundation
Mapelastic Turbo



Table 10: **Mapelastic Smart**: other environmental indicators referred to the declared unit

| Environmental Indicator | Unit | A1-A3 | A4 |
|-------------------------|----------------|-----------|----------|
| RPEE | MJ | 6,36E-01 | 2,92E-02 |
| RPEM | MJ | | |
| TPE | MJ | 6,36E-01 | 2,92E-02 |
| NRPE | MJ | 1,70E+01 | 5,30E-01 |
| NRPM | MJ | - | - |
| TRPE | MJ | 1,70E+01 | 5,30E-01 |
| SM | kg | 2,17E-02* | - |
| RSF | MJ | - | - |
| NRSF | MJ | - | - |
| W | m ³ | 2,39E-03 | 6,65E-04 |

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

*The value is referred only to the powder component.








Table 11: **Mapelastic Smart**: waste production and other output flows referred to the declared unit

| Output flow | Unit | A1-A3 | A4 |
|-------------------------------|------|----------|----|
| NHW | kg | 7,56E-03 | - |
| HW | kg | 1,02E-03 | - |
| RW | kg | 0,00E+00 | - |
| Components for re-use | kg | - | - |
| Materials for recycling | kg | 1,01E-02 | - |
| Materials for energy recovery | kg | - | - |
| Exported energy | MJ | - | - |

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

Mapelastic Foundation

Table 12: **Mapelastic Foundation**: Environmental categories referred to the declared unit

| Environmental category | Unit | A1-A3 | A4 |
|--|---|----------|-----------|
|  GWP₁₀₀ | (kg CO ₂ eq.) | 8,20E-01 | 4,06E-02 |
|  ADPe (element) | (kg Sb eq.) | 5,57E-03 | 3,36E-09 |
|  ADPf (fossil) | (MJ) | 1,62E+01 | 5,51E-01 |
|  AP | (kg SO ₂ eq.) | 3,63E-03 | 2,41E-04 |
|  EP | (kg (PO ₄) ³⁻ eq.) | 2,73E-04 | 6,19E-05 |
|  ODP | (kg R-11 eq.) | 1,46E-08 | 1,11E-15 |
|  POCP | (kg ethylene eq.) | 3,79E-04 | -1,08E-04 |

GWP₁₀₀: 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)

Mapelastic
Mapelastic Smart
Mapelastic Foundation
Mapelastic Turbo



Table 13: **Mapelastic Foundation**: other environmental indicators referred to the declared unit

| Environmental Indicator | Unit | A1-A3 | A4 |
|-------------------------|----------------|-----------|----------|
| RPEE | MJ | 6,61E-01 | 3,05E-02 |
| RPEM | MJ | - | - |
| TPE | MJ | 6,61E-01 | 3,05E-02 |
| NRPE | MJ | 1,64E+01 | 5,53E-01 |
| NRPM | MJ | - | - |
| TRPE | MJ | 1,64E+01 | 5,53E-01 |
| SM | kg | 1,65E-01* | |
| RSF | MJ | - | - |
| NRSF | MJ | - | - |
| W | m ³ | 3,04E-03 | 6,94E-04 |

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

*The value is referred only to the powder component.








Table 14: **Mapelastic Foundation**: waste production and other output flows referred to the declared unit

| Output flow | Unit | A1-A3 | A4 |
|-------------------------------|------|----------|----|
| NHW | kg | 8,76E-03 | - |
| HW | kg | 1,18E-03 | - |
| RW | kg | 0,00E+00 | - |
| Components for re-use | kg | - | - |
| Materials for recycling | kg | 1,14E-02 | - |
| Materials for energy recovery | kg | - | - |
| Exported energy | MJ | - | - |

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

Mapelastic Turbo

Table 15: **Mapelastic Turbo**: Environmental categories referred to the declared unit

| Environmental category | Unit | A1-A3 | A4 |
|--|---|----------|-----------|
|  GWP₁₀₀ | (kg CO ₂ eq.) | 1,07E+00 | 4,12E-02 |
|  ADPe (element) | (kg Sb eq.) | 7,92E-03 | 3,41E-09 |
|  ADPf (fossil) | (MJ) | 2,27E+01 | 5,60E-01 |
|  AP | (kg SO ₂ eq.) | 5,47E-03 | 2,45E-04 |
|  EP | (kg (PO ₄) ³⁻ eq.) | 3,39E-04 | 6,28E-05 |
|  ODP | (kg R-11 eq.) | 8,16E-09 | 1,12E-15 |
|  POCP | (kg ethylene eq.) | 4,59E-04 | -1,10E-04 |

GWP₁₀₀: 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)

Mapelastic
Mapelastic Smart
Mapelastic Foundation
MAPelastic Turbo



Table 16: **Mapelastic Turbo**: other environmental indicators referred to the declared unit

| Environmental Indicator | Unit | A1-A3 | A4 |
|-------------------------|----------------|----------|----------|
| RPEE | MJ | 8,16E-01 | 3,10E-02 |
| RPEM | MJ | - | - |
| TPE | MJ | 8,16E-01 | 3,10E-02 |
| NRPE | MJ | 2,31E+01 | 5,62E-01 |
| NRPM | MJ | - | - |
| TRPE | MJ | 2,31E+01 | 5,62E-01 |
| SM | kg | - | - |
| RSF | MJ | - | - |
| NRSF | MJ | - | - |
| W | m ³ | 4,55E-03 | 7,04E-04 |

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 17: **Mapelastic Turbo**: waste production and other output flows referred to the declared unit

| Output flow | Unit | A1-A3 | A4 |
|-------------------------------|------|----------|----|
| NHW | kg | 7,58E-03 | - |
| HW | kg | 1,02E-03 | - |
| RW | kg | 0,00E+00 | - |
| Components for re-use | kg | - | - |
| Materials for recycling | kg | 1,02E-02 | - |
| Materials for energy recovery | kg | - | - |
| Exported energy | MJ | - | - |

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

To calculate the Environmental Indicators (EI) results for 1 m², use the multiplicative coefficients reported in Table 18.

Table 18: multiplicative coefficients for 1m² and 1mm thickness

| | Application by spray | Application by roller / manual |
|-----------------------|-------------------------|--------------------------------|
| Mapelastic | EI _{DU} * 1,65 | EI _{DU} * 1,28 |
| Mapelastic Smart | EI _{DU} * 1,47 | EI _{DU} * 1,07 |
| Mapelastic Foundation | EI _{DU} * 1,52 | EI _{DU} * 1,14 |
| Mapelastic Turbo | / | EI _{DU} * 0,78 |

EI_{DU}: Environmental Indicator for DU (Declared Unit)

Tables (from 6 to 17) show absolute results for every considered environmental impact category. The **module A1** gives the highest contribution for each of them, up to 99% of the total impact in the whole system boundary.

In particular hydraulic binders and organic polymers, which are some of the main components in the formulations, carry a significant impact for all environmental categories. Latexes increase relative contributes of A1 module, due to polymers emission factors.

The **modules A2** and **A4** (transport of raw materials and transport of the finished product) give a negative contribution to POCP due to NO and NO₂ emission factors (for more details, see the methodology used: *HBEFA - Handbook Emission Factors for Road Transport*).

The specific amounts of **recycled material** used in Mapelastic (part A), Mapelastic Smart (part A) and Mapelastic Foundation (part A) are shown as **SM** (Secondary Material) indicator in Table 7, Table 10 and Table 13 respectively.

The following histogram shows the relative contribution of the modules considered in the system boundary to the environmental impacts.

Mapelastic
Mapelastic Smart
Mapelastic Foundation
Mapelastic Turbo



Table 19: Environmental Impact as percentage (average of all products studied)



More details about electrical mix used in this EPD 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 |

8. DATA QUALITY

Table 20: Data quality

| Dataset & Geographical reference | Database (source) | Temporary reference |
|---|---|---------------------|
| A1; A3 | | |
| Inorganic Binders (DE) | GaBi Database; ecoinvent 3.4; EPD S-P-00880 | 2015 – 2017 |
| Organic Binders (DE) | GaBi Database | 2012 |
| Fillers (EU) | GaBi Database | 2017 |
| Additives (EU) | GaBi Database | 2012 – 2017 |
| Polymer Dispersions (EU) | EcoProfile EPDLA | 2015 |
| Recycled Material (DE) | GaBi Database | 2017 |
| Electricity grid mix (IT) | GaBi Database | 2014 |
| Electricity from photovoltaic (IT) | GaBi Database | 2014 |
| Packaging components (EU) | GaBi Database; PlasticsEurope | 2005 – 2017 |
| A2; A4 | | |
| Truck transport (euro 3, 27t payload – GLO) | GaBi Database | 2017 |
| Oceanic ship (27500 DWT) | 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 |
| Heavy Fuel Oil (EU) | GaBi Database | 2014 |

All data included in the 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 datasets are not more than 10 years old according to EN 15804 § 6.3.7 “Data quality requirements”. The only exception is represented by one raw material used for one packaging component production.

Primary data concern the year 2018 and represent the whole annual production.



9. REQUISITE EVIDENCE

9.1. VOC emissions

Volatile Organic Compounds (VOC) special tests and evidence have been carried out on the two products, according to ISO 16000 parts 3, 6, 9 and 11 and EN 16516.

The waterproofing slurries have been evaluated in emission chambers, in order to detect their VOC emissions after 3 and 28 days storage in the ventilated chambers, according to GEV (Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte e.V.) test method.

Mapelastic, Mapelastic Smart, Mapelastic Foundation and **Mapelstic Turbo** meet the requirements for the emission class Emission class EC1^{PLUS}, as "very low VOC emission", released by GEV.

Next table describes the limits for the Emission class EC1^{PLUS} class.

Table 2: EC1^{PLUS} VOC limits

| | 3 days $\mu\text{g}/\text{m}^3$ | 28 days $\mu\text{g}/\text{m}^3$ |
|--------------------------------------|--|--|
| TVOC (C6-C16) | $\leq 750 \mu\text{g}/\text{m}^3$ | $\leq 60 \mu\text{g}/\text{m}^3$ |
| TSVOC (C16-C22) | | $\leq 40 \mu\text{g}/\text{m}^3$ |
| C1A-C1B substances | Total $\leq 10 \mu\text{g}/\text{m}^3$ | Single substance $\leq 1 \mu\text{g}/\text{m}^3$ |
| Formaldehyde/acetaldehyde | $\leq 50 \mu\text{g}/\text{m}^3$ | |
| Sum of formaldehyde/ acetaldehyde | $\leq 50 \text{ ppb}$ | |
| Sum of non-assessable VOCs | | ≤ 40 |
| R value | | ≤ 1 |

9.2. RECYCLED CONTENT

Mapelastic contains around 2,5% of recycled material in the powder (part A).

Mapelastic Smart contains around 2% of recycled material in the powder (part A).

Mapelastic Foundation contains around 17% of recycled material in the powder (part A).

10. SIGNIFICANT CHANGES FROM THE PREVIOUS VERSION

In this revision new primary data (referred to the reference year 2018) have been adopted and the last update of the PCR 2.3 has been considered. There's new content declaration and the indicator "Materials for recycling" has been assessed.

11. 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 2.3, 2018-11-15 |
| 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 | <input checked="" type="checkbox"/> EPD Process Certification (Internal) <input type="checkbox"/> EPD Verification (external) |
| Third party verifier: | Certiquality S.r.l. Number of accreditation: 003H rev15 |
| Accredited or approved by: | Accredia |
| Procedure for follow-up of data during EPD validity involves third-party verifier | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

Mapelastic
Mapelastic Smart
Mapelastic Foundation
MApelastic Turbo



12. REFERENCES

- EN 1504-2 (PRODUCTS AND SYSTEMS FOR THE PROTECTION AND REPAIR OF CONCRETE STRUCTURES - DEFINITIONS, REQUIREMENTS, QUALITY CONTROL AND EVALUATION OF CONFORMITY - PART 2: SURFACE PROTECTION SYSTEMS FOR CONCRETE)
- EN 14891 (LIQUID-APPLIED WATER IMPERMEABLE PRODUCTS FOR USE BENEATH CERAMIC TILING BONDED WITH ADHESIVES. REQUIREMENTS, TEST METHODS, EVALUATION OF CONFORMITY, CLASSIFICATION AND DESIGNATION).
- 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 2.3

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