



ENVIRONMENTAL PRODUCT DECLARATION

Marble-resin slabs and tiles

ARTIC WHITE; BEIGE LUNA; BALTIC
GREY; BIANCO ISLANDA; BOTTICINO;
BRECCIA AURORA; BRECCIA
ONICIATA; CALACATTA; CARRARA
MICRO; CRYSTAL WHITE; FIOR DI
PESCO; GIALLO REALE; GRIGIO
CARNICO; GRIGIO LONDRA; GRIGIO
TORUN; MISTY WHITE; NERO
PORTORO; NORDIC BLACK; NEW
MARFIL; OLYMPO; PERLATO ROYAL;
RASOTICA; ROSA DEL GARDA; ROSSO
ASIAGO; VENUS; VERDE ALPI; WHITE
ICEBERG; WHITE PEARL

Via Prealpi, 21, 37023 Grezzana (VR), Italy
Via dell'Artigianato 1, 37023 Grezzana (VR),
Italy

In accordance with ISO 14025 and EN15804+A2:2019/AC:2021

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Marble-resin slab

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GENERAL INFORMATION

EPD OWNER

Name of the company	Marmi Scala srl
Registered office	Via Prealpi, 21, 37023, Grezzana (VR)
Contacts for information on the EPD	Manuel Comerlati, manuel@marmiscala.com

PROGRAM OPERATOR

EPDIItaly	Via Gaetano De Castillia n° 10 - 20124 Milano, Italy
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INFORMATION ON THE EPD

EPD type	Average product EPD
Product name (s)	Marble-resin slabs ARTIC WHITE; BEIGE LUNA; BALTIC GREY; BIANCO ISLANDA; BOTTICINO; BRECCIA AURORA; BRECCIA ONICIATA; CALACATTA; CARRARA MICRO; CRYSTAL WHITE; FIOR DI PESCO; GIALLO REALE; GRIGIO CARNICO; GRIGIO LONDRA; GRIGIO TORUN; MISTY WHITE; NERO PORTORO; NORDIC BLACK; NEW MARFIL; OLYMPO; PERLATO ROYAL; RASOTICA; ROSA DEL GARDA; ROSSO ASIAGO; VENUS; VERDE ALPI; WHITE ICEBERG; WHITE PEARL
Site (s)	Via Prealpi, 21, 37023, Grezzana (VR) Via dell'Artigianato 1, 37023 Grezzana (VR)
Short description and technical information of the product (s)	Marble resin made of marble sands and gravel with resin as a binder
Field of application of the product (s)	Construction
Product (s) reference standards (if any)	EN 15285 (marble-resin)
CPC Code (number) https://unstats.un.org/unsd/classifications/Econ	3754– Tiles, flagstones, bricks and similar articles, of cement, concrete or artificial stone

VERIFICATION INFORMATION

PCR (title, version, date of publication or update)	PCR ICMQ-001/15 rev3.2 03/11/2025
EPDIItaly Regulation (version, date of publication or update)	Regolamento EPD Italy Regulation v7.1 of 05/09/2025

Project Report LCA	LCA report of Marmi Scala (ver. 2, 14/11/2025)
LCA study carried out by:	Eco-Loop SRL SB, Viale del Lavoro, 2 - 37023 Grezzana, VR
Independent Verification Statement	Independent verification of the declaration and data, carried out according to ISO 14025: 2010. <input type="checkbox"/> Internal x External Third party verification carried out by: ICMQ S.p.A., via Gaetano De Castilia n ° 10 - 20124 Milan, Italy. Accredited by Accredia.
Comparability Statement	Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply EN15804+A2:2019/AC:2021.
Liability Statement	The EPD Owner releases EPDIItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence. EPDIItaly disclaims any responsibility for the information, data and results provided by the EPD Owner for life cycle assessment.

OTHER INFORMATION	

THE COMPANY, MARMISCALA SRL

Founded in 1963 in Verona, Italy, Marmi Scala is a leading company specialized in natural marble processing and agglomerated marble production. The company has grown significantly, now operating across a 40,000-square-meter facility. They exclusively work with resin- and cement-based marble blocks. Marmi Scala's strength lies in its advanced technology, including marble cutting frames, polishing lines, and custom processing equipment. The company maintains an efficient semi-finished products warehouse and offers comprehensive marble processing capabilities, positioning itself as a key player in the Italian marble industry.



PRODUCTS DESCRIPTIONS

GENERAL DESCRIPTION

This EPD refers to 1 kg of resin-based marble aggregate as reference average product of Marmi Scala Srl among different product compositions.

THE MARBLE-RESIN SLABS

Resin marble is obtained by mixing marble flakes selected for colour, size and resin. The agglomerate is chromatically homogeneous and has a competitive price: this is why it is ideal for large projects that can be made in special colours by the designer.



PRODUCTS CLUSTER

This EPD is an average product EPD, based on the definition of a reference average product defined on the variability of a pool of twenty eight (28) commercial products manufactured during the 2023 at Marmi Scala. The potential environmental impacts reported in this EPD are hence valid for all these products.

Commercial products
ARTIC WHITE
BEIGE LUNA
BALTIC GREY

BIANCO ISLANDA
BOTTICINO
BRECCIA AURORA
BRECCIA ONICIATA
CALACATTA
CARRARA MICRO
CRYSTAL WHITE
FIOR DI PESCO
GIALLO REALE
GRIGIO CARNICO
GRIGIO LONDRA
GRIGIO TORUN
MISTY WHITE
NERO PORTORO
NEW MARFIL
NORDIC BLACK
OLYMPO
PERLATO ROYAL
RASOTICA
ROSA DEL GARDA
ROSSO ASIAGO
VENUS
VERDE ALPI
WHITE ICEBERG
WHITE PEARL

From block manufacturing, different product types and sizes can be obtained: tiles, and custom-size pieces (60x60 cm, 40x40 cm, 30x30 cm, 60x30 cm, 7x1 cm), with thicknesses of 1.2 cm, 2 cm, 3 cm, and 4 cm. All these products are available with different finishing processes: sandblasting, brushing, honing and polishing.

PRODUCT TECHNICAL FEATURES

RESIN MARBLE

Characteristics	Norma	UM	Amount
Density	EN 14617-1:2005	kg/dm ³	2.40 – 2.60
Water absorption	EN 14617-1:2005	% (Volume)	< 0.2
Bending resistance	EN 14617-2:2008	MPa	11.5 – 24.6

Compression resistance	EN 14671-15	MPa	90 – 120
Abrasion resistance	EN 14617-4:2012	mm	34.5 – 36
Linear Thermal Expansion Coefficient	EN 14617-11:2005	m/m°C	14 – 24 x 10 ⁻⁶
Slip resistance	EN 14321:2004	PTV dry	41 – 49
		PTV wet	4 – 8
Fire behavior	EN 13501-1	-	A2 fl S1
Impact resistance	EN 14617-9:2005	W (J)	1-2
Chemical resistance	EN 14617-10:2012	Class	C1
Dimensional Stability	EN 14617-12:2012	Class	A

PRODUCTS' COMPOSITION

The products family of resin marble are composed by the following ingredients, mixed at different percentages depending on the product commercial name.

Marble resin
Marble filler and powder <1mm
Marble aggregate 1-8mm
Pigments
Resin
Additives

PRODUCT PACKAGING

The products leaving Marmi Scala are packaged to be transported to the construction site. The products are loaded into wooden boxes, wrapped in polyethylene film.

MANUFACTURING PROCESS

The slabs are manufactured via a cold working at the Marmi Scala Srl factories located at Grezzana, in the province of Verona (Italy). For both sites the block manufacturing process occurs while cutting, polishing and packaging occurs only in the site of Via Prealpi, 21.

The process starts with the preparation of the mixture, based on different ingredients depending on the two different families. Such mixture is then operated and dried in the formworks to realise the blocks, which are aged until they are ready for the cut to obtain the boards or slabs. Once obtained, the slabs are polished, cut and packed for the transport.

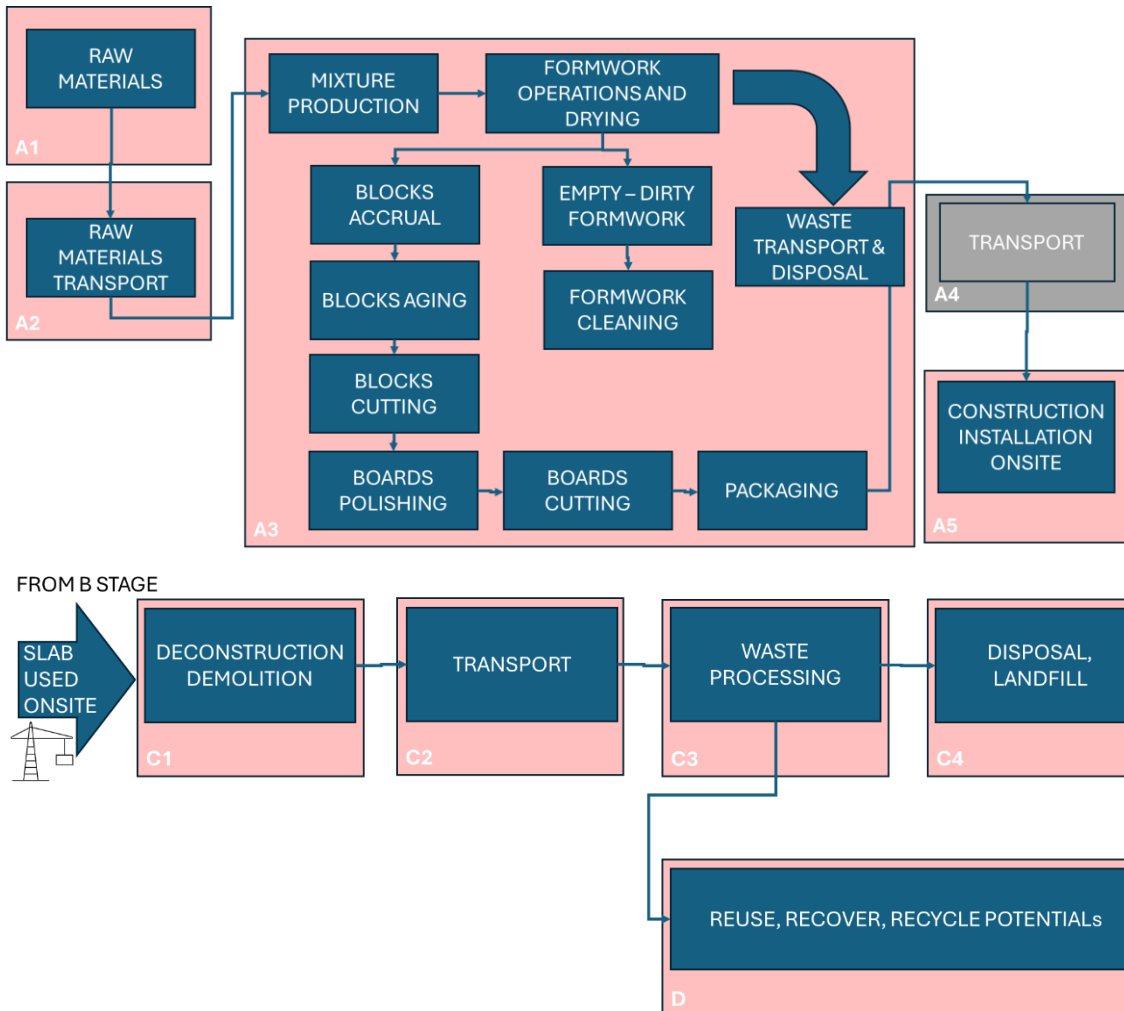


Figure 1: Flow chart of the Marmi Scala Srl production processes and the EPD Life Cycle stages.

CALCULATION RULES

DECLARED UNIT

1 kg of an average marble-resin slab, with possible different thicknesses and sizes.

SYSTEM BOUNDARIES

In compliance with the reference PCR, operations relating to the production, transport and installation of capital goods (machinery, packaging for internal transport) and

general operations (staff travel, marketing and communication actions) are since then excluded from the boundaries of the system and are not directly related to the product studied.

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
	Raw material supply	Transport	Production	Transport from the gate to the site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	
MODULE	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	ND	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
	mdt	mdt	mdt	opt	opt	opt	opt	opt	opt	opt	opt	opt	mdt	mdt	mdt	mdt	mdt

ND=Not Declared; mdt=Mandatory; opt=Optional

TIME AND SPATIAL DEFINITION

The production site is in two factories, located in Grezzana, in the province of Verona (Italy). The raw materials come mainly from northern Italy.

The data used to calculate the environmental impacts refers to the reference year 2023.

The geographical area considered for the end of life scenario is Italy and Europe.

CUT-OFF RULES

The cut-off rules followed in the study comply with the provisions of EN15804+A2:2019/AC:2021 and PCR Construction Products 2019:14 (version 1.11).

Specifically, all activities that do not significantly influence the life cycle of the products as reported below are excluded from the system boundary and from this LCA study.

- Office and commercial activities (administration, R&D/design, procurement, etc.) relating to the production plants;
- Workers' travel to and from the workplace;
- Cleaning activities;

- Construction and extraordinary maintenance activities of machinery and plants (as they are not directly related to the product).

Moreover, the following flows have been neglected because of a very low value in mass per declared unit. However the raw materials in recipes with a mass below 1% have been included in the study because of their potential impacts (pigments, additives)

- Paper bags used for the pigment transportation (with a mass lower than 0.0001% of the final product mass).
- Iron block for the final product packaging (with a mass lower than 0.001% of the final product mass)

DATA SOURCE AND QUALITY

This EPD is based on the following primary data in terms of amounts: the consumption of raw materials, the origin of the raw materials, transportation to the production site, consumption of water and electricity for the production phase, product packaging and waste. Some amounts related to the end of waste scenarios, for example, have been estimated from literature.

The characterisation factors of the most of the flows have been taken from Ecoinvent 3.10 database.

The GWP of the electricity mix applied for A1 is equal to 0.64912 kgCO₂eq/kWh, as per a medium voltage residual mix (Italy). This is in accordance with the “market-based” approach, adopted for this study. Background data refers to the consumption mix.

The GWP of the natural gas mixture applied for A1 is equal to 0.0752 kgCO₂eq/MJ.

The general quality level of the data used for this study is reported in the table below, in compliance with EN 15941:2024 Annex C, Example 4 for the geographical, technological and temporal representativeness for the primary data provided by the company and for the generic data selected in the EcoInvent 3.10 database.

Topic	Description
Data collection	January 2023 – December2023
Sites used	The production occurs in two different sites located in Grezzana (Verona).
Geography	The Marmiscala production is in a unique geographical context. The main raw materials suppliers are from the northern and central part of Italy. The final products are commercialised all over Europe and world wide. The production and final packaging wastes data have been split in different scenarios based on Italian and European statistics. The final product end-of-life has been assumed occurring in Italy.
Technology	The marble-resin slabs are obtained by mixing marble aggregates, resin, additives and pigments. All inventory data are very well representing the company technological approach.
Averaging	The average recipe has been obtained based on the 2023 production registries.

	The electricity consumption for manufacturing has been allocated based on a mass criteria of the overall energy consumption sourced from the national grid during the year 2023 for both production sites.
LCI dataset	Calculated based on the company management system available data for the year 2023
LCA database	Ecoinvent 3.10
EPD used	The following materials input flows have been accounted for based on their EPD; (i) pigments (Codes: EPD-IES-0025251:001, EPD-IES-0017014:004, EPD-IES-0017015:005, EPD-LAN-20230193-IBC1-EN).
CFP used	The following materials GWP input flows have been accounted for based on their CFP; (i) resin from one specific supplier (Code 24P001002)
Data quality scheme	EN 15804:2012+A2:2019, Annex E, Table E.1
Use of Fair data with more than 30 % of a core impact	The main impact in terms of GWPT originates from modules A1–A3, for which only very good data were used. Among the relevant data, there are no fair, poor or very poor ratings associated with contributions above 30%. For the A5, C1–C4 scenarios, the wastes scenarios have good geographical and technical representativeness, while still a very good one.
Use of Poor relevant data	
Use of Very Poor relevant data	

The evaluation of the relevant data, all included in A1, in terms of data quality is reported in the following table, in compliance with EN15804:2012+A2:2019, Annex E, Table E.1.

LC Stages	Relevant flows	Representativeness			Sources	Share of GWPT on A1-A3
		Geographical	Technological	Temporal		
A1	Resin with primary data	<p>Foreground data: very good, data is site specific.</p> <p>Background data: good, data related to Europe.</p>	<p>Foreground data: very good, inventories data specific for the technologies in place.</p> <p>Background data: very good, identical or very similar technological process</p>	<p>Foreground data: very good, data from the reference year</p> <p>Background data: good, less than six years from the publication of the data (ref. year: 1995–2022 for Ecoinvent v3.10, 2023 for CFP)</p>	<p>Type: CFP</p> <p>Source: CFP Report compliant with ISO 14067</p> <p>Type: Database</p> <p>Source: Ecoinvent v3.10</p>	43.71%
	Resin	<p>Foreground data: very good, data is site specific.</p> <p>Background data: good, data related to Europe.</p>	<p>Foreground data: very good, inventories data specific for the technologies in place.</p> <p>Background data: very good, identical or very similar</p>	<p>Foreground data: very good, data from the reference year</p> <p>Background data: good, less than six years from the publication of the data (ref. year: 1995–2022)</p>	<p>Type: Database</p> <p>Source: Ecoinvent v3.10</p>	35.73%

			technological process			
	Transportation	<p>Foreground data: very good, data is site specific.</p> <p>Background data: good, data related to Europe.</p>	<p>Foreground data: very good, inventories data specific for the technologies in place.</p> <p>Background data: very good, identical or very similar technological process</p>	<p>Foreground data: very good, data from the reference year</p> <p>Background data: good, less than six years from the publication of the data (ref. year: 2012-2022)</p>	<p>Type: Database</p> <p>Source: Ecoinvent v3.10</p>	9.77%
D	Pallet avoided material	<p>Foreground data: good, data related to Europe.</p> <p>Background data: good, data related to Europe.</p>	<p>Foreground data: good, inventories similar for the technologies in place.</p> <p>Background data: good, similar technological process.</p>	<p>Foreground data: very good, data from the reference year</p> <p>Background data: good, less than six years from the publication of the data (ref. year: 2019-2022)</p>	<p>Type: Database</p> <p>Source: Ecoinvent v3.10</p>	-
	Gravel avoided material	<p>Foreground data: good, data related to Europe.</p> <p>Background data: good, data related to Switzerland.</p>	<p>Foreground data: good, inventories similar for the technologies in place.</p> <p>Background data: good, similar technological process.</p>	<p>Foreground data: very good, data from the reference year</p> <p>Background data: good, less than six years from the publication of the data (ref. year: 2011-2022)</p>	<p>Type: Database</p> <p>Source: Ecoinvent v3.10</p>	-
	PE production	<p>Foreground data: good, data related to Europe.</p> <p>Background data: good, data related to Europe.</p>	<p>Foreground data: good, inventories similar for the technologies in place.</p> <p>Background data: good, similar technological process.</p>	<p>Foreground data: very good, data from the reference year</p> <p>Background data: good, less than six years from the publication of the data (ref. year: 2010-2023)</p>	<p>Type: Database</p> <p>Source: Ecoinvent v3.10</p>	-
	PE avoided material	<p>Foreground data: good, data related to Europe.</p> <p>Background data: good, data</p>	<p>Foreground data: good, inventories similar for the technologies in place.</p> <p>Background data: good, similar</p>	<p>Foreground data: very good, data from the reference year</p> <p>Background data: good, less than six years from the</p>	<p>Type: Database</p> <p>Source: Ecoinvent v3.10</p>	-

		related to Europe.	technological process.	publication of the data (ref. year: 2010-2023)		
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The representativeness of the data quality is based on EN 15804, Annex E, table E.1

Quality	Geographical Representativeness	Technological Representativeness	Temporal Representativeness
Very good	Data and processes from the area of the study.	Inventories data and processes identical of the technologies in place.	Less than three years from the publication of the data.
Good	Average data and processes from wider area (Europe and Switzerland).	Inventories data and processes similar of the technologies in place.	Less than six years from the publication of the data
Fair	Data and processes from similar production conditions	Inventories data and processes refers to general technologies in place.	Less than ten years from the publication of the data
Poor	Data and processes from slightly different production conditions	Inventories data and processes refers to correlated technologies in place.	Less than fifteen years from the publication of the data
Very poor	Data and processes from different or unknown production conditions	Inventories data and processes refers to diverse scale or technologies in place.	More than fifteen years from the publication of the data

ALLOCATION

For generic data (databases), the existing allocations were maintained.

For specific data, the mass allocation criterion was used based on the total annual production of Marmi Scala reference products compared to the annual production of all products. This was applied for the following categories:

- waste production of the company;
- waste of final products and related packaging recycling scenarios based on literature data;
- consumption of energy carriers (electricity) and water;
- consumption of diesel for internal transport.

DATA ACCURACY AND COMPLETENESS

To ensure the required accuracy and consistency, this study used primary information provided directly by the company for the product manufacturing data conducted itself. This is in line with what is indicated by the reference standard EN15804+A2:2019/AC:2021, which requires that specific data be used at least for the processes over which the

manufacturer exercises direct control. The primary data collected were completed with data from the literature and with background data included in the Ecoinvent 3.10 database, whose coherence and transparency are recognized worldwide. The detailed exchange of information with the company and the use of the Ecoinvent database also made it possible to achieve a good degree of completeness of the information database.

DATA REPRESENTATIVENESS

The primary data collected for the inventory of modules A1 and A3 of the Production phase are site-specific primary data provided by the manufacturer and therefore have a high geographical relevance, technological and temporal representativeness. The datasets used for the recovery of secondary data belong to the Ecoinvent 3.10 database and are all applicable for the year 2023. Where possible, data relating to the reference nation and data referring to a wider geographical area where national data were not applicable.

CALCULATION METHOD

The software used for the calculation is OpenLCA v2.5

The database used is Ecoinvent v. 3.10- EN15804+A2:2019/AC:2021 and the characterisation factors are the ones defined by the EF3.1 reference package.

FIELD OF APPLICATION AND KIND OF EPD

This LCA study analyses the product life cycle from cradle to gate with options (“from cradle to gate with options, modules C1-C4, and module D” according to EN15804+A2:2019/AC:2021).

The modularity principle and the “polluter pay principle” (PPP) were applied in the LCA study.

PROCESSES INCLUDED

MODULE A1 – RAW MATERIALS

The calculated impacts are associated to the following flows, which are used to manufacture the marble resin.

- Marble filler and powder <1mm
- Marble aggregate 1-8mm
- Resin
- Pigment
- Accelerant
- Catalyst
- Natural Gas
- Electricity



MODULE A2 – UPSTREAM TRANSPORTATION

Within module A2, the external transports of all raw materials and packaging materials to the Marmi Scala factory have been considered.



MODULE A3 – CORE

The manufacturing phase is characterised by the following flows.

- Water consumptions for the processes
- Waste production, transport and disposal
- Packaging purchasing
- Diesel for internal transportation



MODULE A5 – INSTALLATION

This optional module has been added to correctly consider the end-of-life of the slabs packing, namely the timber boxes and the polyethylene films. Those are collected as waste at the construction site, transported to a treatment center and processed as wastes. The recycling portions considered in the study derives from the Italian national statistics.



MODULES C1, C2, C3 and C4: DEMOLITION, WASTE TRANSPORT; WASTE TREATMENT, DISPOSAL

The installed slabs after their service life (or the construction one) are demolished with an excavator-like machine (C1) and transported to a treatment centre (C2). There, possible end-of-waste secondary materials are produced to be considered in the D stage. What remains waste and goes to disposal (landfill or incineration) is accounted for in C4.



MODULE D: REUSE AND RECYCLING POTENTIAL

Following the national statistics about Construction Demolition Waste, a 79.8 % of the demolished slabs and tiles are recycled as substitutes of the gravel for the road paving construction.

The timber and the plastic final product packaging are recycled as secondary materials with rates of 64.9% and 44.5% respectively.

RESULTS, MARBLE RESIN SLABS

Environmental impacts indicators (Mandatory)

Legend: Global Warming Potential total GWPT [kg CO₂-Eq.]; Global Warming Potential fossil fuels GWPF [kg CO₂-Eq.]; Global Warming Potential biogenic GWPB [kg CO₂-Eq.]; Global Warming Potential land use and land use change GWPL [kg CO₂-Eq.]; Depletion potential of the stratospheric ozone layer ODP [kg CFC11-Eq.]; Acidification potential, Accumulated Exceedance AP [mol H⁺ Eq.]; Eutrophical potential, fraction of nutrients reaching freshwater end compartment EPF [kg (P) Eq.]; Eutrophical potential, fraction of nutrients reaching marine end compartment (EP-marine) EPM [kg N Eq.]; Eutrophical potential, Accumulated Exceedance (EP-terrestrial) EPT [mol N Eq.]; Formation potential of tropospheric ozone photochemical oxidants POCP [kg NMVOC Eq.]; Abiotic depletion potential for non-fossil resources ADPE [kg Sb-Eq.]; Abiotic depletion potential for fossil resources ADPF [MJ, net calorific value]; Water (user) deprivation potential, deprivation-weighted water consumption WDP [m³ world eq. Deprived].

¹ADPE, ADPF and WDP are subject to Disclaimer 2: the results of this environmental impact indicator should be used with caution given that the uncertainties of these results are high or because there is limited experience with the indicator.

Acronym	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWPT	[kg CO ₂ -Eq.]	4.690E-01	7.765E-03	-1.476E-02	4.620E-01	ND	2.886E-02	ND	2.090E-03	7.458E-03	5.153E-03	1.146E-03	-6.665E-03
GWPF	[kg CO ₂ -Eq.]	4.657E-01	7.748E-03	1.289E-02	4.863E-01	ND	7.138E-04	ND	2.089E-03	7.448E-03	5.093E-03	1.143E-03	-6.510E-03
GWPB	[kg CO ₂ -Eq.]	3.033E-03	1.222E-05	-2.769E-02	-2.464E-02	ND	2.814E-02	ND	4.793E-07	6.248E-06	5.962E-05	3.521E-06	-1.503E-04
GWPL	[kg CO ₂ -Eq.]	2.809E-04	4.447E-06	3.407E-05	3.194E-04	ND	4.091E-07	ND	2.350E-07	3.640E-06	1.217E-06	2.251E-07	-4.115E-06
ODP	[kg CFC11-Eq.]	4.464E-08	1.665E-10	4.867E-10	4.530E-08	ND	8.229E-12	ND	3.323E-11	1.634E-10	9.242E-11	3.961E-11	-1.121E-10
AP	[mol H ⁺ Eq.]	2.769E-03	3.639E-05	6.617E-05	2.871E-03	ND	1.984E-06	ND	1.936E-05	3.478E-05	4.162E-05	7.379E-06	-3.988E-05
EPF	[kg (P) Eq.]	1.161E-04	8.484E-07	3.401E-06	1.203E-04	ND	1.397E-07	ND	6.414E-08	5.371E-07	3.244E-07	5.334E-08	-1.078E-06
EPM	[kg N Eq.]	4.828E-04	1.312E-05	1.868E-05	5.146E-04	ND	3.086E-06	ND	8.976E-06	1.380E-05	1.842E-05	3.218E-06	-1.264E-05
EPT	[mol N Eq.]	5.062E-03	1.410E-04	1.977E-04	5.401E-03	ND	6.890E-06	ND	9.757E-05	1.478E-04	2.000E-04	3.450E-05	-1.533E-04
POCP	[kg NMVOC Eq.]	2.206E-03	5.264E-05	8.815E-05	2.347E-03	ND	2.592E-06	ND	2.890E-05	5.164E-05	6.059E-05	1.369E-05	-4.669E-05
ADPE ¹	[kg Sb-Eq.]	1.912E-06	2.201E-08	3.236E-08	1.967E-06	ND	7.714E-10	ND	4.051E-10	1.646E-08	8.579E-09	6.745E-10	-3.267E-08
ADPF ¹	[MJ, net calorific value]	9.806E+00	1.021E-01	2.788E-01	1.019E+01	ND	6.641E-03	ND	2.504E-02	9.894E-02	7.134E-02	2.659E-02	-1.093E-01
WDP ¹	[m ³ world eq. Deprived]	3.838E-01	6.735E-04	7.631E-03	3.921E-01	ND	1.418E-04	ND	6.814E-05	5.485E-04	1.649E-03	1.006E-04	-1.345E-02

ENVIRONMENTAL IMPACTS INDICATORS (OPTIONAL)

Legend: Potential incidence of disease due to PM emissions PMF [Disease incidence]; Potential Human exposure efficiency relative to UR25 IRH [kBq U235 eq]; Potential Comparative Toxic unit for ecosystems (ETP-fw) ETPF [CTUe]; Potential Comparative Toxic unit for human (HTP-c) HTC [CTUh]; Potential Comparative Toxic unit for human (HTP-nc) HTNC [CTUh]; Potential soil quality index (SQP) LULUC [Dimensionless].

² IRH is subject to Disclaimer 1: This impact category primarily concerns the possible impact of low-dose ionizing radiation on human health from the nuclear fuel cycle. It does not take into account the effects due to possible nuclear accidents, occupational exposure or the disposal of radioactive waste in underground facilities. Potential ionizing radiation from soil, radon and some building materials is not measured by this indicator.

³ ETPF, HTC, HTNC, LULUC are subject to Disclaimer 2: The results of this environmental impact indicator should be used with caution given that the uncertainties of these results are high or because there is limited experience with the indicator.

Acronym	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PMF	[Disease incidence]	3.007E-08	6.879E-10	9.995E-10	3.176E-08	ND	3.114E-11	ND	5.343E-10	6.031E-10	6.994E-09	1.830E-10	-7.452E-10
IRH ²	[kBq U235 eq]	3.304E-02	2.527E-04	1.041E-03	3.433E-02	ND	6.929E-05	ND	1.298E-05	1.488E-04	6.459E-04	2.767E-05	-9.424E-04
ETPF ³	[CTUe]	1.085E+01	5.353E-02	1.315E-01	1.103E+01	ND	3.697E-03	ND	1.306E-02	5.281E-02	3.378E-02	1.225E-02	-4.073E-02
HTC ³	[CTUh]	3.723E-10	8.621E-12	3.958E-11	4.205E-10	ND	3.972E-13	ND	6.365E-13	3.949E-12	2.438E-12	3.841E-13	-7.221E-12
HTNC ³	[CTUh]	4.913E-09	7.435E-11	1.081E-10	5.096E-09	ND	6.689E-12	ND	3.998E-12	7.348E-11	3.059E-11	4.696E-12	-7.132E-11
SQP ³	[Dimensionless]	1.784E+00	6.062E-02	2.574E+00	4.419E+00	ND	6.677E-03	ND	1.837E-03	8.077E-02	2.996E-02	5.998E-02	-1.140E-01

RESOURCE USE

Legend: Use of renewable primary energy excluding renewable primary energy resources used as raw materials PERE [MJ]; Use of renewable primary energy resources used as raw materials (PERM) PERM [MJ]; Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT) PERT [MJ]; Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE) PENRE [MJ]; Use of non-renewable primary energy resources used as raw materials (PENRM) PENRM [MJ]; Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT) PENRT [MJ]; Use of secondary material (SM) SM [kg]; Use of renewable secondary fuels [RSF] RSF [MJ]; Use of non-renewable secondary fuels [NRSF] NRSF [MJ]; Net use of fresh water [FW] FW [m³].

Acronym	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	5.16E-01	2.59E-03	9.85E-03	5.28E-01	ND	0.00E+00	ND	1.56E-04	1.70E-03	1.05E-02	5.77E-04	-1.63E-02
PERM	[MJ]	0.00E+00	0.00E+00	3.69E-01	3.69E-01	ND	-2.40E-01	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00



PERT	[MJ]	5.16E-01	2.59E-03	3.79E-01	8.98E-01	ND	-2.40E-01	ND	1.56E-04	1.70E-03	1.05E-02	5.77E-04	-1.63E-02
PENRE	[MJ]	4.81E+00	1.02E-01	7.62E-02	4.96E+00	ND	2.18E-02	ND	2.50E-02	9.89E-02	7.13E-02	2.66E-02	-1.09E-01
PENRM	[MJ]	2.05E+00	0.00E+00	5.04E-02	2.10E+00	ND	-4.44E-02	ND	0.00E+00	0.00E+00	-1.63E+00	0.00E+00	0.00E+00
PENRT	[MJ]	6.86E+00	1.02E-01	1.27E-01	7.06E+00	ND	-2.26E-02	ND	2.50E-02	9.89E-02	-1.63E+00	2.66E-02	-1.09E-01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	1.15E-02	2.24E-05	3.06E-04	1.18E-02	ND	6.32E-06	ND	2.44E-06	1.85E-05	4.15E-05	3.45E-05	-3.40E-04

OUTPUT FLOW

Legend: Components for re-use (CRU) CRU [Kg]; Materials for recycling (MFR) MFR [Kg]; Materials for energy recovery (MER) MER [Kg]; Exported energy (Electrical) EEE [MJ]; Exported energy (Thermal) EET [MJ]; Waste: Hazardous waste disposed HWD [kg (HWD)]; Waste: Non-hazardous waste disposed NHWD [kg (NHWD)]; Waste: Radioactive waste disposed RWD [kg (RWD)]

Acronym	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
CRU	[Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	1.28E-02	ND	0.00E+00	0.00E+00	7.98E-01	0.00E+00	8.11E-01
MER	[Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HWD	kg (HWD)	0.00E+00	0.00E+00	2.65E-01	2.65E-01	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg (NHWD)	0.00E+00	0.00E+00	1.51E-03	1.51E-03	ND	7.27E-03	ND	0.00E+00	0.00E+00	0.00E+00	2.02E-01	0.00E+00
RWD	kg (RWD)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ADDITIONAL INFORMATION

Slab	UM/UD	Biogenic Carbon Content
Product	kgCb/ UD	0.0
Timber packaging	kgCb/ UD	0.213

NOTE: 1 kg di biogenic carbon is equivalent to 44/12 kgCO₂.

IMPACTS DEVIATIONS WITHIN THE PRODUCT CLUSTER

The potential impacts variabilities of the mandatory environmental indicators have been calculated for all products recipes defined in the product cluster. The potential impacts relative deviations from the average recipe results are reported in the following table.

Due to the variability in resin content among recipes and the high environmental impact associated with resin production, most products display significant variability in their impact indicators. Such variability can be higher than 10% for most of the indicators. The variabilities for pigments content and the aggregate upstream transport, play a crucial role for the others indicators and differences below 10%.

Product	GWPB	GWPF	GWPL	GWPT	GWP-IOBC	ETW-fw	HTC-nc	ADPF	ADPE	AP	ODP	EP-freshwater	EP-marine	EP-terrestrial	POCP	HTP-c	IRP	PM	SQP	WDP
ARTIC WHITE	44.90%	42.30%	42.60%	42.30%	42.70%	44.70%	45.80%	41.70%	45.90%	79.80%	44.70%	50.80%	38.60%	36.70%	40.20%	38.60%	48.80%	39.70%	16.30%	58.30%
BALTIC GREY	22.20%	24.50%	24.70%	24.40%	25.30%	29.10%	26.10%	26.20%	25.90%	29.50%	29.10%	28.40%	21.70%	21.30%	23.00%	21.50%	27.10%	20.80%	8.00%	28.80%
BEIGE LUNA	34.50%	38.50%	40.00%	38.40%	40.30%	46.80%	41.90%	41.70%	47.30%	43.60%	46.80%	45.00%	34.10%	33.60%	36.30%	35.00%	43.80%	32.70%	12.70%	47.50%
BIANCO ISLANDA	7.80%	3.20%	2.60%	3.30%	2.40%	-0.50%	3.50%	0.70%	0.90%	25.00%	-0.50%	4.80%	3.60%	2.70%	3.30%	3.30%	4.40%	5.30%	2.80%	8.90%
BOTTICINO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-8.30%	-
BRECCIA AURORA	22.40%	23.40%	23.70%	23.40%	24.10%	27.10%	25.10%	24.50%	25.10%	32.30%	27.10%	27.40%	20.90%	20.40%	22.10%	20.90%	26.40%	20.40%	-8.10%	29.50%
BRECCIA ONICIATA	21.90%	22.80%	22.90%	22.80%	23.50%	26.40%	24.40%	23.90%	23.00%	31.70%	26.40%	26.80%	20.40%	19.90%	21.50%	20.20%	25.60%	20.00%	-8.00%	28.50%
CALACATTA	10.10%	17.50%	18.80%	17.50%	19.40%	26.60%	18.90%	22.20%	22.70%	5.20%	26.50%	19.30%	14.70%	15.50%	16.30%	15.20%	18.90%	11.80%	-3.80%	15.50%
CARRARA MICRO	20.60%	21.80%	22.30%	21.80%	22.80%	26.10%	23.70%	23.30%	24.00%	27.30%	26.10%	25.70%	19.40%	19.10%	20.60%	19.70%	24.90%	18.90%	7.60%	27.90%
CRYSTAL WHITE	22.80%	25.40%	25.80%	25.40%	26.60%	30.70%	27.40%	27.30%	27.00%	30.60%	30.70%	29.80%	22.60%	22.20%	24.10%	22.50%	28.50%	21.80%	8.40%	30.30%
FIORI DI PESCO	21.70%	23.70%	24.50%	23.70%	24.70%	28.60%	25.70%	25.60%	28.10%	27.90%	28.60%	27.70%	21.00%	20.70%	22.40%	21.50%	26.90%	20.20%	-7.90%	29.40%
GIALLO REALE	14.50%	14.40%	14.40%	14.40%	14.70%	15.90%	15.50%	14.60%	14.60%	23.80%	15.90%	17.10%	13.00%	12.50%	13.70%	12.80%	16.30%	13.10%	-5.30%	18.70%



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