



ENVIRONMENTAL PRODUCT DECLARATION

Marble-cement slabs and tiles

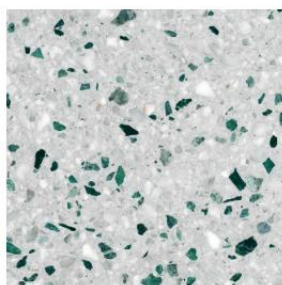
**BARDIGLIO; BASEL; BLAWHI; BOTT
0/25; BOTT 0/7; BA 0/25; BA 0/7;
CARGREY; CARRARA 0/25; CARRARA
0/7; LIME; ESCO; ETNA; GIALLO MORI;
GRALO; GRIBEL; GV 0/25; GRISCAL;
MILLENNIUM; NERO EBANO; PIRA;
RONUV; ROSSO VERONA; VERDE ALPI;
VIOLEG**

**Via Prealpi, 21, 37023 Grezzana (VR),
Italy**

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

Program Operator	EPDItaly
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Marble-cement slab



www.epditaly.it

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

EPDItaly	Via Gaetano De Castilia n° 10 - 20124 Milano, Italy
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INFORMATION ON THE EPD

EPD Type	Average product EPD
Product name (s)	Marble cement slabs BARDIGLIO; BASEL; BLAWHI; BOTT 0/25; BOTT 0/7; BA 0/25; BA 0/7; CARGREY; CARRARA 0/25; CARRARA 0/7; LIME; ESCO; ETNA; GIALLO MORI; GRALO; GRIBEL; GV 0/25; GRISCAL; MILLENNIUM; NERO EBANO; PIRA; RONUV; ROSSO VERONA; VERDE ALPI; VIOLEG
Site (s)	Via Prealpi, 21, 37023, Grezzana (VR)
Short description and technical information of the product (s)	Marble cement slabs made of marble sands and gravel with cement
Field of application of the product (s)	Construction
Product (s) reference standards (if any)	EN 13748-1 (marble-cement)
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
EPDItaly 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. ☐ 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 with EN 15804: 2012 + A2: 2019.
Liability Statement	The EPD Owner releases EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence. EPDItaly 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 the only cement-based marble aggregate slabs of 1 kg as reference average product of Marmi Scala Srl among different product compositions and sizes.

THE MARBLE-CEMENT SLABS

Cement marble is obtained by mixing marble flakes selected for colour, size and cement. 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-five (25) commercial products manufactured at Marmi Scala. The potential environmental impacts reported in this EPD are hence valid for all these products.

Commercial products

BARDIGLIO
BASEL
BLAWHI
BOTT 0/25
BOTT 0/7
BA 0/25
BA 0/7
CARGREY
CARRARA 0/25
CARRARA 0/7
LIME
ESCO
ETNA
GIALLO MORI
GRALO
GRIBEL
GV 0/25
GRISCAL
MILLENNIUM
NERO EBANO
PIRA
RONUV
ROSSO VERONA
VERDE ALPI
VIOLEG

From block manufacturing, different products' 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, polishing.

PRODUCT TECHNICAL FEATURES

CEMENT MARBLE

Characteristics	Reference Norm	UM	Amount
Density	EN 14617-1:2005	Kg/dm ³	2.40 – 2.60
Water absorption	EN 14617-1:2005	W24h	0.24 – 0.30 g/cm ³
		Wm,a	5.16 – 6.85 %

Bending resistance	EN13748-1:2005	Pm	3.1 – 3.5 kN
		Tm	7.7 – 8.8 MPa
Compression resistance	EN 14617-1:2005	MPa	70 – 100
Abrasion resistance	EN 13748-1:2005	Mm	> 24
Slip resistance	EN 13748-1:2005	PTV dry	47 – 49
		PTV wet	14 – 20
Fire behaviour	EN 13501-1	–	A1

PRODUCTS' COMPOSITION

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

Marble cement
Marble filler and powder <1mm
Marble aggregate 1-8mm
Pigments
White cement
Additives

PRODUCT PACKAGING

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

MANUFACTURING PROCESS

The slabs are manufactured via a cold working at the Marmi Scala Srl factory of Grezzana, in the province of Verona (Italy).

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.

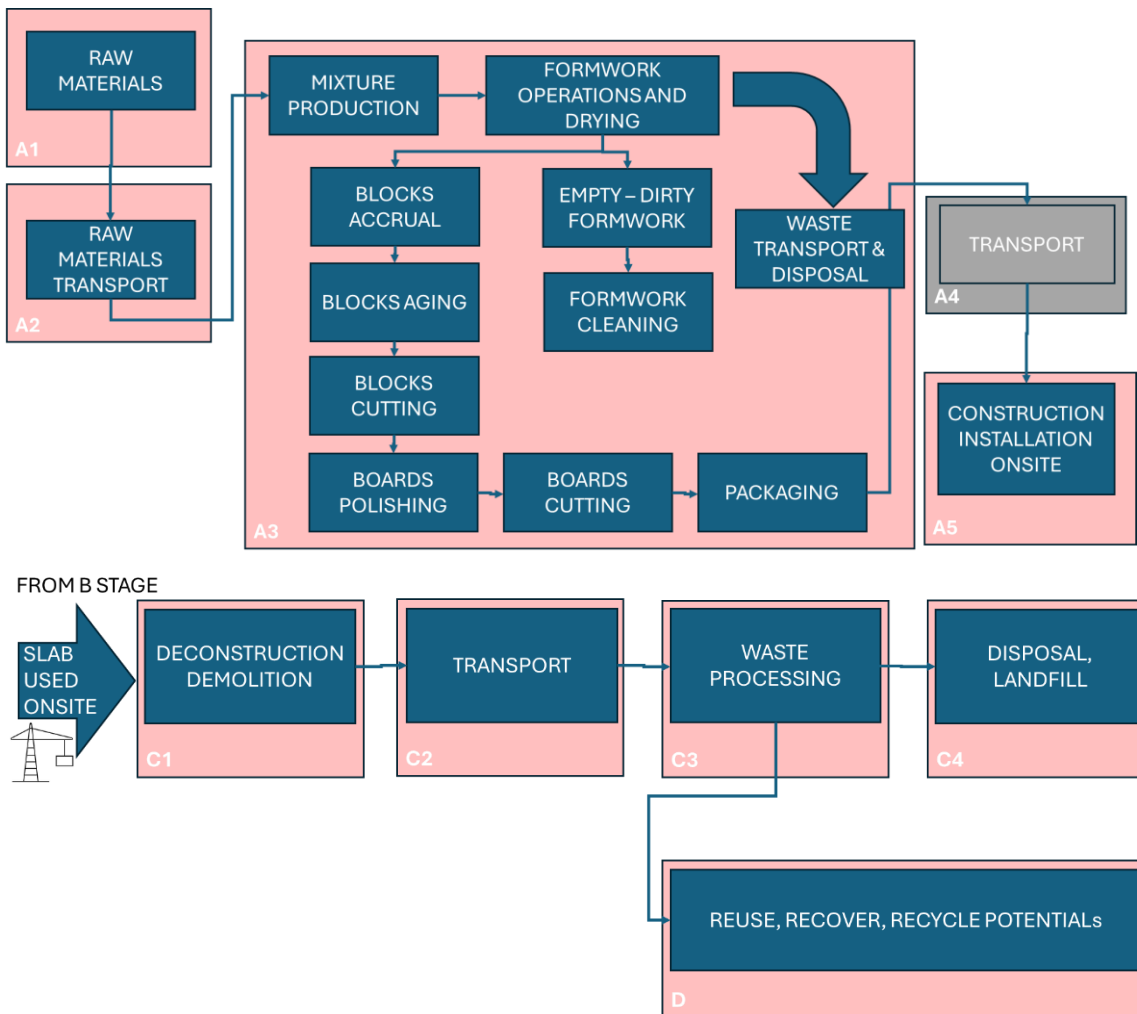


Figure 1: Flow chart of the Marmi Scala Srl production processes and the EPD Life Cycle stages.

CALCULATION RULES

DECLARED UNIT

1 kg of an average marble-cement 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	Reuse- recovery- recycling- potential
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 the factory, located in Grezzana, in the province of Verona (Italy). The raw materials come mainly from northern Italy.

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

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

CUT-OFF RULES

The cut-off rules followed in the study comply with the provisions of EN15804:2012+A2:2019 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 based on a mass criterion, representing less than 1% of the final product mass.

- Ancillary raw materials, such as the catalyst and pigments a weight less than 0.01 %).
- The catalyst made of organic peroxides (equal to 0.15% of the product mass).
- Paper bags used for the pigment transportation (with a mass lower than 0.0001% 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 most of the flows have been taken from Ecoinvent 3.10 database.

The GWP of the electricity mix applied for AI 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 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 – December 2023
Sites used	The production occurs in one unique site in Grezzana (Verona)
Geography	The Marmi Scala production is in a unique geographical context. The main raw materials suppliers are from the northern and central parts 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-cement slabs are obtained by mixing marble aggregates, cement, 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.

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) white cement (S-P Code: S-P-02234); (ii) pigments (Codes: EPD-IES-0025251:001, EPD-IES-0017014:004, EPD-IES-0017015:005, EPD-LAN-20230193-IBC1-EN).
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			Source	Share of GWPT on A1–A3
		Geographical	Technological	Temporal		
A1	Cement	Foreground data: very good, data is site specific. Background data: very good, data is site specific.	Foreground data: very good, inventory data specific for the technologies in place. Background data: very good, identical technological process	Foreground data: very good, data from the reference year Background data: very good, less than six years from the publication of the data (2021)	Type: EPD, Program Operator: International AB	74.1 %
	Upstream transport to suppliers	Foreground data: very good, data is site specific. Background data: good, data is referred to Europe.	Foreground data: very good, inventory data specific for the technologies in place. Background data: good, similar technological	Foreground data: very good, data from the reference year Background data: good, less than six years from the publication of the data (2012–2022)	Type: Database Source: Ecoinvent 3.10	13.1 %

			process (freight, lorry)			
D	Pallet avoided material	Foreground data: good, data related to Europe. Background data: good, data related to Europe.	Foreground data: good, inventories similar for the technologies in place. Background data: good, similar technological process.	Foreground data: very good, data from the reference year Background data: good, less than six years from the publication of the data (ref. year: 2019-2022)	Ecoinvent v3.10	-
	Gravel avoided material	Foreground data: good, data related to Europe. Background data: good, data related to Switzerland.	Foreground data: good, inventories similar for the technologies in place. Background data: good, similar technological process.	Foreground data: very good, data from the reference year Background data: good, less than six years from the publication of the data (ref. year: 2011-2022)	Ecoinvent v3.10	-
	PE production	Foreground data: good, data related to Europe. Background data: good, data related to Europe.	Foreground data: good, inventories similar for the technologies in place. Background data: good, similar technological process.	Foreground data: very good, data from the reference year Background data: good, less than six years from the publication of the data (ref. year: 2010-2023)	Ecoinvent v3.10	-
	PE avoided material	Foreground data: good, data related to Europe. Background data: good,	Foreground data: good, inventories similar for the technologies in place. Background data: good, similar	Foreground data: very good, data from the reference year Background data: good, less than six years from the	Ecoinvent v3.10	-

		data 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 from similar production conditions	Inventories data and processes refer to general technologies in place.	Less than ten years from the publication of the data
Poor	Data from slightly different production conditions	Inventories data and processes refer to correlated technologies in place.	Less than fifteen years from the publication of the data
Very poor	Data from different or unknown production conditions	Inventories data and processes refer to diverse scale or technologies in place.	More than ten 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 EN15804:2013+A2:2019, 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-EN 15804+A2 and the characterisation factors are the ones defined as per the EF3.1.

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).

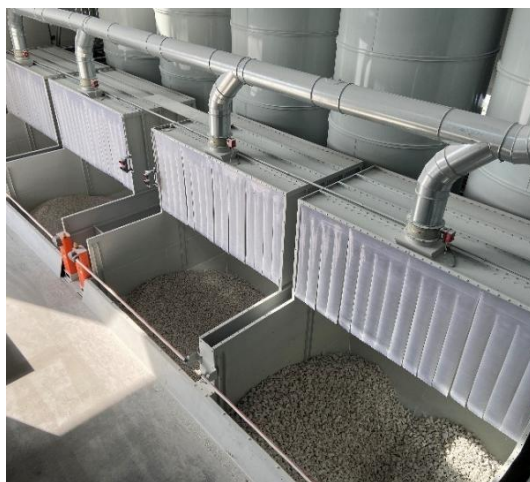
The modularity principle and the “polluter pay principle” (PPP) were applied in the LCA study.

PROCESSES INCLUDED

MODULE A1 – RAW MATERIALS

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

- Marble filler and powder <1mm
- Marble aggregate 1-8mm
- Cement
- Pigment
- Water
- 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 centre 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.

The demolished cement-based slabs have considered to have a second life in the sector of roads paving. All products packaging (wood boxes and PE film) are considered to have a recycling process as well.

MODULE D: REUSE AND RECYCLING POTENTIALS

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 CEMENT 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.]	3.047E-01	6.81E-03	-1.52E-02	2.96E-01	ND	2.89E-02	ND	2.15E-03	7.46E-03	5.15E-03	1.15E-03	-6.66E-03
GWPF	[kg CO ₂ -Eq.]	3.014E-01	6.80E-03	1.25E-02	3.21E-01	ND	7.14E-04	ND	2.15E-03	7.45E-03	5.09E-03	1.14E-03	-6.51E-03
GWPB	[kg CO ₂ -Eq.]	3.252E-03	7.55E-06	-2.77E-02	-2.44E-02	ND	2.81E-02	ND	4.92E-07	6.25E-06	5.96E-05	3.52E-06	-1.50E-04
GWPL	[kg CO ₂ -Eq.]	3.172E-05	3.53E-06	3.40E-05	6.92E-05	ND	4.09E-07	ND	2.41E-07	3.64E-06	1.22E-06	2.25E-07	-4.12E-06
ODP	[kg CFC11-Eq.]	1.820E-09	1.48E-10	4.47E-10	2.42E-09	ND	8.23E-12	ND	3.41E-11	1.63E-10	9.24E-11	3.96E-11	-1.12E-10
AP	[mol H ⁺ Eq.]	4.413E-04	3.18E-05	6.42E-05	5.37E-04	ND	1.98E-06	ND	1.99E-05	3.48E-05	4.16E-05	7.38E-06	-3.99E-05
EPF	[kg (P) Eq.]	1.313E-04	5.83E-07	3.37E-06	1.35E-04	ND	1.40E-07	ND	6.59E-08	5.37E-07	3.24E-07	5.33E-08	-1.08E-06
EPM	[kg N Eq.]	1.078E-04	1.22E-05	1.83E-05	1.38E-04	ND	3.09E-06	ND	9.22E-06	1.38E-05	1.84E-05	3.22E-06	-1.26E-05
EPT	[mol N Eq.]	3.937E-03	1.31E-04	1.94E-04	4.26E-03	ND	6.89E-06	ND	1.00E-04	1.48E-04	2.00E-04	3.45E-05	-1.53E-04
POCP	[kg NMVOC Eq.]	4.179E-04	4.68E-05	8.44E-05	5.49E-04	ND	2.59E-06	ND	2.97E-05	5.16E-05	6.06E-05	1.37E-05	-4.67E-05
ADPE ¹	[kg Sb-Eq.]	4.833E-07	1.66E-08	3.22E-08	5.32E-07	ND	7.71E-10	ND	4.16E-10	1.65E-08	8.58E-09	6.75E-10	-3.27E-08
ADPF ¹	[MJ, net calorific value]	2.968E+00	9.00E-02	2.56E-01	3.31E+00	ND	6.64E-03	ND	2.57E-02	9.89E-02	7.13E-02	2.66E-02	-1.09E-01
WDP ¹	[m ³ world eq. Deprived]	4.295E-02	5.34E-04	7.60E-03	5.11E-02	ND	1.42E-04	ND	7.00E-05	5.49E-04	1.65E-03	1.01E-04	-1.34E-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, SQP 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]	4.658E-09	5.70E-10	9.82E-10	6.21E-09	ND	3.11E-11	ND	5.49E-10	6.03E-10	6.99E-09	1.83E-10	-7.45E-10
IRH ²	[kBq U235 eq]	4.983E-03	1.67E-04	1.03E-03	6.18E-03	ND	6.93E-05	ND	1.33E-05	1.49E-04	6.46E-04	2.77E-05	-9.42E-04
ETPF ³	[CTUe]	4.027E-01	4.77E-02	1.21E-01	5.71E-01	ND	3.70E-03	ND	1.34E-02	5.28E-02	3.38E-02	1.23E-02	-4.07E-02
HTC ³	[CTUh]	3.857E-11	5.06E-12	3.97E-11	8.34E-11	ND	3.97E-13	ND	6.54E-13	3.95E-12	2.44E-12	3.84E-13	-7.22E-12
HTNC ³	[CTUh]	7.431E-10	6.64E-11	1.16E-10	9.26E-10	ND	6.69E-12	ND	4.11E-12	7.35E-11	3.06E-11	4.70E-12	-7.13E-11
SQP ³	[Dimensionless]	6.244E-01	6.62E-02	2.57E+00	3.26E+00	ND	6.68E-03	ND	1.89E-03	8.08E-02	3.00E-02	6.00E-02	-1.14E-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]	4.07E-02	1.82E-03	8.55E-02	1.28E-01	ND	0.00E+00	ND	1.60E-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]	4.07E-02	1.82E-03	4.55E-01	4.97E-01	ND	-2.40E-01	ND	1.60E-04	1.70E-03	1.05E-02	5.77E-04	-1.63E-02
PENRE	[MJ]	5.24E-02	9.00E-02	1.68E+00	1.82E+00	ND	2.18E-02	ND	2.57E-02	9.89E-02	7.13E-02	2.66E-02	-1.09E-01



PENRM	[MJ]	0.00E+00	0.00E+00	2.96E-01	2.96E-01	ND	-4.44E-02	ND	0.00E+00	0.00E+00	-1.96E-01	0.00E+00	0.00E+00
PENRT	[MJ]	5.24E-02	9.00E-02	1.97E+00	2.11E+00	ND	-2.26E-02	ND	2.57E-02	9.89E-02	-1.96E-01	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]	1.39E-03	1.79E-05	3.43E-04	1.75E-03	ND	6.32E-06	ND	2.50E-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	3.80E-05	3.80E-05	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	2.66E-01	2.66E-01	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	0.0213

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 high variability of pigments contents among recipes and the high environmental impact associated with their production, most products display variability in their impact indicators. Such variability is higher than 10% for AP and WP, while lower than 10% for the rest.

Product	GWP-biogenic	GWP-fossil	GWP-luluc	GWP-total	GWP-IOBC/GHG	ETP-fw	HTP-nc	ADPF	ADPE	AP	ODP	EP-freshwater	EP-marine	EP-terrestrial	POCP	HTP-c	IRP	PM	SQP	WDP
BARDIGLIO	-1.9%	-2.0%	-6.0%	-2.0%	-5.3%	-6.1%	-6.3%	-2.6%	-3.9%	-20.5%	-6.2%	-1.3%	-4.2%	-1.6%	-4.6%	-5.7%	-7.4%	-3.9%	-1.1%	-17.3%
BASEL	-1.7%	-1.4%	-5.0%	-1.4%	-3.0%	-3.6%	-3.7%	-1.9%	-1.9%	-18.2%	-4.0%	-0.3%	-2.9%	-0.6%	-2.9%	-3.5%	-4.9%	-2.5%	-0.5%	-13.6%
BLAWHI	2.3%	1.8%	1.6%	1.8%	-3.7%	-4.5%	-4.5%	2.2%	0.6%	-15.9%	-3.6%	1.0%	-1.5%	0.9%	-2.2%	-4.1%	-5.1%	-3.1%	-0.8%	-12.7%
BOTT 0/25	-2.8%	-2.6%	1.4%	-2.6%	5.9%	7.2%	7.3%	-2.5%	1.0%	29.6%	7.1%	-2.6%	2.7%	-1.9%	3.8%	6.2%	8.7%	4.9%	1.3%	22.9%
BOTT 0/7	0.5%	0.6%	1.8%	0.6%	6.1%	7.2%	7.4%	0.2%	3.5%	30.2%	7.3%	1.8%	2.5%	0.9%	3.7%	6.5%	9.2%	4.9%	1.1%	24.4%
BA 0/25	-5.6%	-5.2%	-6.9%	-5.2%	-3.3%	-3.9%	-4.0%	-5.4%	-4.2%	-19.0%	-4.2%	-4.3%	-4.1%	-3.7%	-3.8%	-4.1%	-4.9%	-2.7%	-0.5%	-15.0%
BA 0/7	-5.6%	-5.2%	-6.9%	-5.2%	-3.3%	-3.9%	-4.0%	-5.4%	-4.2%	-19.0%	-4.2%	-4.3%	-4.1%	-3.7%	-3.8%	-4.1%	-4.9%	-2.7%	-0.5%	-15.0%
CARGREY	-5.7%	-5.2%	-5.4%	-5.2%	-2.8%	-3.3%	-3.4%	-5.1%	-4.4%	-18.2%	-3.8%	-5.2%	-3.0%	-3.9%	-2.9%	-3.4%	-4.5%	-2.3%	-0.3%	-14.7%
CARRARA 0/25	-1.5%	-1.3%	1.9%	-1.3%	6.0%	7.3%	7.4%	-1.4%	1.8%	30.2%	7.2%	-1.2%	2.9%	-0.8%	3.9%	6.3%	8.8%	4.9%	1.3%	23.6%
CARRARA 0/7	0.7%	0.7%	1.1%	0.7%	5.5%	6.8%	6.9%	0.0%	3.2%	29.6%	6.8%	2.0%	2.2%	1.0%	3.3%	5.7%	8.4%	4.6%	1.1%	23.7%
LIME	-1.9%	-1.6%	-6.5%	-1.6%	-3.4%	-4.2%	-4.2%	-2.5%	-1.8%	-19.0%	-4.4%	0.3%	-4.1%	-0.6%	-3.9%	-4.2%	-5.1%	-2.8%	-0.6%	-13.8%
ESCO	4.1%	3.8%	9.3%	3.8%	14.7%	17.9%	18.2%	3.4%	8.7%	78.5%	18.1%	4.4%	8.9%	3.3%	10.8%	16.0%	22.0%	12.2%	2.8%	61.7%
ETNA	-0.9%	-0.7%	-4.3%	-0.7%	-3.4%	-4.1%	-4.2%	-1.2%	-1.8%	-18.2%	-4.3%	0.2%	-2.8%	-0.3%	-3.0%	-3.5%	-5.1%	-2.8%	-0.7%	-14.0%
GIALLO MORI	-0.7%	-1.1%	0.7%	-1.1%	-4.2%	-5.0%	-5.0%	-0.3%	-1.9%	-16.7%	-4.1%	-2.7%	-2.0%	-1.7%	-2.7%	-4.8%	-5.6%	-3.3%	-0.9%	-14.9%
GRALO	-0.8%	-0.7%	-4.5%	-0.7%	-3.9%	-4.6%	-4.8%	-1.2%	-2.2%	-18.8%	-4.8%	0.1%	-2.9%	-0.3%	-3.2%	-4.1%	-5.9%	-3.0%	-0.8%	-14.9%
GRIBEL	2.0%	1.7%	-1.3%	1.7%	-4.1%	-5.0%	-5.0%	1.7%	-1.5%	-17.5%	-5.0%	1.6%	-1.7%	1.0%	-2.6%	-4.7%	-5.5%	-3.4%	-0.9%	-13.1%
GV 0/25	0.3%	0.3%	10.1%	0.3%	15.6%	18.9%	19.1%	0.8%	6.5%	79.6%	18.9%	-0.6%	9.8%	0.2%	11.7%	16.9%	22.9%	12.8%	3.1%	61.4%
GRISCAL	-0.4%	-0.1%	-5.7%	-0.1%	-2.9%	-3.5%	-3.6%	-1.1%	-0.5%	-18.3%	-3.8%	2.0%	-3.3%	0.8%	-3.2%	-3.6%	-4.7%	-2.5%	-0.5%	-12.5%
MILLENNIUM	4.2%	3.6%	5.2%	3.6%	-3.7%	-4.5%	-4.5%	5.1%	-1.8%	-14.8%	-4.6%	0.4%	2.2%	1.5%	0.1%	-4.0%	-5.0%	-3.1%	-0.8%	-11.8%
NERO EBANO	7.2%	7.2%	12.4%	7.2%	-0.4%	-0.8%	-1.1%	9.7%	1.1%	-10.6%	-1.7%	1.9%	7.7%	4.3%	5.1%	3.2%	-2.5%	-0.6%	-0.4%	-10.3%
PIRA	-1.2%	-0.9%	-4.1%	-0.9%	-3.0%	-3.6%	-3.8%	-1.4%	-1.9%	-18.0%	-4.0%	-0.2%	-2.3%	-0.3%	-2.5%	-3.3%	-5.1%	-2.5%	-0.5%	-13.8%
RONUV	-1.9%	-2.0%	-3.8%	-2.0%	-4.1%	-4.9%	-5.0%	-2.5%	-2.5%	-18.5%	-4.6%	-1.5%	-3.7%	-1.6%	-3.8%	-4.8%	-5.6%	-3.3%	-0.9%	-14.9%
ROSSO VERONA	6.0%	4.5%	11.5%	4.6%	-4.5%	-5.2%	-5.4%	6.1%	0.4%	-14.5%	-4.1%	0.5%	1.7%	1.8%	-0.4%	-4.2%	-6.4%	-3.4%	-1.0%	-14.2%
VERDE ALPI	0.4%	0.4%	-1.7%	0.4%	-3.2%	-3.9%	-4.0%	0.2%	-0.9%	-17.3%	-3.9%	0.6%	-1.9%	0.4%	-2.4%	-4.2%	-5.1%	-2.7%	-0.5%	-12.9%
VIOLEG	1.3%	1.2%	1.0%	1.2%	5.4%	6.6%	6.7%	0.4%	3.5%	31.3%	6.8%	2.8%	1.8%	1.4%	2.9%	5.7%	8.6%	4.5%	0.9%	25.3%



MAX	Nero Ebano	Nero Ebano	Nero Ebano	Nero Ebano	Grigio Venato	Grigio Venato	Grigio Venato	Nero Ebano	Esco	Grigio Venato	Grigio Venato	Esco	Grigio Venato	Nero Ebano	Grigio Venato	Grigio Venato	Grigio Venato	Grigio Venato	Grigio Venato	Esco
MIN	Car Grey	Car Grey	Breccia Aurora 025	Car Grey	Bardiglio	Bardiglio	Bardiglio	Breccia Aurora 025	Car Grey	Bardiglio	Bardiglio	Car Grey	Bardiglio	Car Grey	Bardiglio	Bardiglio	Bardiglio	Bardiglio	Bardiglio	Bardiglio

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