



ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025

Thermal insulation systems:

Mapetherm EPS
Mapetherm XPS
Mapetherm M.Wool



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

Programme
operator:
EPD International AB

EPD registration
number:
S-P-00914

Approval
date:
2017-01-23

Valid until:
2022-01-22

Geographical
scope:
International





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 81 subsidiaries in Mapei Group, with a total of 73 production facilities located around the world in 33 different countries and in 5 different continents. Mapei has also 18 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 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 2.01, date 2016-03-09 and to have more comprehension about the environmental impacts related to components included in three different thermal insulation systems. **Mapetherm AR1 GG**, **Quarzolite** and **Silancolor** are manufactured in Mapei S.p.A. located in Robbiano di Mediglia (MI-ITALY), in year 2016, including packaging of the finished products. Panels used in the systems, anchors and fiberglass net, are produced by Mapei SpA suppliers.

Target audiences of the study are customers and other parties with an interest in the environmental impacts of **Thermal insulation systems with three different panels**:

- **Mapetherm EPS** (expanded polystyrene)
- **Mapetherm XPS** (extruded polystyrene)
- **Mapetherm M.Wool** (mineral wool).

Each of these systems has been studied with two different surface coatings:

- **Quarzolite Base Coat + Quarzolite Tonachino.**
- **Silancolor Base Coat + Silancolor Tonachino.**

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

2. PRODUCT DESCRIPTION

All systems studied include several components, as follows:

1. **Mapetherm AR1 GG (grey)**: one component cementitious mortar for bonding and levelling thermal insulation panels .Mapetherm AR1 GG is used both as adhesive and smoothing layer.
2. **Mapetherm EPS panel**: expanded polystyrene panel with 80 mm of thickness.
3. **Mapetherm XPS panel**: extruded polystyrene panel with 80 mm of thickness.
4. **Mapetherm M. Wool panel**: mineral wool panel with 80 mm of thickness.
5. **Mapetherm Fix**: anchors with a metal core and PP body.
6. **Mapetherm Net**: fiberglass mesh.
7. **Quarzolite Base Coat**: acrylic undercoat with an uniformly rough finish, good filling and adhesion promoting properties, for internal and external surfaces.
8. **Quarzolite Tonachino**: high-protection, thick-layered acrylic coating with high filling properties for internal and external surfaces.
9. **Silancolor Base Coat**: siloxane undercoat with an uniformly rough finish and good filling properties for internal and external surfaces.
10. **Silancolor Tonachino**: high-protection, thick-layered siloxane coating with high filling properties for internal and external surfaces.

All components are compliant to ETAG 004 ("Guideline for european technical approval of external thermal insulation composite systems -etics- with rendering").

Products are supplied as follows:

- **Mapetherm AR1 GG**: 25kg multiplybags on wooden pallet wrapped with LDPE.
- **Mapetherm Fix**: cardboard boxes with 100 pieces on wooden pallet wrapped with LDPE.

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- **Mapetherm Net:** rolls with 50m and 1m weidth (cardboard core) on wooden pallet wrapped with LDPE.
- **Quarzolite / Silancolor (Base Coat and Tonachino):** bucket with 20kg of paint on wooden pallet wrapped with LDPE.
- **Mapetherm EPS, XPS, M. Wool** panels: wooden pallet with around 40 m² of panels wrapped with LDPE.

3. CONTENT DECLARATION

Following tables shows components and weight of the systems studied:

Table 1: Mapetherm EPS system composition

Component	Weight (kg)	Percentage (%)
Mapetherm AR1 GG (adhesive layer)	4,5	31,0
Mapetherm EPS panel (80 mm)	1,6	11,0
Mapetherm Fix (anchors)	0,16	1,1
Mapetherm AR1 GG (smoothing layer)	5,2	35,8
Mapetherm Net (fiberglass mesh)	0,16	1,1
Quarzolite / Silancolor Base Coat	0,3	2,1
Quarzolite / Silancolor Tonachino	2,6	17,9
TOTAL	14,5	100,0

Table 2: Mapetherm XPS system composition

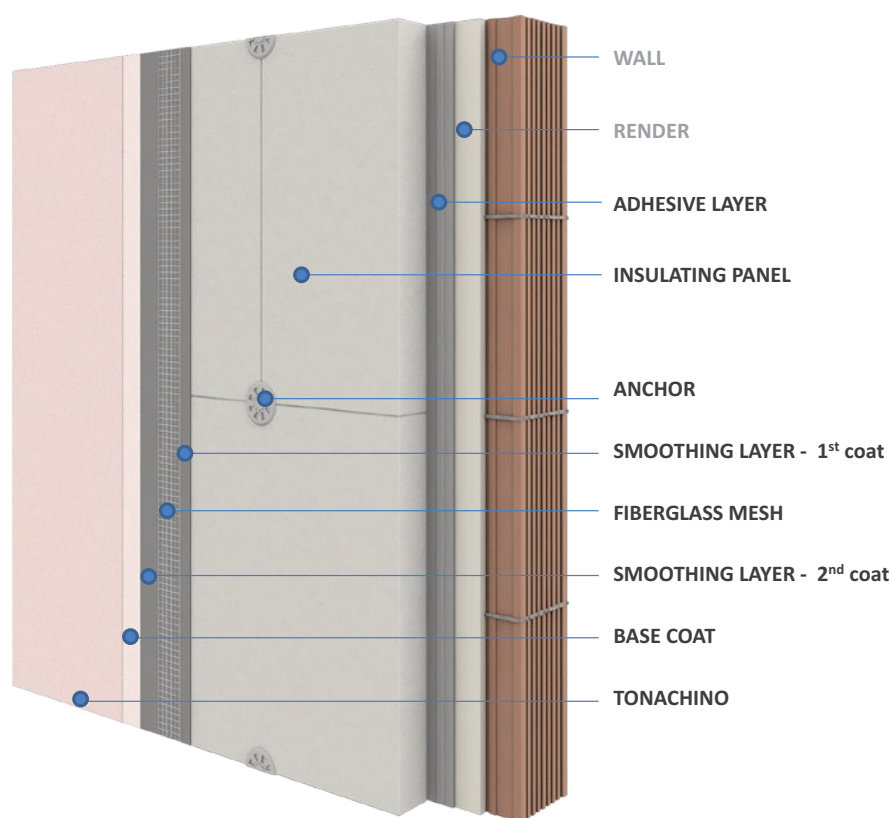
Component	Weight (kg)	Percentage (%)
Mapetherm AR1 GG (adhesive layer)	4,5	29,1
Mapetherm XPS panel (80 mm)	2,6	16,5
Mapetherm Fix (anchors)	0,16	1,0
Mapetherm AR1 GG (smoothing layer)	5,2	33,6
Mapetherm Net (fiberglass mesh)	0,16	1,0
Quarzolite / Silancolor Base Coat	0,3	1,9
Quarzolite / Silancolor Tonachino	2,6	16,8
TOTAL	15,5	100,0

Table 3: Mapetherm M. Wool system composition

Component	Weight (kg)	Percentage (%)
Mapetherm AR1 GG (adhesive layer)	4,5	23,8
Mapetherm M.Wool panel (80 mm)	6,0	31,7
Mapetherm Fix (anchors)	0,16	0,8
Mapetherm AR1 GG (smoothing layer)	5,2	27,5
Mapetherm Net (fiberglass mesh)	0,16	0,8
Quarzolite / Silancolor Base Coat	0,3	1,6
Quarzolite / Silancolor Tonachino	2,6	13,7
TOTAL	18,9	100,0

The choice of panels with 8cm thickness comes from a specific request and reflects the actual market situation.

The formulations contain no hazardous substances. These products contain no 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).



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4. DECLARED UNIT AND REFERENCE SERVICE LIFE:

The declared unit is 1m² of thermal insulation system included packaging of the single components.

Packaging materials include:

- Wooden pallet.
- Cardboard boxes (ref. Mapetherm Fix).
- Multiply bags (ref. Mapetherm AR1 GG).
- LDPE used as wrapping material.
- Cardboard (ref. Mapetherm Net), used as core material for rolls.
- PP (polypropylene) for buckets used for coatings (Quarzolite / Silancolor).

According to the system boundary used in this EPD, a RSL has not been provided.

5. SYSTEM BOUNDARIES & ADDITIONAL TECHNICAL INFORMATION:

The approach is a “cradle to gate”.

The following modules have been considered:

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

Table 4: System boundaries (X=included, MND= module not declared)

Product stage			Assembly stage		Use stage								End of life stage			
Up-stream	Core		Downstream													
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Both manufacturing processes of powder (e.g. Mapetherm AR1 GG) and liquid products (e.g. Quarzolite / Silancolor), are quite similar: raw materials are carried

to the plants, conveniently stored inside silos or hoppers, weighted and then wrapped, ready to ship to the customers.

Production processes of those system components purchased by Mapei SpA, are well represented by generic datasets which reflect the actual technological situation.



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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 exclusion of inputs and outputs complies with the following procedure:

- All inputs and outputs to a unit process are included in the calculation, for which data are available..
- Less than 1% of the total mass inputs / outputs of the unit process A1 and A3, are cut off (see Table 5).

Input flows are covered for the whole formula.

Table 5: Cut-off criteria

Process excluded from study	Cut-off criteria	Quantified contribution from process
A3: production (auxiliary materials)	less than 10E-5 kg / kg of system	less than 10E-5 kg / kg of finished system
A3: waste	<ul style="list-style-type: none"> - less than 10E-5 kg / kg of system - wastes coming from anchors and glassfiber net (purchased products) 	<ul style="list-style-type: none"> - less than 10E-5 kg / kg of finished system - sensitivity studies demonstrate a very low relative contribution due to wastes

For the allocation procedure and principles, consider the following table (Table 6):








Table 6: Allocation procedure and principles

Module	Allocation Principle
A1; A2	All data are referred to 1m ² of system <ul style="list-style-type: none"> • A1: electricity is allocated to the whole plant production
A3	All data are referred to 1m ² of system (packaged products) <ul style="list-style-type: none"> • A3-wastes: all data are allocated to the whole plant production (ref. Mapetherm AR1 GG and paints – Quarzolite / Silancolor)

7. ENVIRONMENTAL PERFORMANCE & INTERPRETATION

Following tables show environmental impacts for the considered products according to CML methodology (2010 - Apr2013, version 4.2).

Table 7 : **Mapetherm EPS** system with Quarzolite: Environmental categories

System boundary		Upstream + core	
Parameter	Unit	A1-A3	
 GWP₁₀₀	kg CO ₂ eq.	1,08E+01	
 ADP_e (element)	kg Sb eq.	6,56E-03	
 EP	kg (PO ₄) ³⁻ eq.	3,94E-03	
 AP	kg SO ₂ eq.	3,34E-02	
 POCP	kg ethylene eq.	3,06E-02	
 ODP	kg R-11 eq.	9,44E-07	
 ADP_f (fossil)	MJ	2,21E+02	

GWP₁₀₀: Global Warming Potential; **ADP_e**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADP_f**: Abiotic Depletion Potential (fossil)

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Table 8: **Mapetherm EPS** system with Quarzolite: other environmental indicators

System boundary		Upstream + core
Parameter	Unit	A1-A3
RPEE	MJ	1,14E+01
RPEM	MJ	-
TPE	MJ	1,14E+01
NRPE	MJ	2,31E+02
NRPM	MJ	-
TRPE	MJ	2,31E+02
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m ³	2,91E-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 9: **Mapetherm EPS** system with Quarzolite: waste production & other output flows

System boundary		Upstream + core
Parameter	Unit	A1-A3
NHW	kg	3,02E-00
HW	kg	1,07E-02
RW	kg	1,44E-03
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

Table 10: **Mapetherm EPS** system with Silancolor: Environmental categories

System boundary		Upstream + core	
Parameter	Unit	A1-A3	
 GWP₁₀₀	kg CO ₂ eq.	1,07E+01	
 ADP_e (element)	kg Sb eq.	6,29E-03	
 EP	kg (PO ₄) ³⁻ eq.	3,78E-03	
 AP	kg SO ₂ eq.	3,37E-02	
 POCP	kg ethylene eq.	3,06E-02	
 ODP	kg R-11 eq.	1,23E-06	
 ADP_f (fossil)	MJ	2,20E+02	

GWP₁₀₀: Global Warming Potential; **ADP_e**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADP_f**: Abiotic Depletion Potential (fossil)

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Table 11: **Mapetherm EPS** system with Silancolor: other environmental indicators

System boundary		Upstream + core
Parameter	Unit	A1-A3
RPEE	MJ	1,14E+01
RPEM	MJ	-
TPE	MJ	1,14E+01
NRPE	MJ	2,30E+02
NRPM	MJ	-
TRPE	MJ	2,30E+02
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m ³	3,09E-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 12: **Mapetherm EPS** system with Silancolor: waste production & other output flows

System boundary		Upstream + core
Parameter	Unit	A1-A3
NHW	kg	3,02E-00
HW	kg	1,07E-02
RW	kg	1,44E-03
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

Table 13: **Mapetherm XPS** system with Quarzolite: Environmental categories

System boundary		Upstream + core	
Parameter	Unit	A1-A3	
 GWP₁₀₀	kg CO ₂ eq.	1,31E+01	
 ADP_e (element)	kg Sb eq.	6,57E-03	
 EP	kg (PO ₄) ³⁻ eq.	4,34E-03	
 AP	kg SO ₂ eq.	3,70E-02	
 POCP	kg ethylene eq.	9,59E-03	
 ODP	kg R-11 eq.	8,29E-07	
 ADP_f (fossil)	MJ	2,92E+02	

GWP₁₀₀: Global Warming Potential; **ADP_e**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADP_f**: Abiotic Depletion Potential (fossil)

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Table 14: **Mapetherm XPS** system with Quarzolite: other environmental indicators

System boundary		Upstream + core
Parameter	Unit	A1-A3
RPEE	MJ	1,96E+01
RPEM	MJ	-
TPE	MJ	1,96E+01
NRPE	MJ	3,03E+02
NRPM	MJ	-
TRPE	MJ	3,03E+02
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m ³	7,64E-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 15: **Mapetherm XPS** system with Quarzolite: waste production & other output flows

System boundary		Upstream + core
Parameter	Unit	A1-A3
NHW	kg	8,85E-02
HW	kg	5,83E-03
RW	kg	3,85E-03
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

Table 16: **Mapetherm XPS** system with Silancolor: Environmental categories

System boundary		Upstream + core
Parameter	Unit	A1-A3
 GWP₁₀₀	kg CO ₂ eq.	1,31E+01
 ADP_e (element)	kg Sb eq.	6,29E-03
 EP	kg (PO ₄) ³⁻ eq.	4,18E-03
 AP	kg SO ₂ eq.	3,73E-02
 POCP	kg ethylene eq.	9,60E-03
 ODP	kg R-11 eq.	1,12E-06
 ADP_f (fossil)	MJ	2,91E+02

GWP₁₀₀: Global Warming Potential; **ADP_e**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADP_f**: Abiotic Depletion Potential (fossil)

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Table 17: **Mapetherm XPS** system with Silancolor: other environmental indicators

System boundary		Upstream + core
Parameter	Unit	A1-A3
RPEE	MJ	1,96E+01
RPEM	MJ	-
TPE	MJ	1,96E+01
NRPE	MJ	3,02E+02
NRPM	MJ	-
TRPE	MJ	3,02E+02
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m ³	7,81E-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 18: **Mapetherm XPS** system with Silancolor: waste production & other output flows

System boundary		Upstream + core
Parameter	Unit	A1-A3
NHW	kg	8,85E-02
HW	kg	5,83E-03
RW	kg	3,85E-03
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

Table 19: **Mapetherm M.Wool** system with Quarzolite: Environmental categories

System boundary		Upstream + core	
Parameter	Unit	A1-A3	
 GWP₁₀₀	kg CO ₂ eq.	2,43E+01	
 ADP_e (element)	kg Sb eq.	6,57E-03	
 EP	kg (PO ₄) ³⁻ eq.	1,52E-02	
 AP	kg SO ₂ eq.	9,08E-02	
 POCP	kg ethylene eq.	5,96E-03	
 ODP	kg R-11 eq.	1,85E-06	
 ADP_f (fossil)	MJ	3,21E+02	

GWP₁₀₀: Global Warming Potential; **ADP_e**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADP_f**: Abiotic Depletion Potential (fossil)

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Table 20: **Mapetherm M.Wool** system with Quarzolite: other environmental indicators

System boundary		Upstream + core
Parameter	Unit	A1-A3
RPEE	MJ	2,03E+01
RPEM	MJ	-
TPE	MJ	2,03E+01
NRPE	MJ	3,76E+02
NRPM	MJ	-
TRPE	MJ	3,76E+02
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m ³	2,24E-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 21: **Mapetherm M.Wool** system with Quarzolite: waste production & other output flows

System boundary		Upstream + core
Parameter	Unit	A1-A3
NHW	kg	6,71E-02
HW	kg	1,79E-01
RW	kg	1,26E-02
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

Table 22: **Mapetherm M.Wool** system with Silancolor: Environmental categories

System boundary		Upstream + core	
Parameter	Unit	A1-A3	
 GWP₁₀₀	kg CO ₂ eq.	2,43E+01	
 ADP_e (element)	kg Sb eq.	6,29E-03	
 EP	kg (PO ₄) ³⁻ eq.	1,50E-02	
 AP	kg SO ₂ eq.	9,10E-02	
 POCP	kg ethylene eq.	5,97E-03	
 ODP	kg R-11 eq.	2,14E-06	
 ADP_f (fossil)	MJ	3,20E+02	

GWP₁₀₀: Global Warming Potential; **ADP_e**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADP_f**: Abiotic Depletion Potential (fossil)

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Table 23: **Mapetherm M.Wool** system with Silancolor: other environmental indicators

System boundary		Upstream + core
Parameter	Unit	A1-A3
RPEE	MJ	2,04E+01
RPEM	MJ	-
TPE	MJ	2,04E+01
NRPE	MJ	3,75E+02
NRPM	MJ	-
TRPE	MJ	3,75E+02
SM	kg	-
RSF	MJ	-
NRSF	MJ	-
W	m ³	2,41E-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 24: **Mapetherm M.Wool** system with Silancolor: waste production & other output flows

System boundary		Upstream + core
Parameter	Unit	A1-A3
NHW	kg	6,71E-02
HW	kg	1,79E-01
RW	kg	1,26E-02
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

Following plots show the impacts due to each single component of the systems.

Table 25: Environmental Impact as percentage – EPS system with Quarzolite / Silancolor

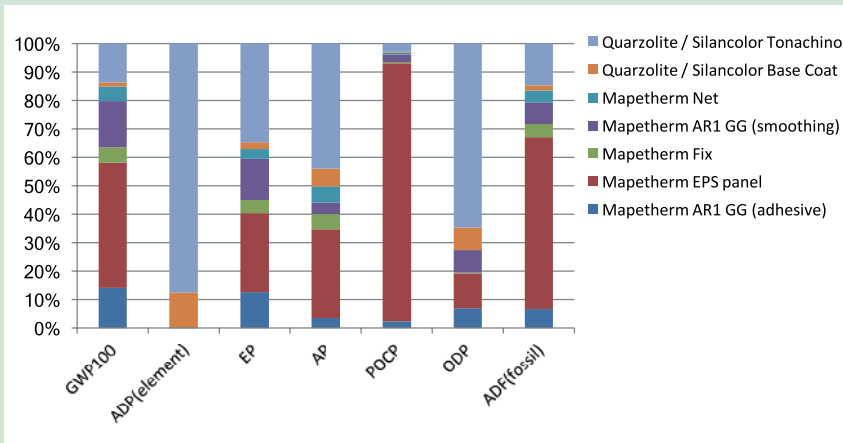
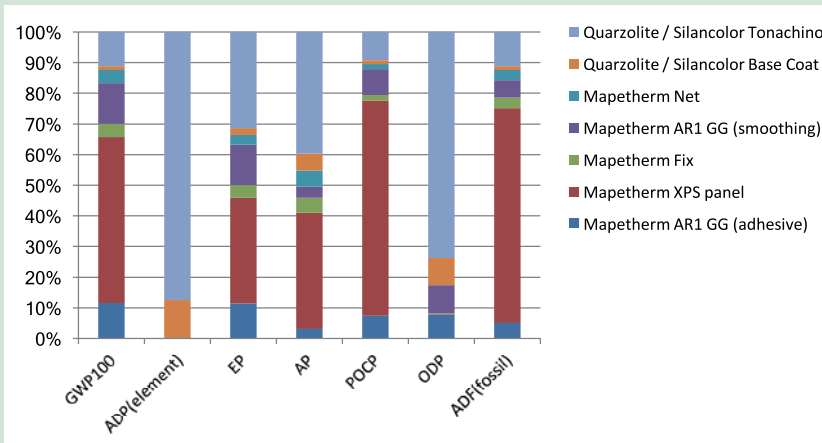


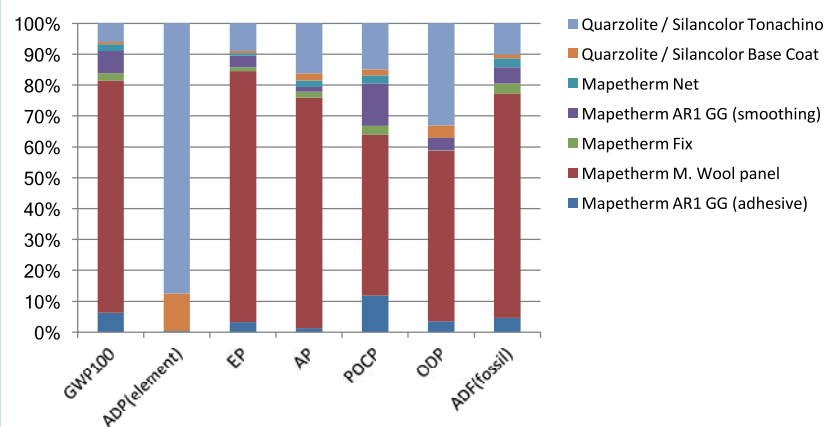
Table 26: Environmental Impact as percentage – XPS system with Quarzolite / Silancolor



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Table 27: Environmental Impact as percentage – MW system with Quarzolite / Silancolor



Negligible differences between Quarzolite and Silancolor systems can be detected for all environmental categories: all values reported in the tables above (tab. 7 – 24), show differences under 5%.

Calculated values clearly indicate that manufacturing process of thermal insulation panels gives an important contribution to all environmental categories specified in this EPD; the only exception is represented by ADPe since the formulations of Quarzolite and Silancolor give the only valuable impact.

Even if Mapetherm AR1 GG represents the product with the highest weight in the systems studied (from 68% to 87% - see tab. 1 - 3), it does not carry the highest contribution in the environmental categories; in fact, the emission factors of additives in the paints have higher values than those of the hydraulic binders and fillers contained in Mapetherm AR1 GG.

Other products included in the systems but not directly manufactured by Mapei, are technologically represented by generic datasets used in the model, but they don't have specific information about wastes produced (NHW, HW and RW – see tables above). Therefore some environmental indicators coming from suppliers / Association EPD, have been used to define wastes amount for panels.

Products directly manufactured by Mapei SpA, use specific electrical mix (Italian grid mix – 2012), as shown below (in terms of GWP_{100} excluded biogenic carbon):

Data source	Amount	Unit
GaBi (v6) database	0,468	kg CO ₂ -eqv/kWh

This value represents the average country specific electricity supply for final consumers, including electricity own consumption, transmission/distribution losses and electricity imports from neighbouring countries. The national energy carrier mixes used for electricity production, the power plant efficiency data, shares on direct to combined heat and power generation (CHP), as well as transmission/distribution losses and own consumption are taken from official statistics (International Energy Agency) for the corresponding reference year.

Also photovoltaic electricity in Mediglia plant has been used for the manufacturing process with the following emission factor (in terms of GWP₁₀₀ excluded biogenic carbon):

Data source	Amount	Unit
GaBi (v6) database	0,0314	kg CO ₂ -eqv/kWh

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8. DATA QUALITY

Table 28: Data quality

Dataset & Geographical reference	Database (source)	Temporary reference
A1-A3		
Grey Portland Cement (IT)	EPD S-P-00880	2016
Fillers (EU)	GaBi Database	2015
Additives, other components (EU)	GaBi Database	2012 – 2015
Mapetherm EPS panel (EU)	GaBi Database, EPD EUMEPS ECO-EPS-00020101-1106 (wastes)	2011 - 2015
Mapetherm XPS panel (EU)	GaBi Database, EPD-EXI-20140155-IBE1-EN (wastes)	2014 - 2015
Mapetherm M.Wool panel (EU)	GaBi Database; EPD EPD-GHI-2010312-D (wastes)	2010
EPDLA Life Cycle Inventory of Polymer Dispersions (EU)	EcoProfile EPDLA (Final Summary Report)	2015
Electricity grid mix (IT)	GaBi Database	2012
Electricity from photovoltaic (IT)	GaBi Database	2012
A2		
Truck transport with 27ton payload (GLO)	GaBi Database	2012
Ocean ship (27500 DWT-GLO)	GaBi Database	2015
Electricity grid mix (EU)	GaBi Database	2012
Diesel for transport (EU)	GaBi Database	2012
Heavy Fuel Oil (EU)	GaBi Database	2012

Considered data refer to a period between 2010 and 2016; the most relevant ones are European or specific from supplier or German, while the others (i.e. transport and minor contribution dataset), come from European or global databases.

All dataset are not more than 10 years old (according to EN 15804 § 6.3.7 “Data quality requirements”).

Dataset representing manufacturing processes for panels, has been chosen according several quality criteria, e.g. technologically, temporary, geographically representativeness and consistency.

Primary data are collected during 2015 and are representative for the entire annual production.

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.

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PCR:	PCR 2012:01 Construction products and Construction services, Version 2.01, 2016-03-09
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 rev14
Accredited or approved by:	Accredia

11. REFERENCES

- General Programme Instructions of the International EPD® System. Version 2.5.
- PCR 2012:01; “Product Group Classification: Multiple UN CPC Codes Construction Products and Construction Services”; Version 2.01
- EN 15804: Sustainability of Construction works, Environmental Product Declarations, Core Rules for the Product Category of Construction Products
- ETAG 004: “Guideline for European Technical Approval of External Thermal Insulation Composite Systems (ETICS) with rendering”
- ISO 14025: Environmental Labels and Declarations – Type III Environmental Declarations – Principles and Procedures

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