In accordance with ISO 14025
EN 15804:2012+A2:2019/AC:2021
ISO 21930:2017

EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM

ENVIRONMENTAL PRODUCT DECLARATION

PORCELAIN STONEWARE
CERAMIC SLABS
∓ 6 MM

CASTELLARANO SITE, RE - ITALY

EPD Programme	The International EPD® System, www.environdec.com
Programme operator	EPD International AB
EPD Registration Number	S-P-12918
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An EPD should provide current information and may be updated if conditions change.
The stated validity is therefore subject to the continued registration and publication at www.environdec.com

IRIS CERAMICA GROUP

PORCELAIN STONEWARE CERAMIC SLABS ÷ 6 mm | Castellarano Plant, RE - Italy

EPD®
THE INTERNATIONAL EPD® SYSTEM

ariostea®

FIANDRE®
ARCHITECTURAL SURFACES

iris
FMG FABBRICA MARMI E GRANITI

iris® Ceramica

Porcelaingres®

SAPIENSTONE

STONEPEAK

SURFACES
ACTIVE®
design for a better life

BRANDS OF IRIS CERAMICA GROUP

PROGRAMME INFORMATION

Programme	Programme operator address	Web site	E-mail
The International EPD® System, www.environdec.com	EPD International AB Box 210 60, 100 31 Stockholm, Sweden	www.environdec.com	info@environdec.com

The EN 15804 standard is the reference for the Core Product Category Rules (PCR)	
PCR	PCR 2019:14 Construction products, versione 1.3.1 C-PCR-002 Ceramic tiles (EN 17160:2019), versione 2019-12-20
PCR review was conducted by	The Technical Committee of the International EPD® System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via www.environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006	☐ EPD process certification (Internal) ☑ EPD verification (External)
Third party verifier	Bureau Veritas Italia S.P.A. Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up of data during EPD validity involves third party verifier	☑ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs of construction products may not be comparable if they do not comply with EN 15804.
EPDs within the same product category but from different programmes may not be comparable.
For further information about comparability, see EN 15804 and ISO 14025.

COMPANY INFORMATION

02

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OWNER OF THE EPD

GranitiFiandre S.p.A., Via Radici Nord 112, 42014 Castellarano (RE), Italy

COMPANY PROFILE

Iris Ceramica Group is a benchmark for the design and development of high-end natural ceramic surfaces used in innovative architecture, interior design and furnishing solutions and projects. With over 60 years of history, the Group produces porcelain stoneware materials for floor and wall coverings and the interior design and furnishing sectors, designing solutions that meet the aesthetic and functional needs of architects, interior designers and clients. Over the years, the company has introduced a number of sustainable innovation processes, acquiring many technological patents that have become a standard for the production of technical ceramics (porcelain stoneware). The materials are manufactured in compliance with the toughest regulatory standards, respecting both people and the environment. This process is based on constant research into knowledge and practices fostering more sustainable and responsible decisions and life styles.

With its brands, Iris Ceramica Group delivers high-end wall and floor coverings, kitchen tops and furnishing solutions, combining exceptional performance with a distinctive style and high degree of customisation.

The materials are designed to fully meet contemporary living needs, offering functional indoor and outdoor solutions that are ideal for use in residential, commercial and industrial spaces.

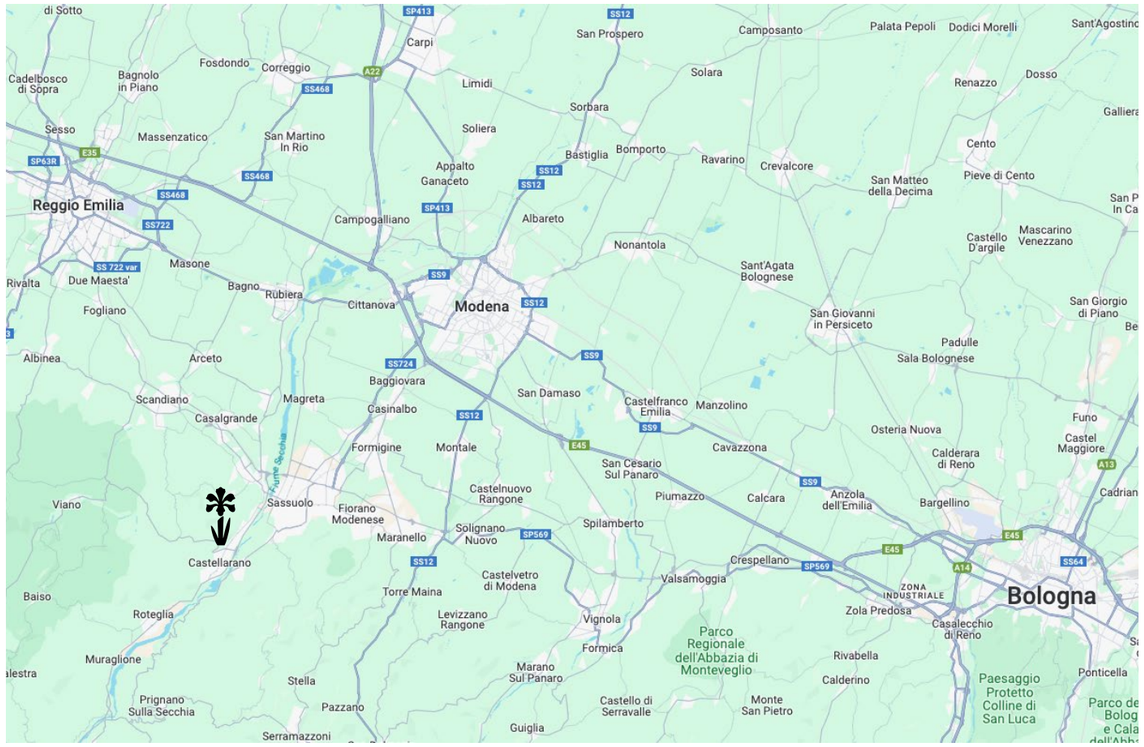
Sustainability, innovation and excellent quality are the values that have always inspired the Group, expressed through the creation of natural ceramic surfaces that stand out for their technology and beauty, embodying a profound value: re-engineering ceramics to obtain solutions that improve the interaction between people and the environment.

PRODUCTION SITES

The production process (from raw materials to finished product) does not always begin and end at the same plant, but the various process steps may be carried out at different sites.
For the production of the ceramic slabs thickness 6 mm included in this EPD, the following facilities are considered:

LOCATIONS

Castellarano (RE) - Via Radici Nord n.112
Castellarano (RE) - Via Cimabue n.20
Castellarano (RE) - Via Manganella n.2



SUSTAINABILITY

We are **Ecopreneurs**, because for us responsible production is a real priority: Iris Ceramica Group's vision and mission are based on the equation **"Economy=Ecology"**, the term coined in the 1960s by the group's pioneering Chairman and Founder Romano Minozzi, as demonstrated by over half a century of concrete commitment to sustainability. As **Eco-innovators**, we have always led the field: we work with latest-generation technologies, paving new ways for ceramic applications, all fully **respecting the environment.** We measure our commitment according to three **ESG criteria: environmental, social and corporate governance**, and for years we have been applying energy savings solutions to safeguard the environment, developing and investing in the related best practices.

Iris Ceramica Group's entire production process has also obtained the following certifications, thanks to the organisation and rigorous periodic inspections of its industrial processes:

- **UNI EN ISO 9001**: Quality Management System
- **UNI EN ISO 14001**: Environmental Management System
- **UNI CEI EN ISO 50001**: Energy Management System
- **UNI ISO 45001**: Health & Safety Management System
- **UNI/PdR 125**: Gender Equality Management System

- **EMAS** (Registration number IT–000039): compliance with the EMAS European Regulation on Environmental Management

Iris Ceramica Group's ceramic surfaces have been certified as complying with the parameters set by the Green Building Council's **BREEAM** (BRE Environmental Assessment Method) and **LEED** (Leadership in Energy and Environmental Design) rating systems.

CONTACTS

For more information on Iris Ceramica Group or about this EPD, you can contact

Sustainability Dept. - Iris Ceramica Group
Phone number: +39 0536 819611 - e-mail: sustainability@icgmail.com

Alternatively, the following site can be consulted: www.irisceramicagroup.com

PRODUCT INFORMATION

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PRODUCT NAME

Porcelain Stoneware Ceramic Slabs, thickness 6 mm.

PRODUCT IDENTIFICATION

The range of materials in this EPD includes porcelain stoneware ceramic slabs, countertops and furniture under the brands Ariostea, Fiandre Architectural Surfaces, FMG Fabbrica Marmi e Graniti, Iris Ceramica, Porcelaingres, SapienStone, Stonepeak Ceramics e Active Surfaces® with thickness 6 mm.

PRODUCT DESCRIPTION

Technical ceramic slabs - porcelain stoneware - combine the highest levels of technical characteristics with a particularly prestigious aesthetic appearance.
There are many areas of application: floorings, wall coverings, interior design, outdoor applications and the furnishing sector (including countertops).
Iris Ceramica Group's porcelain stoneware slabs represent a unique material, made of high quality natural raw materials, extracted all over the world and processed in some of the most advanced plants in the world: their intrinsic values, nurtured by more than 60 years of market leadership, constitute a unique mix of innovation, design and sustainability.
In particular, large slabs combine consolidated and classic characteristics with new qualities of the highest performance: strength, lightness, flexibility, ductility.
Large-size slabs combine maximum design freedom with great flexibility: while on the one hand the maxi-slab drastically reduces the amount of interruptions in the design unit, on the other hand the wide range of all submultiples guarantees great versatility for every need.

UN CPC CODE

3732 Refractory bricks, blocks, tiles and similar refractory ceramic constructional goods, other than those of siliceous earths

GEOGRAPHICAL SCOPE

Global

TECHNICAL SPECIFICATIONS

The materials meet requirements defined by the European standard EN 14411 and ISO 13006 Annex G, according to criteria established by test method ISO 10545 - *"International Organization for Standardization Specifications for Ceramic Tile"*, reported below.

Technical Properties	Standard or Measuring Method	Value Required EN14411 ANNEX G	Average Values of Production
Water Absorption	ISO 10545-3	≤ 0.5%	≤ 0.1%
Lenght and width	ISO 10545-2	± 0.6%	± 0.1%
Thickness		± 5%	± 5%
Streightness of sides		± 0.5%	± 0.1%
Rectangularity		± 0.5%	± 0.1%
Planarity		± 0.5%	± 0.2%
Modulus of rupture (R)	ISO 10545-4	≥ 35 N/mm^2	51 N/mm^2
Resistance to deep abrasion	ISO 10545-6	Max 175 mm^3	140 mm^3
Coefficient of linear thermal expansion	ISO 10545-8	≤ 9 x10^{-6} K^{-1}	6.5 x10^{-6} K^{-1}
Resistance to thermal shock	ISO 10545-9	Available test method	Compliant
Frost resistance	ISO 10545-12	Requested	Compliant
Resistance to chemicals* - Household chemicals - Swimming pool salts	ISO 10545-13	Min. Class B	Compliant
Resistance to staining	ISO 10545-14	1 < X ≤ 5	Compliant
Reaction to fire	Decision 96/603 CE Test absent	--	A1 – A1$_{FL}$

(*) With the exception of HYDROFLUORIC acid (HF) or its derivatives and compounds

PRODUCTION PROCESS

The production process of the ceramic slabs covered by this EPD is divided into a series of working phases as described below:

Raw materials acquisition: mineral raw materials (clay, sand, feldspar, kaolin, pigments) arrive at the production facilities and are stored in special warehouses.
The clay fraction performs a plasticizing function; the inert fraction (sand) a slimming and structural function, capable of limiting shrinkage and expansion during the firing of the ceramic piece; the feldspathic fraction has a melting function, which allows the glass formation during the baking of the piece.

Mixture preparation: the mineral raw materials suitably pre-mixed are dosed (in a variable percentage according to the production recipe) inside the milling plants, consisting of continuous mills and turbo dissolvers.
At the same time and in appropriate percentages, water (taken from wells and recirculation), fluidifying agent and grinding bodies (consisting of pebbles and alumina spheres) are added to the raw materials. The dough that is formed with a percentage of water equal to about 30% is called "slip". Downstream of this phase, color concentrates (pigments) are also added, in a variable percentage depending on the product to be made.

Spray-drying: the "slip" is sprayed inside steel cylinders (spray-dryers), where it is sprayed to obtain very fine droplets. Subsequently, hot air is introduced for the drying of the drops of slip producing the atomized, mixture of granules with controlled humidity.

Forming: the atomized powders are mixed, sieved and then compacted by pressing between two surfaces in order to obtain a raw compacted product, the so-called "green slab".

Drying: the formed tile undergoes a drying process by means of a recirculation of hot air which considerably reduces its humidity to almost negligible levels, and gives it an even higher mechanical load, which allows it to be subjected to various surface processes to confer appropriate aesthetic properties.

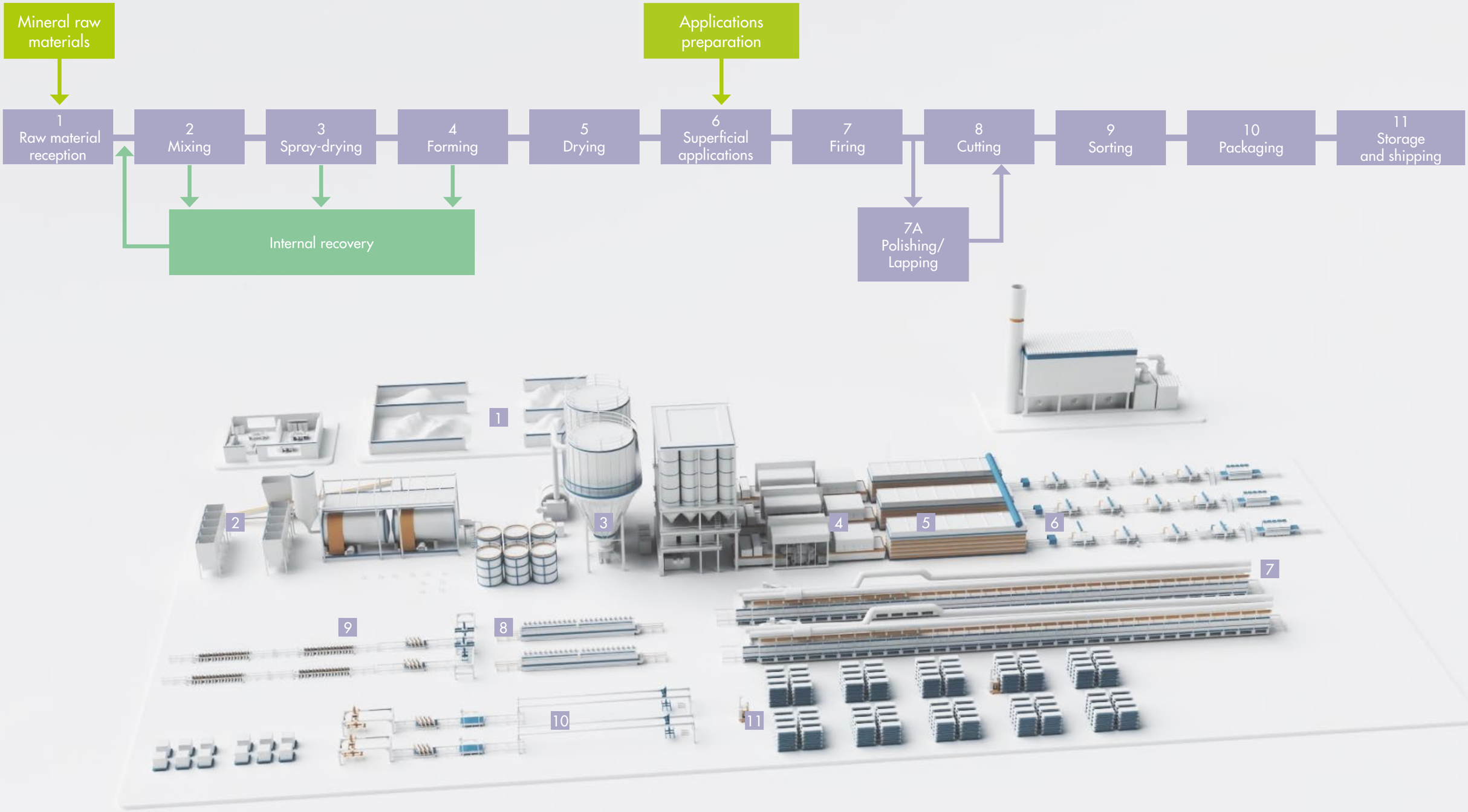
Surface processing: the desired final aesthetic effect could be obtained also by using digital printers.
Firing: the firing phase has the aim of reinforcing the slab so as to give mechanical characteristics, inertia and physical-chemical resistance appropriate to the different uses. The dried sheet is placed in ovens and cooked. During the cooking cycle, the slab is preheated, cooked and cooled; the durability of these phases and the temperature reached determine the mechanical and resistance characteristics pursued.

Lapping / Polishing (optional): lapping and polishing are rotary mechanical abrasion processes of controlled removal of the surface layer of ceramic slabs and are carried out to give them a bright surface and a high-quality aesthetic appearance.

Cutting: the cutting phase is necessary to transform the "big slabs" into the size requested by customers. The cut is made by water jet.

Sorting, packaging and storage: during the sorting phase all the dimensional and qualitative characteristics are checked. This phase is carried out in appropriately equipped automatic lines. The slabs are placed inside crates/stands appropriately packed with stretch film. The finished packed material is ready to be shipped by lorries or containers to the final user.

FLOW DIAGRAM OF THE PRODUCTION PROCESS



LCA INFORMATION

Functional Unit	Coverage of 1 m^2 of flooring in buildings for residential and commercial use for a duration of over 50 years. Weight: 14.07 kg/m^2 Conversion factor for 1 kg is 0.071.
Reference Service Life (RSL)	The RLS of the tiles is generally over 50 years (BNB 2011). Furthermore, according to the US Green Building Council, the RLS of the tiles could have the same duration as the building itself; therefore, 60 years represents an alternative RSL value for tiles. The environmental performance results reported in this EPD refer to the product RSL with the exception of the B2-Maintenance module for which they refer to 1 year (multiplying the B2 values by 50 or 60 it is possible to obtain performance values relating to the useful life). An RSL has not been defined in accordance with ISO 15686.
Temporal representativeness	Primary data relating to the production facilities refer to the year 2022.
Database and LCA software	Ecoinvent 3.8 and Simapro 9.5.0.1
System boundaries	From cradle to grave and module D (A+B+C+D)
Allocations	Allocations relating to input and output flows were made on a mass basis
Cut-off	In accordance with EN 15084, a minimum of 95% of the total mass and energy flows per module has been included
Electric Mix (Module A3)	Castellarano Site: Renewable sources: 100% Climate impact of electricity production: 0.00652 kg CO_2 eq./kWh
Exclusions	Processes found to be not significant with respect to overall environmental performance were excluded. The environmental impacts of administrative activities, the movement of workers to and from the workplace, cleaning activities, the construction of machinery and plants were excluded, as they were not directly related to the product.
Technical support for the LCA	Bureau Veritas Nexta Srl – www.nexta.bureauveritas.it

DECLARED MODULES, GEOGRAPHICAL REPRESENTATION, DATA VARIATION

	Product stage			Construction process stage		Use stage							End of life stage				Resource Recovery Stage
	Raw materials supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-cnstruction demolition	Transport	Waste processing	Disposal	Reuse - recovery Recycling - potential
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Declared modules	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geography	GLO	GLO	IT	GLO													GLO
Specific data	> 90%																

X = Module Declared; ND = Module not declared

	A1 - A3
	6 mm
Variation - products %	< 10%
Variation - Sites %	Not relevant

A1-A3 "PRODUCTION STAGE"

A1 – Raw materials supply

The porcelain stoneware slab is mainly composed of mineral raw materials (clay, quartz, kaolin, feldspar) which come partly directly from quarries and partly principally from pre-consumer recycled material and / or from ceramic waste resulting from the ceramic and sanitary sectors.
The module includes the processes of extraction of mineral raw materials from European and non-European quarries, selection and grinding of waste from the ceramic and sanitary sector to obtain secondary raw materials, manufacture of the fluidifier and colored pigments, generation of electricity needed for production at the Iris Ceramica Group facilities.

A2 – Raw Materials Transport

The module includes the transport of raw materials by sea, road and rail to the production site.

A3 – Manufacturing

The module includes the ceramic slab manufacturing activities at the production site in the scope of this declaration, the production of packaging and auxiliary materials, and the transport and treatment processes of the waste produced.

A4-A5 "CONSTRUCTION PROCESS STAGE"

A4 – Product transport to building site

The module includes the transport of porcelain stoneware slabs from Iris Ceramica Group production site to the customer or to the point of installation. The marketing of the products takes place all over the world.
The transport scenarios used (distances and transport vehicles) are shown in the following table and refer to average data reported in the EN 17160: 2019 standard (Product category rules for ceramic tiles).

Scenario Information	Unit / description
Fuel type and consumption	Diesel – 31.2 l/100 km (National and European destination)
Distance	National destination (Truck with a capacity of 16-32 tons): 300 km European destination (Truck with a capacity of 16-32 tons): 1390 km International (non-European) destination (Transoceanic freight ship): 6520 km
Capacity utilization	% assumed in Ecoinvent 3.8
Bulk density of transported product	0.08-1.03 kg/m^3 per Functional Unit, depending on product thickness

A5 – Product Installation

The module includes the product installation phases and the treatment of the waste produced (e.g. from packaging). The slabs are fixed to the surfaces of walls and floors using specific materials and in different quantities: the installation scenarios used are shown in the following table and refer to average data reported in the EN 17160: 2019 standard (Product category rules for ceramic tiles).
The production of ceramic waste in the installation phase is negligible.

Scenario Information	Unit / description
Ancillary materials for installation	6 kg/FU of cementitious adhesive
Use of water	No use of water resulting from product installation
Use of other resources	No use of other resources resulting from product installation
Quantitative description of the type of energy and the consumption during the installation process	No consumption of energy resulting from product installation
Waste materials on the building site generated by the product's installation	Packaging waste: Wood: 1.5 kg/FU depending on product thickness Cardboard: 0.23 kg/FU depending on product thickness PE stretch Film: 0.012 kg/FU depending on product thickness
Output materials as a result of waste processing at the building's site	Wood: 42% recycling, 23% energy recovery, 35% landfill Cardboard: 70% recycling, 5% energy recovery, 25% landifll PE Stretch Film: 33% recycling, 27% energy recovery, 40% landifll
Direct emissions to ambient air, soil and water	No emissions to air, soil or water resulting from product installation

B1-B7 "USE STAGE"

B1 – Use
During use, ceramic slabs do not require the use of resources nor generate emissions into the environment. At this stage there are no processes that generate environmental impacts.

B2 – Maintenance
The maintenance of the slab consists of cleaning operations with detergents, which varies according to the type of building (residential, commercial, sanitary). The module therefore includes the water supply and detergent production processes. The maintenance scenarios used are shown in the following table and refer to average data reported in the EN 17160: 2019 standard (Product category rules for ceramic tiles).
The values declared in this stage refer to a time period of 1year.

Scenario Information	Unit / description
Maintenance process	Periodic cleaning using floor disinfectants
Maintenance cycle	52/year
Ancillary materials for maintenance	Liquid detergent: 0.2 ml/week
Waste materials resulting from maintenance	Not relevant
Net fresh water consumption during maintenance	0.1 l/week
Energy input during maintenance	No energy input during maintenance

B3-B4-B5 – Repair, replacement and refurbishment
These types of interventions are not necessary: if correctly installed, the slabs do not require repair, replacement or renovation.

B6 – B7 – Operational energy use and Operational water use
These modules are not relevant for ceramic slabs.

C1-C4 "END OF LIFE STAGE"

C1 – De-construction demolition
This module includes the processes of de-construction and removal of slabs at the end of their life.
It is not relevant from the point of view of environmental impacts.

C2 – Transport
The module includes the transportation of the demolished slab to a recycling or disposal process.

C3 – Waste processing and C4 - Disposal
The modules include the treatment processes aimed at recycling (C3) and final disposal in landfills (C4) of the slab at the end of life.

Scenario Information	Unit
Collection process	kg/FU collected separaltely: 0%
	Kg/FU collected with mixed construction waste: 100% for all products
Recovery system	kg/FU for re-use: 0
	kg/FU for recycling (depending on product thickness): 13.47 (6 mm)
	kg/FU for energy recovery: 0
Disposal	kg/FU for final disposal (depending on product thickness): 6.6 (6 mm)
Waste transportation (distance)	50 km. The return trip is included in the system.

MODULE D "REUSE-RECOVERY-RECYCLING POTENTIAL"

Module D accounts for the potential net environmental benefits produced beyond the boundaries of the system studied, deriving from reuse, recovery and recycling processes.
For ceramic slabs included in this EPD, the net environmental benefits from recycling of slabs and packaging and the net environmental benefits from energy recovery of packaging are calculated.

CONTENT DECLARATION

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The porcelain stoneware slab is mainly composed of mineral raw materials (clay, quartz and feldspathic). The composition of the mineral part can vary from product to product depending on the specific mixture used.
The aesthetic aspect could be obtained initially by coloring the mixture with suitable coloring pigments (consisting mainly of complex inorganic oxides) and subsequently before firing may be reached through surface decorations with inks or through glazing (the glaze is mainly made up of silicate glass).
Auxiliary additives, such as the fluidifying agents necessary to facilitate the grinding process of mineral raw materials, also form part of the product composition.
The packaging materials are cardboard, polyethylene stretch film and wood. The quantity of packaging materials varies according to the thickness and size of the slabs.
Porcelain stoneware slabs DO NOT contain substances with a high degree of concern SVHC contemplated in the ECHA Candidate List in concentrations greater than 0,1% by mass.
The weight content of the porcelain stoneware slabs included in the EPD is shown in the following tables.

Product components		Weight % Average Value	Post-consumer material. weight-%	Pre-consumer material. weight-%	Biogenic carbon content. kgC/kg
Mineral raw materials	Clay	93.1%	0%	> 40%	0
	Feldspar				0
	Kaolin				0
	Sand				0
	Others				0
Coloring pigments		5.8%	0%	0%	0
Inks/glaze*		<1%	0%	0%	0
Auxiliary additives		<1%	0%	0%	0
Total		100% 14.07 kg/m²	0%	> 40%	0

* inks and glaze are alternative

Packaging materials	Weight, %		Biogenic carbon content, kgC/kg
	Kg/mq	% on FU	
Cardboard	0.23	1.6	9.25E-02
Polyethylene film	0.0012	0.008	0
Wood	1.5	10.6	6.70E-01

ENVIRONMENTAL PERFORMANCE

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POTENTIAL ENVIRONMENTAL IMPACTS - 6 mm

Indicators	Units	A1-A3	A4	A5	B1 - B3 B4 - B5 B6 - B7 C1	B2	C2	C3	C4	D
GWP-total	kg CO_2 eq	8.01E+00	2.39E+00	3.93E+00	0.00E+00	4.51E-02	2.82E-01	1.24E-01	3.42E-02	5.08E+00
GWP-fossil	kg CO_2 eq	7.99E+00	2.38E+00	3.83E+00	0.00E+00	3.46E-02	2.82E-01	1.23E-01	3.42E-02	5.08E+00
GWP-biogen.	kg CO_2 eq	1.03E-02	7.67E-04	9.71E-02	0.00E+00	1.14E-04	8.28E-05	2.26E-04	1.63E-05	1.79E-03
GWP-luluc	kg CO_2 eq	4.16E-03	9.18E-04	1.87E-03	0.00E+00	1.04E-02	1.01E-04	1.16E-04	1.04E-05	5.12E-04
GWP-GHG[1]	kg CO_2 eq	8.08E+00	2.39E+00	3.93E+00	0.00E+00	4.51E-02	2.82E-01	1.24E-01	3.42E-02	5.08E+00
ODP	kgCFC11eq	1.73E-06	5.36E-07	2.49E-07	0.00E+00	2.44E-09	6.46E-08	2.11E-08	1.44E-08	8.81E-08
AP	mol H+ eq	3.84E-02	1.73E-02	1.51E-02	0.00E+00	2.28E-04	1.16E-03	9.85E-04	3.31E-04	4.13E-02
EP-freshw.	kg P eq	1.15E-03	1.98E-04	5.99E-04	0.00E+00	1.27E-05	2.08E-05	2.82E-05	3.58E-06	1.51E-03
EP-marine	kg N eq	2.00E-02	4.27E-03	4.41E-03	0.00E+00	1.44E-04	3.48E-04	3.58E-04	1.15E-04	4.71E-03
EP-terrestrial	mol N eq	1.33E-01	4.72E-02	4.62E-02	0.00E+00	6.31E-04	3.81E-03	3.89E-03	1.26E-03	4.90E-02
POCP	kgNMVOC	2.74E-02	1.17E-02	1.12E-02	0.00E+00	9.95E-05	9.45E-04	9.43E-04	3.09E-04	1.37E-02
ADPmin&met[2]	kg Sb eq	2.95E-04	5.57E-05	2.50E-04	0.00E+00	8.68E-07	7.70E-06	7.86E-07	3.19E-07	-1.01E-05
ADPfossil[2]	MJ	1.34E+02	3.60E+01	2.70E+01	0.00E+00	6.76E-01	4.29E+00	1.84E+00	9.75E-01	3.87E+01
WDP[2]	m^3.depriv.	1.40E+01	1.16E-01	3.87E-01	0.00E+00	2.59E-01	1.17E-02	2.59E-02	4.37E-02	-3.34E-01

GWP-total = Climate change; **GWP-fossil** = Climate change – fossil; **GWP-biogenic** = Climate change – biogenic; **GWP-luluc** = Climate change - land use and land use change; **GWP-GHG** = GWP total excluded biogenic carbon dioxide emissions and biogenic carbon stored in the product; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential, Accumulated Exceedance; **EP-freshwater** = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-marine** = Eutrophication potential, fraction of nutrients reaching marine end compartment; **EP-terrestrial** = Eutrophication potential, Accumulated Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP-minerals&metals** = Abiotic depletion potential for non-fossil resources; **ADP-fossil** = Abiotic depletion for fossil resources potential; **WDP** = Water use

1: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A2:2019.
2: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

RESOURCE USE - 6 mm

Indicators	Unit	A1-A3	A4	A5	B1 - B3 B4 - B5 B6 - B7 C1	B2	C2	C3	C4	D
PERE	MJ	1.41E+02	5.52E-01	2.86E+00	0.00E+00	3.05E-01	6.05E-02	7.13E-02	7.88E-03	0.00E+00
PERM	MJ	3.05E+01	0.00E+00	-2.49E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.72E+02	5.52E-01	-2.21E+01	0.00E+00	3.05E-01	6.05E-02	7.13E-02	7.88E-03	0.00E+00
PENRE	MJ	1.47E+02	3.82E+01	2.86E+01	0.00E+00	7.44E-01	4.55E+00	1.95E+00	1.04E+00	0.00E+00
PENRM	MJ	4.81E-01	0.00E+00	-4.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.47E+02	3.82E+01	2.82E+01	0.00E+00	7.44E-01	4.55E+00	1.95E+00	1.04E+00	0.00E+00
SM	Kg	4.49E-01	0.00E+00	0.00E+00	0.00E+00	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	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	4.80E-02	4.23E-03	1.39E-02	0.00E+00	7.02E-03	4.43E-04	7.54E-04	1.03E-03	0.00E+00

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; **PERM** = Use of renewable primary energy resources used as raw materials; **PERT** = Total use of renewable primary energy resources; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** = Use of non-renewable primary energy resources used as raw materials; **PENRT** = Total use of non-renewable primary energy re-sources; **SM** = Use of secondary material; **RM**: Use of recycled materials and by-products (according to Green Building Protocols as LEED and BREEAM); **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Use of net fresh water

WASTE PRODUCTION - 6 mm

Indicators	Unit	A1-A3	A4	A5	B1 - B3 B4 - B5 B6 - B7 C1	B2	C2	C3	C4	D
HW	Kg	1.13E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHW	Kg	5.67E-01	0.00E+00	1.73E+00	0.00E+00	0.00E+00	0.00E+00	9.43E+00	4.64E+00	0.00E+00
RW	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HW = Hazardous waste disposed; **NHW =** Non-hazardous waste disposed; **RW =** Radioactive waste disposed

OUTPUT FLOWS - 6 mm

Indicators	Unit	A1-A3	A4	A5	B1 - B3 B4 - B5 B6 - B7 C1	B2	C2	C3	C4	D
REUSE	Kg	2.23E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RECYCLE	Kg	2.35E+00	0.00E+00	7.95E-01	0.00E+00	0.00E+00	0.00E+00	9.43E+00	0.00E+00	0.00E+00
EN-REC	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE-E	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE-T	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

REUSE = Components for reuse; **RECYCLE** = Materials for recycling; **EN-REC** = Materials for Energy Recovery; **EE-E**= Exported Energy Electricity; **EE-T**= Exported Thermal Energy

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

The values of the following additional environmental impact indicators have been calculated by LCA analysis and are available on request by writing to sustainability@icgmail.com

Indicator	Particulate matter emissions	Lonising radiation, human health*	Ecotoxicity (freshwater)**	Human toxicity, cancer effects**	Human toxicity, non- cancer effects**	Land use related impacts / soil quality**
Unit	Disease incidence	kBq U235eq	CTUe	CTUe	CTUe	dimensionless

** This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.*

*** The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.*

ADDITIONAL INFORMATION

07

PRODUCT CIRCULARITY

Iris Ceramica Group materials are manufactured using variable amounts of pre and post consumer materials as raw materials input, in quantities exceeding 40% by weight of the product.
At the end of the reference service life of the product, which can be assessed in at least 50 years, the product could be entirely subjected to a simple mechanical crushing treatment for the recovery of material that can be used in various other sectors (for example concrete production, road construction) instead of primary materials.
Iris Ceramica Group production is a closed-circuit and all the raw materials waste and wastewater are reused into the production cycle.

AIR QUALITY (USE STAGE)

Our materials do not contain added VOC (volatile organic compounds). With regard to emissions of VOCs and formaldehyde in indoor environments, emissions of Iris Ceramica Group ceramic slabs are classified A +.
No need for sealants or waxes that could contribute to the emission of harmful VOCs in buildings.
The stain-resistant surface reduces the need to use strong detergents. For routine cleaning, a pH-neutral detergent is all that is needed.

Certifications	Description
Greenguard and Greenguard Gold  View certified products on https://spot.ul.com/	The GREENGUARD Certification ensures that materials intended for indoor use are characterized by the absence of emissions of volatile substances, helping to create healthier environments. The GREENGUARD Gold Certification includes safety factors that take account of sensitive subjects (such as children and elderlies) and ensures that the use of a product is acceptable in environments such as schools and health facilities. This certification is widely recognized and accepted by sustainable building programs and building codes worldwide. In the US, it is taken as a reference of the evaluation system of the CHPS buildings (The Collaborative for High Performance Schools) and LEED (Leadership in Energy and Environmental Design). For more information on the GREENGUARD certified products, refer to the website: www.spot.ul.com
NSF/ANSI 51 – 2014 Food Equipment Materials  See official listing (www.nsf.org) to identify which models are NSF Certified	The certification has been developed mainly for commercial applications including bars, restaurants, hotel kitchens and cafeterias. Ceramic slabs are now applied not only in tabletop applications where customers consume food or beverages, but also in areas where there may be direct contact with food such as worktops, bar counters and so on, with the exception of direct food contact areas for storage and/or preservation applications. This certification offers an additional and certified guarantee of quality and safety for consumers in the case of certified products. Following the link where the entire list of certified materials is available: www.nsf.org
Cradle To Cradle  See official listing www.c2ccertified.org	Cradle to Cradle Certified® Silver level issued by *"The Cradle to Cradle Products Innovation Institute"* to Iris Ceramica Group. The aim of the scheme is to promote innovation that strives for a circular economy through the development and production of products that have a positive impact on the environment and on people (for the complete list of certified products, please see the following link www.c2ccertified.org).

END OF LIFE

Iris Ceramica Group Porcelain Stoneware slabs offer an additional guarantee of respect for the environment even in the end of life stage. In fact all the materials at the end of their life cycle do not require treatments since, by virtue of the high chemical inertia, do not release substances into the environment. Precisely for this reason they are considered to all effects inert materials. They can be used as fill material for construction sites and as background material for road beds, thus reducing the need for quarried gravel.

GREEN PUBLIC PROCUREMENT (GPP) AND MINIMUM ENVIRONMENTAL CRITERIA (CAM)

The minimum environmental criteria (CAM) are environmental requirements established by the Italian State in the context of its Green Public Procurement (GPP) policies; they are defined for the various stages of the public administrations purchase process and are aimed at identifying the best design solution, product or service from an environmental point of view along the life cycle, taking into account market availability.
For construction products, the criteria adopted by the Decree of the Minister of the Environment for the Protection of the Territory and the Sea of 11 January 2017 ("Entrusting of design and work services for the new construction, renovation and maintenance of public buildings") must be respected.
Iris Ceramica Group complies with the following minimum environmental criteria on the basis of the test methods provided for by Decision 2021/476/EC of 16 March 2021 (Ecolabel) or other equivalent test methods established by the Competent Authority in the respective environmental permits

Fuel consumption for drying and firing

The specific fuel energy consumption for drying and firing processes shall not exceed the relevant mandatory limits defined below.

	Spray dryer (MJ/kg)	Ware dryer & kiln (MJ/kg)
Ceramic tile: family of products	1.8	5.5

CO_2 Emissions

The specific CO_2 emissions associated with fuel combustion and process emissions from raw material decarbonation during drying and firing processes shall not exceed the relevant mandatory limits defined below.

	Spray dried powder production ($kgCO_2/t$)	Ware dryer & kiln ($kgCO_2/t$)
Ceramic tile: family of products	184	360

Process water consumption

Have a closed loop wastewater recycling system for process wastewater that facilitates zero liquid discharge. Specific freshwater consumption is less than or equal to 1 l/kg of product.

Emissions to air

Measures to reduce dust emissions from "cold" dusty operations at the ceramic tile production site shall cover at least the reception, blending and milling of raw materials and the shaping and glazing/decoration of tiles.

The specific dust, HF, NOx and SOx emissions to air associated with the production of ceramic or fired clay products shall not exceed the relevant mandatory limits defined in the table below.

Emission parameter	Mandatory limit (mg/kg)
DUST (Spray dryer)	90
DUST (Kiln)	50
HF (Kiln)	20
NOx as NO_2 (Kiln)	250
SOx as SO_2 (Kiln)	1300

Wastewater management

After waste water treatment, the following values must not be exceeded:

Parameter	Mandatory limit (mg/l)
Suspended solids	40
Cadmium	0.015
Lead	0.15

Reuse of process waste

At least 90 % (by weight) of the total waste generated by the processes must be recovered, according to the general terms and definitions contained in Council Decision (EU) 2021/476.

Glazes and inks

In cases where ceramic tiles are glazed or decorated, the glaze formulation or ink shall contain less than 0.10 % wt. Pb and less than 0.10 % wt. Cd.

DIFFERENCES VERSUS PREVIOUS VERSION

This EPD is an update of the EPD "Porcelain Stoneware Slabs for Interior and Exterior Floor and Wall Coverings Countertops - Furnishings", revision date 2020-07-24, regarding thickness 6mm. Within this version, the extension of all product life cycle stages (cradle to grave) has been confirmed within the LCA. In addition, potential benefits from material and energy flows outside the boundaries of the analysed system (material and energy recovery) have been accounted for in Module D.
The technical specifications underlying the LCA elaborations and the development of the contents of this EPD are the PCRs "EN 15804:2012+A2:2019 Sustainability of Construction Works" and "2019:14 Construction products, version 1.3.1".
The results of the GWP total indicator reported in this document referring to the 6mm thickness are significantly lower than those reported in the previous version, thanks to the acquisition of more accurate data and considerable improvement measures carried out at the plants covered by this declaration.

REFERENCES

- International EPD® System - General Programme Instructions, Version 4.0
- International EPD® System - PCR 2019:14 Construction products, versione 1.3.1
- International EPD® System - C-PCR-002 Ceramic tiles (EN 17160:2019), version 2019-12-20
- EN 15804:2012+A2:2019 Sustainability of Construction Works
- EN 17160:2019 Product category rules for ceramic tiles
- ISO 14020:2000 Environmental labels and declarations-General principles
- ISO 14025:2010 Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures
- ISO 14040:2006 Environmental management-Life Cycle Assessment-Principles and framework
- ISO 14044:2018 Environmental management-Life Cycle AssessmentRequirements and guidelines
- Report LCA "Superfici ceramiche IRIS CERAMICA GROUP" - Rev1, December 2023


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