

MARCOTHERM

THERMAL COATING SYSTEM

Environmental Product Declaration

Marcotherm EPS, EPS Color, Rock, PU

Colorificio San Marco SpA



san marco
SISTEMI VERMICIANTI PER L'EDILIZIA



Construction products and cpc 54 construction services

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1. The company and the product

The Colorificio San Marco SpA has been working to quantify the environmental impact of some of its products in order to stimulate research for improving technical and environmental performance.

The Colorificio San Marco's objective is to make the entire colour supply chain more environmentally responsible, pursuing a transparency policy with regard to the environmental impact of its products.

In this context, Colorificio San Marco, which has already get the EPD in the International EPD System, for three products of the Greenspirit line, has decided to obtain the EPD certification also for the coating system Marcotherm.

The present LCA is in line with the International standards ISO 14040/14044, the PCR "Construction products and cpc 54 construction services" and the standard UNI EN 15804.

1.1 Colorificio San Marco SpA

The Colorificio San Marco is part of the San Marco Group which, with its 7 manufacturing facilities around the world and 6 brands, has become a leader in the paint and coatings sector for professional construction in Italy.

The Colorificio San Marco has a capillary distribution network throughout Italy that leads to highly specialized retail stores in Professional Application Centres that can offer high quality products and services to colour professionals.

Outside of Italy, the San Marco Group is present in more than 40 countries around the world, through specialized distributors. Thanks to a company policy that focuses on greater internationalization and continuous and significant investments in both production and Research & Development, the company's commercial and manufacturing structure is constantly expanding.



1.2 Mission

- To become one of the top industrial companies in Italy in the paint and coatings sector for professional construction in terms of market share, product quality and territorial coverage.
- To strengthen loyalty with Italian and foreign customers by offering a range of qualified services in terms of content and reliability, in order to guarantee the support needed for the selling of its products through the best partners operating in this segment.
- To be an important reference in the market in terms of business ethics and responsibility for collaborators, customers, suppliers and potential investors.
- To promote the culture of restoration construction in Europe and the value of the "Made in Italy" and "Made in Venice" brands throughout the world.

1.3 Environmental policy

Protecting the environment and respecting the workplace for operators are important aspects of the Colorificio San Marco's company policy. This is why the Colorificio San Marco is continuously trying to improve the quality of its products and its production cycles in order to reduce the overall environmental impact.

Colorificio San Marco was one of the first companies that offered water-based solutions for enamels and stains back in 1982 with the Unimarc Line and since then the pursuit has continued towards eliminating raw materials considered hazardous to humans and the environment from its formulations.

The Greenspirit line was developed in 2009: a selection of high-tech natural products for bioconstruction with low environmental impact.

In 2010 Colorificio San Marco has began using the LCA methodology, to understand the environmental performance of its products and to analyze their strengths and weaknesses. The holistic view of LCA convinced Colorificio San Marco to acquire internally skills on the methodology and its application, with the ambitious goal of leading the LCA analysis of all the main products.



The LCA studies conducted allow Colorificio San Marco to photograph, from an environmental point of view, their products and to take actions of eco-design, both through actions for the improvement of its processes, and through the involvement of the supply chain in a virtuous circle. Moreover, the application of LCA in 2011 has allowed San Marco to achieve the certification EPD or Environmental Product Declaration, for three products.

After using the LCA methodology for 4 years and having studied more than 40 products, Colorificio San Marco has created its own system of LCA calculation, reviewed by the certification body CSQA in March 2014.

The system of calculation LCA provides the standardization of a methodology for the collection and processing of data; it describes how to set the LCA studies, giving indications on fundamental assumptions, boundaries of the system under study, functional unit, the origin and the quality of data and the impact assessment methods. The calculation method LCA San Marco is the basis for the environmental declaration of San Marco products. The environmental declaration are environmental identity card for the products, describing the basic parameters of the study and the results, as well as other environmental information (LEED, VOC, etc.).

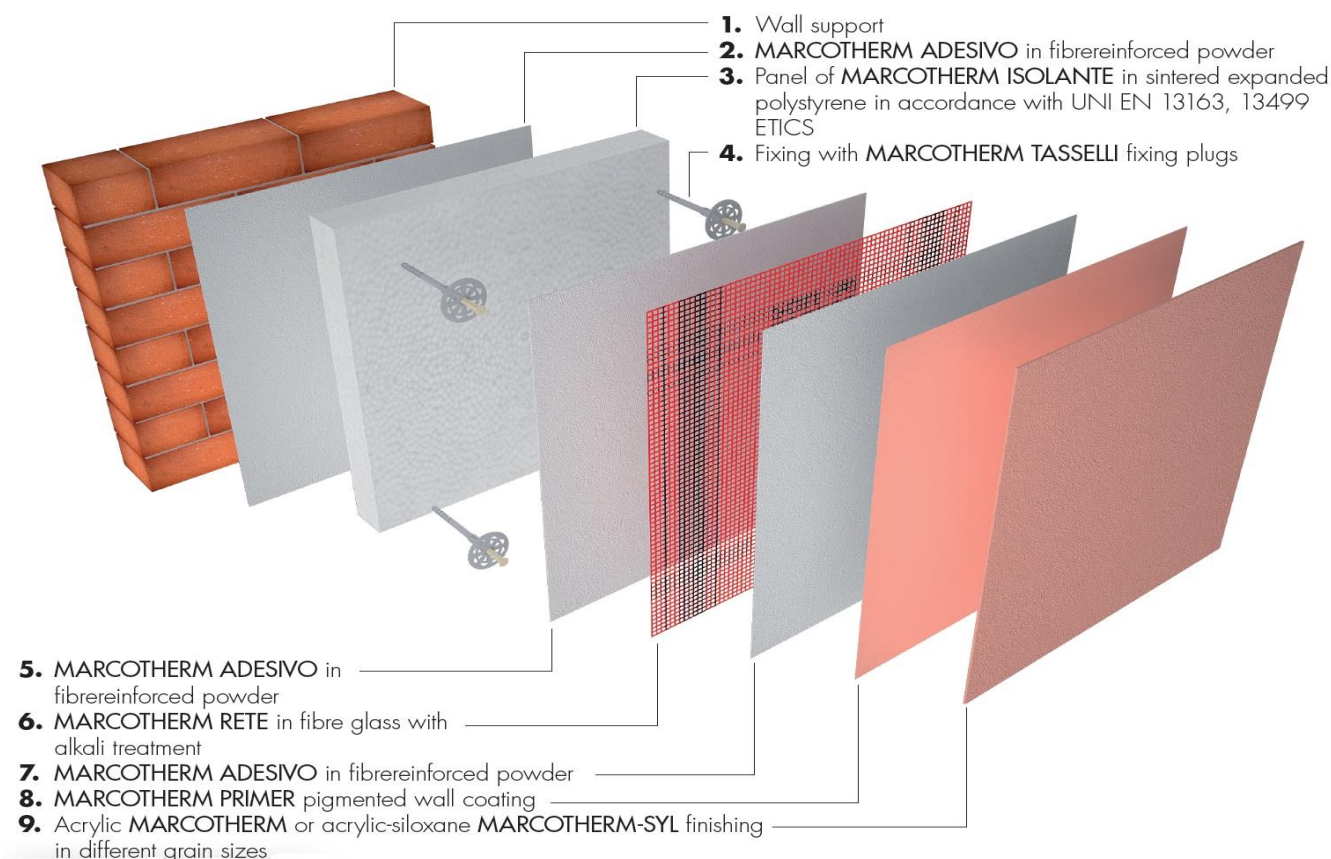
1.4 Product description

The object of this EPD is the thermal insulating coating system Marcotherm, available with the following insulation materials: EPS (expanded polystyrene insulating panel), EPS color (expanded polystyrene insulating panel with additives), Rock (rock wool insulating panel) and PU (polyurethane insulating panel).

As shown in Table 1,2,3,4 the Marcotherm system is composed of several elements. Colorificio San Marco produces the finishes (Marcotherm-Syl Intonachino, Marcotherm-Syl Rustico and Marcotherm Compact), the primer and the adhesive. Insulating materials and accessories are produced by suppliers.

The present EPD is representative for the Marcotherm system with finishes Marcotherm-Syl Rustico, Marcotherm-Syl Intonachino and Marcotherm Compact. In particular, the present document refers to the finishing with the major environmental impact (Marcotherm-Syl Rustico).

1.5 Marcotherm system components- stratigraphy



Marcotherm EPS system	Material	Weight (kg)	Weight (%)
Marcotherm Adesivo	Adhesive in powder	8,00	59,2%
Marcotherm Syl Rustico	Finishing	2,70	20,0%
EPS Panels	EPS	2,34	17,3%
Anchor TERMOZ CN 8 230	PP/ PA6+GF/Steel	0,17	1,3%
Mesh	Fibre glass	0,16	1,2%
Marcotherm Primer	Primer	0,13	1,0%
Total		13,50	100,0%

Table 1: Components weights of 1m² of Marcotherm system EPS.

Marcotherm EPS Color system	Material	Weight (kg)	Weight (%)
Marcotherm Adesivo	Adhesive in powder	8	60,1%
Marcotherm Syl Rustico	Finishing	2,7	20,3%
EPS Color panels	EPS with additives	2,15	16,2%
Anchor TERMOZ CN 8 210	PP/ PA6+GF/Steel	0,16	1,2%
Mesh	Fibre glass	0,16	1,2%
Marcotherm Primer	Primer	0,13	1,0%
Total		13,30	100,0%

Table 2: Components weights of 1m² of Marcotherm EPS Color.

Marcotherm Rock system	Material	Weight (kg)	Weight (%)
Rock panels	rock wool	14,04	51,5%
Marcotherm Adesivo GG	Adhesive in powder	10,00	36,7%
Marcotherm Syl Rustico	Finishing	2,70	9,9%
Anchor TERMOZ CN 8 230	PP/ PA6+GF/Acciaio	0,17	0,6%
Mesh	Fibre glass	0,16	0,6%
Marcotherm Primer	Primer	0,13	0,5%
Plate Fischer DT90	PP	0,05	0,2%
Total		27,24	100,0%

Table 3: Components weights of 1m² of Marcotherm Rock.

Marcotherm PU system	Material	Weight (kg)	Weight (%)
Marcotherm Adesivo GG	Adhesive in powder	10	58,4%
PUR panels	PUR	3,96	23,2%
Marcotherm Syl Rustico	Finishing	2,7	15,8%
Mesh	Fibre glass	0,16	0,9%
Anchor TERMOZ CN 8 190	PP/ PA6+GF/Acciaio	0,15	0,9%
Marcotherm Primer	Primer	0,13	0,8%
Total		17,10	100,0%

Table 4: Components weights of 1m² of Marcotherm PU.

2. Environmental Impact Declaration

2.1 Functional unit

The functional unit is 1 m² of thermal insulating coating system, which guarantees to the wall a thermal transmittance of 0,20 W/ m²K. The m² considered is a central portion of blind wall. The transmittance of 0,20 W/ m²K also includes the brick support (25 cm double UNI).

2.2 System boundaries

The present EPD is a declaration “from cradle to gate with options” (PCR 2012:01 v1.2). The system boundaries include the following life cycle stages: production of raw materials, their transport, manufacturing of semi-finished products, manufacturing of the coating system components and end of life. For a major completeness, the packaging of San Marco’s products and its disposal is included.

The following life cycle stages are excluded: distribution, installation of the coating system, use phase and demolition, because these phases are strongly characterized by the conditions in which the system is used. The brick wall, on which the coat is applied, is not included in system boundaries.

More specifically, the upstream processes for Colorificio San Marco manufacturing include: the raw materials used in San Marco’s products and their packaging, their transportation to suppliers and after to to Colorificio San Marco and the production of packaging. For the components of the coating system not produced by San Marco the following life cycle stages are included: raw materials, transport and production.

The following core processes are performed on the production plants (Core): production (through the use of a mechanical mixer for liquid products), internal handling with electric vehicles, washing operations, packaging with primary packaging materials, transport and storage on pallets, manufacturing scraps and their disposal. Transport of materials from suppliers to Colorificio San Marco, energy and water consumptions, direct emissions and waste treatment are included in the production process of the coating system.

The downstream processes include the waste treatment of all Marcotherm components and their of primary and tertiary packaging.

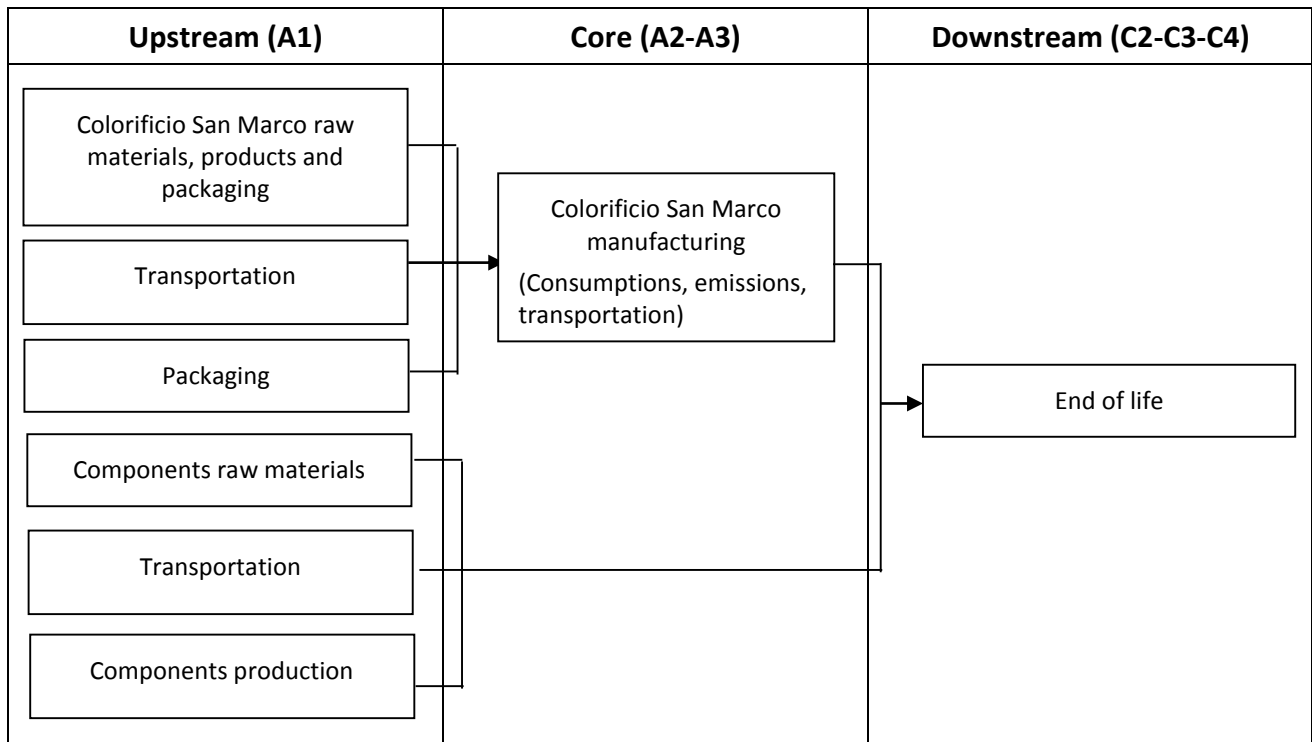


Figure 1: LCA System boundaries of Marcotherm.

2.3 Boundaries in time

Primary data come from Colorificio San Marco and refer to the year 2012. Secondary data come from the ecoinvent v3 database and cover the period between 2004 and 2013.

2.4 Geographical boundaries

The manufacturing sites are in Marcon, in Venice province in Italy and in Latisana, in Udine province. Since the components of the Marcotherm system are mainly produced, distributed and used in Italy, this study refers to the Italian situation. The end of life scenario for packaging materials refers to “Rapporto Rifiuti Urbani - Edizione 2013. Dati di sintesi”.

The most significant processes from the ecoinvent database have been modified to make them more representative of the Italian situation, for example, by changing the energy mix.

2.5 Boundaries in the Life Cycle

As given in the PCR for “Construction products and CPC 54 construction services”, the following processes are excluded from the LCA: the construction of company buildings; the production of manufacturing equipment and other capital goods; personnel activities. The contribution of infrastructures has not been excluded from the processes of the ecoinvent database that originally contained them. Inside the EPD all components of the Marcotherm system have been evaluated.

2.6 Boundaries to nature and other systems

Emissions to air, treatment of wastewater and waste, from the production process, and their transport were included in the LCA. The CO₂ credits in the renewable raw materials (wood, paper) were excluded from the LCA.

2.7 Allocation rules

The raw materials and manufacturing processes are included in the virgin resources. No allocation is made for the materials that can be recycled. The recycling process is included for the input of the recycled resources. The outputs subject to recycling are considered inputs for the next life cycle. For the processes subject to close-loop, such as pallets, costs and benefits of the recovery process have been allocated to the life cycle of the system Marcotherm.

The allocation based on mass criteria was applied to the consumption of energy and water in the production plants of San Marco in Marcon (VE) and Eurobeton in Latisana (UD).

3. Data quality

Primary data have been used for fundamental aspects of the product life cycle, such as consumptions in production plants of San Marco and weight of the main components of the Marcotherm system (insulation material, San Marco products) as well as the composition of the products of Colorificio San Marco.

The thicknesses of the insulating materials correspond to a transmittance of 0.20 W/m²K. In some cases, calculated thicknesses are not available on the market. Nevertheless, it is preferred to maintain the calculated thicknesses.

For the data collection and LCA calculations, the methodology described in the manual “LCA calculation method San Marco” was used. Since some of the chemicals are not available in the LCA database, some assumptions have been made. Table 5 shows the materials with the most significant contribution to the environmental performance of the Marcotherm system.

Raw material	Substance from database	Amount (%)
CW02E	<i>Cement, Portland {Europe without Switzerland} production Alloc Def, S</i>	100%
CW03E	<i>Cement, Portland {Europe without Switzerland} production Alloc Def, S</i>	94%
	<i>Limestone, crushed, for mill {IT} production Alloc Def, CSM S</i>	6%
		100%
EA50	<i>Butyl acrylate {RER} production Alloc Def, S</i>	29%
	<i>Styrene {RER} production Alloc Def, S</i>	21%
	<i>Water, deionised, from tap water, at user {CH} production Alloc Def, S</i>	50%
		100%
EP10	<i>Ethylene vinyl acetate copolymer {RER} production Alloc Def, S</i>	100%
PB10	<i>Titanium dioxide {RER} production, chloride process Alloc Def, S</i>	100%

Table 5: Assumptions made for the some main materials used by San Marco.

For all the components of the Marcotherm system a disposal in landfill has been considered. It involves a transportation distance equal to 10 km.

The waste scenario of the primary packaging refers to the percentages derived from the “Rapporto Rifiuti Urbani - Edizione 2013”. Tertiary packaging disposal scenario considers that most pallets used by San Marco are reused; the remaining part follows the same waste scenario as the primary packaging.

Representative literature data (EPD) are used to describe weight and composition of some insulation system components (net and anchors). In particular published EPD are supplied by insulation and accessory suppliers.

For all processes for which primary data were not available or representative, the LCA database ecoinvent v3, allocation default was used. Some processes of the database have been modified in order to make them more representative to the Italian situation, for example by changing the energy mix.

In agreement with the PCR, the environmental impact associated with secondary data do not exceed 10% of the overall environmental impact related to the life cycle of the product.

The electrical energy mix used by the production plant in Latisana (UD) is based on the Italian electric mix coming from the ecoinvent v3 database (98.2%) and photovoltaic panels installed by the company (1.8%).

4. Environmental indicators

The following Tables report the environmental indicators for the life cycle of 1 m² of Marcotherm EPS, Marcotherm EPS Color, Marcotherm Rock e Marcotherm PU.

The environmental indicators are composed of 6 impact categories (global warming, ozone layer depletion, acidification, photochemical oxidation, eutrophication, abiotic depletion (kg and MJ), consumption of resources (renewable and non-renewable), fossil fuels from secondary sources, recycled materials, water consumption and waste production (hazardous and non-hazardous waste).

The environmental indicators represent the environmental impact for the life cycle of 1 m² of thermal insulating coating system Marcotherm. The indicators are divided into the contribution of upstream, core and downstream processes. In the downstream processes, the negative value for the abiotic depletion is caused by the pallet reuse by San Marco.

1 m ² Marcotherm EPS		Unit	Total	Upstream (A1)	Core (A2-A3)	Downstream (C2-C3-C4)
Impact categories	Global Warming	kg CO ₂ eq	18.6	17.3	0.7	0.6
	Ozone layer depletion	mg CFC-11 eq	0.72	0.65	0.06	0.01
	Acidification	kg SO ₂ eq	3.27	3.27	0.00	0.00
	Eutrophication	kg PO ₄ ³⁻ eq	0.05	0.02	0.00	0.03
	Photochemical oxidation	kg C ₂ H ₄ eq	0.16	0.16	0.00	0.00
	Abiotic depletion	mg Sb eq	29.4	28.1	1.4	-0.1
	Abiotic depletion	MJ	328	315	11	2
Consumption of resources	Consumption of renewable resources	MJ	0.04	0.04	0.00	0.00
	Consumption of energy resources renewable as raw materials	MJ	-	-	-	-
	Total consumption of energy renewable resources	MJ	0.04	0.04	0.00	0.00
	Consumption of energy non-renewable resources	MJ	359	345	12	2
	Consumption of energy resources non-renewable as raw materials	MJ	-	-	-	-
	Total consumption of energy non-renewable resources	MJ	359	345	12	2
	Consumption of secondary material	kg	0.00	0.00	0.00	0.00
	Consumption of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00
	Use of net fresh water (Blue virtual water)	m ³	0.08	0.08	0.00	0.00
Waste	Non-hazardous waste	kg	14.3	0.7	0.2	13.4
	Hazardous waste	kg	0.03	0.03	0.00	0.00
	Radioactive waste	kg	0.00	0.00	0.00	0.00

Table 6: Environmental impacts of 1 m² of Marcotherm EPS.
 Life cycle stages not included: A4-A5-B1-B2-B3-B4-B5-D.

1 m ² Marcotherm EPS Color		Unit	Total	Upstream (A1)	Core (A2-A3)	Downstream (C2-C3-C4)
Impact categories	Global Warming	kg CO ₂ eq	17.4	16.1	0.7	0.6
	Ozone layer depletion	mg CFC-11 eq	0.73	0.66	0.06	0.01
	Acidification	kg SO ₂ eq	3.27	3.27	0.00	0.00
	Eutrophication	kg PO ₄ ³⁻ eq	0.05	0.02	0.00	0.03
	Photochemical oxidation	kg C ₂ H ₄ eq	0.16	0.16	0.00	0.00
	Abiotic depletion	mg Sb eq	29	27.7	1.4	-0.1
	Abiotic depletion	MJ	304	291	11	2
Consumption of resources	Consumption of renewable resources	MJ	0.04	0.04	0.00	0.00
	Consumption of energy resources renewable as raw materials	MJ	-	-	-	-
	Total consumption of energy renewable resources	MJ	0.04	0.04	0.00	0.00
	Consumption of energy non-renewable resources	MJ	333	319	12	2
	Consumption of energy resources non-renewable as raw materials	MJ	-	-	-	-
	Total consumption of energy non-renewable resources	MJ	333	319	12	2
	Consumption of secondary material	kg	0.00	0.00	0.00	0.00
	Consumption of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00
	Use of net fresh water (Blue virtual water)	m ³	0.08	0.08	0.00	0.00
	Waste	Non-hazardous waste	kg	14.1	0.7	0.2
Hazardous waste		kg	0.03	0.03	0.00	0.00
Radioactive waste		kg	0.00	0.00	0.00	0.00

Table 7: Environmental impacts of 1 m² of Marcotherm EPS Color.

Life cycle stages not included: A4-A5-B1-B2-B3-B4-B5-D.

1 m ² Marcotherm Rock		Unit	Total	Upstream (A1)	Core (A2-A3)	Downstream (C2-C3-C4)
Impact categories	Global Warming	kg CO ₂ eq	31.1	29.8	0.8	0.5
	Ozone layer depletion	mg CFC-11 eq	1.43	1.34	0.07	0.02
	Acidification	kg SO ₂ eq	3.41	3.41	0.00	0.00
	Eutrophication	kg PO ₄ ³⁻ eq	0.06	0.05	0.00	0.01
	Photochemical oxidation	kg C ₂ H ₄ eq	0.17	0.17	0.00	0.00
	Abiotic depletion	mg Sb eq	68.8	67.2	1.6	0.0
	Abiotic depletion	MJ	436	420	12	4
Consumption of resources	Consumption of renewable resources	MJ	0.04	0.04	0.00	0.00
	Consumption of energy resources renewable as raw materials	MJ	-	-	-	-
	Total consumption of energy renewable resources	MJ	0.04	0.04	0.00	0.00
	Consumption of energy non-renewable resources	MJ	419	401	13	5
	Consumption of energy resources non-renewable as raw materials	MJ	-	-	-	-
	Total consumption of energy non-renewable resources	MJ	419	401	13	5
	Consumption of secondary material	kg	0.00	0.00	0.00	0.00
	Consumption of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00
	Use of net fresh water (Blue virtual water)	m ³	0.24	0.23	0.00	0.01
	Waste	Non-hazardous waste	kg	14.2	0.9	0.2
Hazardous waste		kg	0.07	0.07	0.00	0.00
Radioactive waste		kg	0.00	0.00	0.00	0.00

Table 8: Environmental impacts of 1 m² of Marcotherm Rock.
 Life cycle stages not included: A4-A5-B1-B2-B3-B4-B5-D.

1 m ² Marcotherm PU		Unit	Total	Upstream (A1)	Core (A2-A3)	Downstream (C2-C3-C4)
Impact categories	Global Warming	kg CO ₂ eq	25.0	23.5	0.8	0.7
	Ozone layer depletion	mg CFC-11 eq	0.67	0.58	0.07	0.02
	Acidification	kg SO ₂ eq	3.31	3.31	0.00	0.00
	Eutrophication	kg PO ₄ ³⁻ eq	0.09	0.03	0.00	0.06
	Photochemical oxidation	kg C ₂ H ₄ eq	0.16	0.16	0.00	0.00
	Abiotic depletion	mg Sb eq	44.1	42.6	1.6	-0.1
	Abiotic depletion	MJ	443	428	12	3
Consumption of resources	Consumption of renewable resources	MJ	0.04	0.04	0.00	0.00
	Consumption of energy resources renewable as raw materials	MJ	-	-	-	-
	Total consumption of energy renewable resources	MJ	0.04	0.04	0.00	0.00
	Consumption of energy non-renewable resources	MJ	500	484	13	3
	Consumption of energy resources non-renewable as raw materials	MJ	-	-	-	-
	Total consumption of energy non-renewable resources	MJ	500	484	13	3
	Consumption of secondary material	kg	0.00	0.00	0.00	0.00
	Consumption of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00
	Use of net fresh water (Blue virtual water)	m ³	0.34	0.34	0.00	0.00
	Waste	Non-hazardous waste	kg	18.1	0.9	0.2
Hazardous waste		kg	0.04	0.04	0.00	0.00
Radioactive waste		kg	0.00	0.00	0.00	0.00

Table 9: Environmental impacts of 1 m² of Marcotherm PU.
 Life cycle stages not included: A4-A5-B1-B2-B3-B4-B5-D.

5. Information about the company and the certifying body

5.1 Colorificio San Marco SpA contact information

The Life Cycle Assessment (LCA) study and this EPD were created by the Product Safety Department of Colorificio San Marco SpA, in collaboration 2B Srl (www.to-be.it). The company references are:

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5.2 Verification and registration

Programme EPD:	The International EPD System. Further information: www.environdec.com
Registration N°:	S-P-00668
Date of publication:	16 jan 2015
Document valid until:	14 jan 2018
EPD valid in the geographical area:	Global
PCR of reference:	PCR 2012:01, version 1.2
PCR Revision conducted by::	The Technical Committee of the International EPD® System info@environdec.com
Certification body:	Independent verification of the declaration and data, according to ISO 14025:2006 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External Third party verifier: CSQA Certificazioni Srl Via San Gaetano n. 74, 36016 Thiene (VI) Tel: 0445-313011 – Fax: 0445313070 www.csqa.it Certification body accredited by: Accredia (004H)

5.3 Other information

This EPD and the reference PCR (PCR 2012:01 v1.2 “Construction products and CPC 54 construction services”) are available on the website of the International EPD® System (www.environdec.com).

It is specified that it is not pertinent, in the case under study, the use of PCR relating to "Insulation materials" and, therefore, of the related functional unit. Those PCR define the category in this way: *“The product category referred to in this PCR includes all thermal insulation products (e.g. panels, slabs, bulk materials, etc.) for building purposes (e.g. in floor, roof, ceiling, walls, etc.)”*

Despite the apparent affinity, in the specific case, an entire product system is considered. It consists, as well as the insulating materials, also of other elements such as adhesive, network, anchors and finishing; that is a set of components with structural, decorative and protective functions as well as insulating.

Comparisons between EPDs for paints shall be done carefully, because of the possible variations in system boundaries and the data sources used. Therefore EPDs belonging to the same product category but originating from different EDP programmes may not be comparable.

In particular, EPD that do not meet the comparability requirements set in the standard EN 15804, are not comparable.

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