Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for

PORCELAIN STONEWARE

from

Gruppo Bardelli S.p.A.

Registered office: Via Montenapoleone 8 | 20121 Milan (MI) Italy
Production site: Loc. Vergnasco | Via Papa Giovanni XXIII, 100 | 13882 Cerrione (BI) Italy

The EPD covers multiple products (listed at pag.4), based on the pondered average results of the product group.

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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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

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *Construction product, PCR 1019:14, version 1.3.4* c-PCR to PCR 2019:14: CERAMIC TILES (EN 17160:2019) - PRODUCT GROUP CLASSIFICATION: UN CPC 373 - C-PCR-002 (TO PCR 2019:14) - VERSION: 2024-04-30
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: *Gruppo Bardelli S.p.A.*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Marcel Gomez Ferrer Marcel Gómez Consultoria Ambiental, info@marcelgomez.com Phone: +34 630 64 35 93 - Email: info@marcelgomez.com Approved by: The International EPD® System
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 within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Name and contact information of LCA practitioners:
Esalex srl, www.esalex.eu, info@esalex.eu

Company information

Owner of the EPD: Gruppo Bardelli S.p.A.

Contact: Gianmaria Bardelli, i.bardelli@gruppobardelli.com

Description of the organisation: Gruppo Bardelli S.p.A. is an Italian company specialized in porcelain and mosaic ceramic tiles from interior and exterior architecture. The company was founded in 1962 in Bareggio and was transferred in 1965 to the headquarters in Vittuone in the province of Milan and then consolidated and structured in the offices of Cerrione, in the province of Biella and Oderzo, in province of Treviso.
The company currently has around 170 collaborators between the headquarters and the two production units. The two production units are custodians of a historical tradition, technical expertise, operational know-how and leading aesthetic creativity. This EPD covers only the productive site of Cerrione (BI).
The Group generates 40% of its turnover on the national market, while international markets represent over 60% of its total turnover in over 70 countries around the world.

More information: www.gruppobardelli.com

Name and location of production site:
Gruppo Bardelli S.p.A.
Loc. Vergnasco | Via Papa Giovanni XXIII, 100
13882 Cerrione (BI) Italy
T. +39 015.6721
info@gruppobardelli.com

Product information

Product name: Porcelain stoneware

Product description and identification: The products of Gruppo Barelli are an excellence of the Italian ceramics and of the design. The colours, the shapes and the ceramic surfaces create strongly connoted scenarios, characterised by a rigorous conception of space, for internal and external application.
In this EPD, the porcelain stoneware tiles produced by Gruppo Bardelli are studied and 25 collections inside 2 brands are included. This EPD covers multiple products based on the pondered average results of the product group.

The products covered the EPD are:

1. For Ceramica Vogue brand:

   System Interni*
   System Trasparenze*
   System Flooring*
   System Grip*
   System Interni Plus
   System Interni Mix*
   System Trasparenze Mix*
   System Flooring Mix*
   System Grip Mix*
   System Decor 1*
   System Decor 2*
   System Bisello Interni e Trasparenze
   System Materia Interni e Trasparenze
   Twins*
   Flauti*
   Riflessi*
   Graph
   Vogue Pool

2. For Ceramica Bardelli brand:

   Pittorica
   Caleido
   Fleurs
   Fabrics
   Corrispondenza
   Tangram
   Queen

   *products with the possible use of fibreglass net.

In the LCA study, all raw materials used for the production of slabs have been considered, with the relative transportation. In A3 module the consumptions and emissions are allocated for the whole production for the average product under study. The variability of the products is determined by the different colours and the weight of the tiles. The composition of tiles is the same for all products; the variation is determined by the colouring pigments, the shape and the possibility to inclusion of

fibreglass net. In the study, the variability of results between the worst scenario - average scenario and the variability between the best scenario – average scenario have been evaluated. The variability of results for all indicators is declared in the additional information chapter.

UN CPC code: **3732** Refractory bricks, blocks, tiles and similar refractory ceramic constructional goods, other than those of siliceous earths

Geographical scope: Global
The pretended communication of the EPD is B2B and B2C.

Technical specification:

PHYSICAL PROPERTIES	TESTING METHOD	REFERENCE STANDARD
Water absorption %	EN ISO 10545-3	0,5% < Eb ≤ 3,0 %
Tensile strength thickness ≥ 7,5 mm	EN ISO 10545-4	1.100 N min.
Tensile strength thickness < 7,5 mm	EN ISO 10545-4	700 N min.
Modulus of rupture	EN ISO 10545-4	30 N/mm^2 min.
Coefficient of linear thermal expansion	EN ISO 10545-8	< 6,9x10-6/°C
Thermal shock resistance	EN ISO 10545-9	guaranteed
Crazing resistance	EN ISO 10545-11	guaranteed
Frost resistance	EN ISO 10545-12	guaranteed
Expansion to humidity	EN ISO 10545-10	< 0,04%
Impact resistance	EN ISO 10545-5	> 0,6
Stain resistance	EN ISO 10545-14	3 min.
Resistance to chemical products for housekeeping and to the additives used in swimming pools	EN ISO 10545-13	GB min
Resistance to acids and bases at low concentrations		GLB min.
Resistance to acids and bases at high concentrations		GHB min.
Lead and cadmium losses	EN ISO 10545-15	available if required
Colour resistance to light	DIN 51094	guaranteed
Reaction to the fire		class A1

LCA information

Functional unit: 1 m^2 of porcelain stoneware with thickness from 7 to 10 mm (weight 13,89 - 21,77 kg) installed and with a useful life of 50 years. The mass conversion factor (average product) for 1 m^2 is 14,87 kg., with 7,3 mm thickness.
The product is used as floors and walls recovering and decoration for interiors and exteriors.
The study comprises the raw material extraction, raw material transportation, manufacturing, transportation to costumer, installation, end-of-life of product.

Reference service life: 50 years

Time representativeness: primary data refer to 2023 year. The generic data has been updated in 2023 (Ecoinvent 3.9.1).

Geographical representativeness: primary data are derived from Gruppo Bardelli production site in Cerrione (Biella - Italy). The secondary data are derived by database Ecoinvent 3.9.1 (RER or GLO records).

Technological representativeness: primary data are derived from processes and products of Gruppo Bardelli under study. The secondary data are derived from databases of Gruppo Bardelli similar technology.

Data quality: The time representativeness, the geographical representativeness, technological representativeness with parameter uncertainty are assessed for both primary and secondary data, following the criteria of Product Environmental Footprint Category Rules (declared in EN 15804:2012+A2:2019/AC:2021 Annex E). The results of the assessment of each module are:

- A1: Very good quality
- A2: Good quality
- A3: Good quality
- A4: Good quality
- A5: Fair quality
- B: Good quality
- C: Fair quality

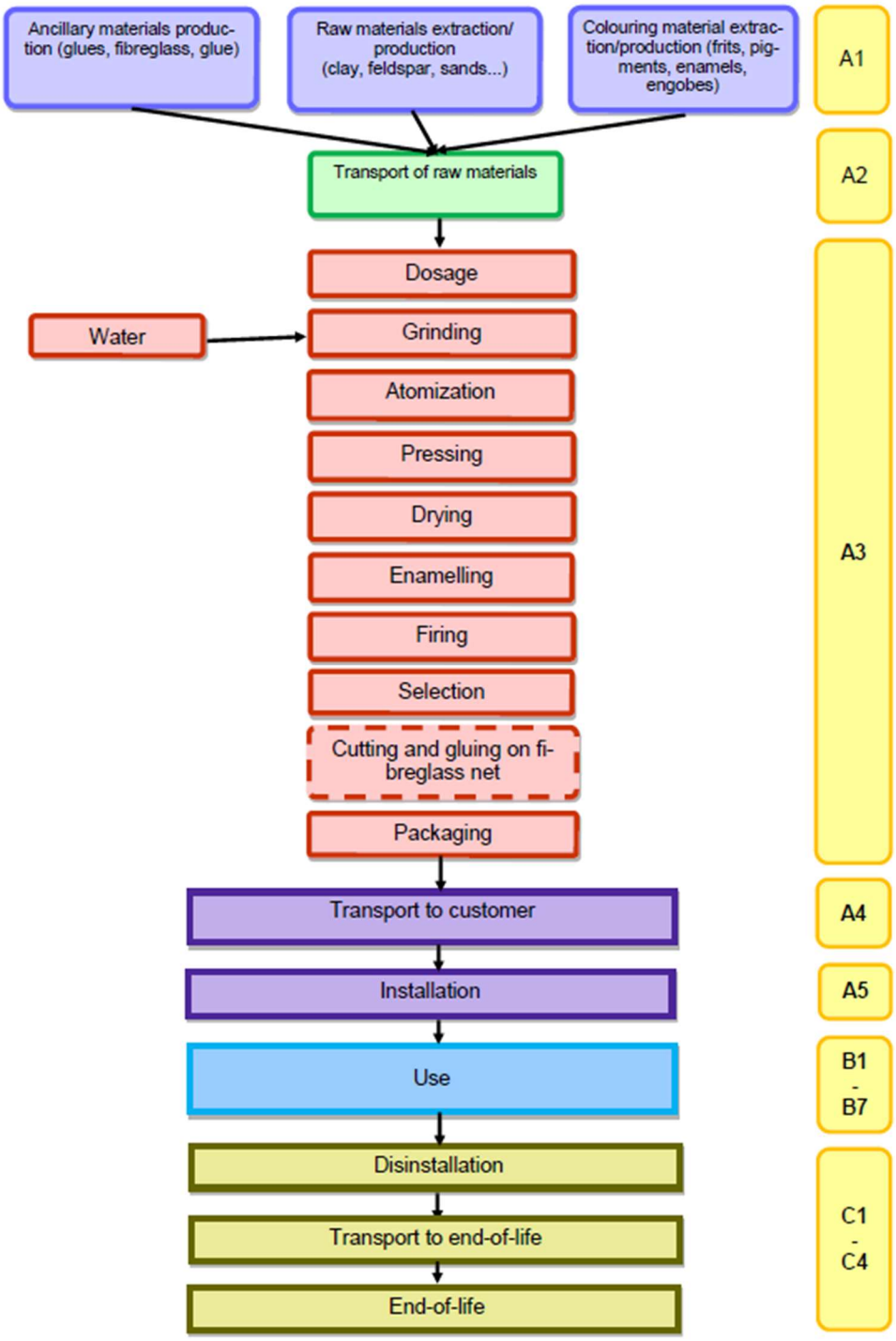
Database and LCA software used: for the elaboration of data SimaPro v. 9.5.0.2; the database used is Ecoinvent 3.9.1.

Description of system boundaries: Cradle-to-grave and module D (A + B + C + D)

Excluded lifecycle stages: all life stages are included in the LCA study

More information: www.gruppobardelli.com

Production process
The system boundary is presented in the flow chart below:



The productive process begins in the warehouse where the raw materials (as feldspar, clay) are stocked in boxes and in silos. The silos are connected to a weighting system, that determines the specific quantities of raw materials according to the recipe. Then, the raw materials are transported by a belt to the mill for the grinding. In the mill, water is added (in the productive process the water is recycled and is taken from well for integration) with the deflocculant for melting the granule of clay. The slip, at the end of grinding process, is transferred to storage tanks, after sieving. The slip is kept in motion by blades and then it is sent to the atomisation, via pumps. The atomized material remains in storage in the silos for a few days; after which it is sent to the pre-loading hoppers that feeds the

presses. The tiles are formed with hydraulic presses using isostatic type pads and sent to horizontal or vertical dryers. By a system of belts, the tiles are sent to enamelling (with the use of enamels and engobe, prepared by the grinding line). The raw materials for the enamelling are frits, silica sand, kaolin, pigments. First of all, the engobe is applied, to hide the aesthetic defects and to act as a primer for the following applications. The tiles are enamelled using high pressure airbrushes.
After the enamelling, the tiles are transferred to ovens (with a 1200°C of temperature). The tiles are so selected and packed. Some products can be cut in smaller size or glued on a fibreglass net.

Additional information:

- The allocation is applied in the LCA study: when necessary, mass allocation is used.
- Cut-off: at least 95% of the energy and materials used by module has been introduced, as well as 99% of the total use of energy and materials
- The modularity principle, as well as the polluter payer principle have been followed
- The long-term emissions have not been included.
- The next processes have not been included since its impact is not significant:
    - Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process.
    - Personnel-related impacts, such as transportation to and from work.

- The impact method used are:
    - Environmental footprint 3.1
    - Cumulative energy demand (LHV) v. 1.00 for resource use
    - EDIP 2003 v. 1.07 for waste production.

The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction 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**
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	Global	Global	Italy	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global	Global
Specific data used	7,68%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-20%; +65%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

- Module A1 – Raw material supply: this module includes the extraction and production of raw material. The Bardelli group S.p.A purchases recycled ceramic scraps (pre-consumer) as secondary raw material. The ceramic scraps represent 9,65% of the product composition.

- Module A2 – Transport: this module includes the transportation of raw materials from the production site to the Gruppo Bardelli gate. The specific distance of supply of each raw material is included in the study.

- Module A3 – Manufacturing: this module considers Gruppo Bardelli S.p.A. internal processes of the Cerrione site, including consumption of energy, resources, packaging and generation of waste and emissions in air. The natural gas production used in productive process is included (0,054 kg CO_2eq/MJ).
  The electricity used in the productive process is modelled from the Italian residual mix and the Ecoinvent record is used (1 kWh – medium voltage - Italy = 0,601 kg CO_2eq with 4,22% of renewable sources).

- Module A4 – Transport: this module considers the transport of product to construction site. The distances are calculated as average weighted (in Italy and abroad) of all transports of 2023; for the model the distances from Gruppo Bardelli site to centre of state or city of delivery, when available, are considered.

PARAMETER	DESCRIPTION / VALUE for FU
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc	From Ecoinvent Truck (16-32 metric ton): 0,0374 kg of diesel low sulfur for ton*km transported Ferry: 0,030 kg of heavy fuel oil for ton*km transported Ship: 0,0025 kg of heavy fuel oil for ton*km transported
Distance	The distances are calculated as weighted average of all transportation in 2023 Truck: 793,49 km Ferry: 1,92 km Ship: 2172,07 km
Capacity utilisation (including empty returns)	From Ecoinvent database: Truck: 36,67% Ferry: 50% Ship: 70%
Bulk density of transported products (kg/m3)	2074,20 kg/m^3
Volume capacity utilisation factor	1

- Module A5 – Construction installation: this module considers the installation of product in the building with use of auxiliary materials.

PARAMETER	DESCRIPTION	VALUE for FU
Auxiliary materials for installation	Adhesive mortar (kg)	5
Use of water	m^3	2,4E-04
Use of other resources	kg	0
Quantitative description of energy type and consumption during the preparation and installation process	Electric energy (kWh)	0 (manual installation)
Direct emissions to ambient air, soil and water	kg	0
Waste materials on the building site, before waste processing, generated by the product's installation; specified by type	Product loss	5%
	Wood packaging (kg)	4,09E-02
	Cardboard (kg)	1,12E-01
	Plastic packaging (kg)	1,55E-02
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal; specified by route	Landfill	100% of product packaging (0,04 kg of wood, 0,11 kg of cardboard, 0,02 kg of plastic) and 100% of product loss (0,74 kg)

- Module B – Use stage: The product is maintained with a periodic cleaning with water (every week) and detergent (every 2 weeks) for 50 years.

SCENARIO INFORMATION	DESCRIPTION / VALUE for FU
Maintenance process	Periodic cleaning with water and detergent
Maintenance cycle	For 50 years
Ancillary materials for maintenance	Detergent: 0,134 ml/two weeks (0,185 kg in the whole RSL)
Waste material resulting from maintenance	Not relevant
Net fresh water consumption during maintenance	Tap water: 0,1 l/week (260 kg in the whole RSL)
Energy input during maintenance	No energy use during maintenance

- Module C1 – Deconstruction/demolition: The product is uninstalled with the use of jackhammer and the consume of 0,03 kWh/FU of electricity.

- Module C2 – Transport to waste processing: the product is then transported to disposal; the scenario provides the transport for 50 km.

- Module C3 - Waste processing for reuse, recovery and/or recycling: the product is sent to landfill; any process of reuse, recovery and/or recycling isn't considered in the study.

- Module C4 - Disposal: the product is totally disposed in landfill.

PARAMETER	DESCRIPTION / VALUE for FU
Collection process specified by type	Product waste are collected with 16-32 metric ton truck
Recovery system specified by type	There is no recovery, recycling or reuse
Disposal specified by type	100 % Landfill (14,87 kg of product and 5 kg of adhesive mortar)
Assumptions for scenario development (e.g. transportation)	16-32 metric ton truck. Distance: 50 km

Module D - Reuse-Recovery-Recycling potential: Module D calculates the potential environmental benefits and impacts of the recycling or reuse of materials. The benefits/impacts linked to the use of secondary material in A1 module are accounted in D module, applying the formula of EN 15804:2012+A2:2019/AC:2021. At the end of life the product is sent to landfill, so there is a loss of recycled material.

Content information (14,87 kg)

The composition presented in the table below is for a weighted averaged product (weight of 14,87 kg and 7,3 mm thickness) and it is the same for all products studied. The weight of minimum product is 13,89 kg (thickness 7,0 mm) and the weight of maximum product is 21,77 kg (thickness 10,0 mm). The variation of impacts is presented as additional information.

Product components	**Weight, %**	**Post-consumer material, weight-%**	**Biogenic material, weight-% and kg C/kg**
Clay	<60%	0	0
Feldspar	>25%	0	0
Ceramic scraps	<10%	0	0
Liquid additive	<1%	0	0
Engobes	>2%	0	0
Compound/glazes/frits/pigments	>5%	0	0
Other additives	<1%	0	0
Fibreglass net	0-<1%	0	0
TOTAL Kg	14,87	0	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Wood	4,09E-02	0,27	0,47
Cardboard	1,06E-01	0,71	0,45
Paper	5,89E-03	0,04	0,49
Plastic	1,55E-02	0,10	0,00
TOTAL	1,68E-01	1,13	/

During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has not been used in a percentage higher than 0,1% of the weight of the product.

Results of the environmental performance indicators

The following results refers to 1 m^2 of average tile of Gruppo Bardelli porcelain stoneware, weighting 14,87 kg/m^2 with average thickness of 7,3 mm.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

This EPD contains the module C; we strongly discourage the use of the results of modules A1 - A3 without considering the results of module C.

Potential environmental impact – mandatory indicators according to EN 15804

The results are referring to a 1m^2 of averaged product with weight of 14,87 kg and thickness of 7,3 mm.

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil (kg CO_2 eq.)	1,29E+01	2,13E+00	7,17E+00	0,00E+00	6,82E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,29E-02	1,51E-01	0,00E+00	5,37E-02	2,93E+00
GWP-biogenic (kg CO_2 eq.)	-2,38E-01	1,19E-04	2,93E-01	0,00E+00	2,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,43E-05	8,62E-06	0,00E+00	5,66E-06	8,69E-03
GWP-luluc (kg CO_2 eq)	6,33E-03	8,03E-05	6,49E-03	0,00E+00	1,96E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,86E-05	5,81E-06	0,00E+00	2,69E-06	3,52E-03
GWP-total (kg CO_2 eq)	1,26E+01	2,13E+00	7,47E+00	0,00E+00	8,80E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,30E-02	1,51E-01	0,00E+00	5,37E-02	2,94E+00
ODP (kg CFC 11 eq.)	5,62E-07	3,15E-08	2,88E-07	0,00E+00	6,98E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,31E-10	2,23E-09	0,00E+00	7,98E-10	2,22E-07
AP (mol H^+ eq.)	4,72E-02	1,71E-02	4,33E-02	0,00E+00	4,04E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,10E-04	6,04E-04	0,00E+00	4,99E-04	2,24E-02
EP-freshwater (kg P eq)	2,06E-04	4,48E-06	2,59E-04	0,00E+00	4,12E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,15E-06	3,54E-07	0,00E+00	1,90E-07	1,19E-04
EP-marine (kg N eq.)	1,14E-02	5,44E-03	7,37E-03	0,00E+00	2,60E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,96E-05	2,47E-04	0,00E+00	2,27E-04	4,07E-03
EP-terrestrial (mol N eq.)	1,12E-01	5,93E-02	7,74E-02	0,00E+00	1,15E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,16E-04	2,66E-03	0,00E+00	2,47E-03	3,87E-02
POCP (kg NMVOC eq.)	4,18E-02	1,73E-02	2,88E-02	0,00E+00	3,69E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,42E-05	8,39E-04	0,00E+00	7,38E-04	1,09E-02
ADP-minerals&metals (kg Sb eq.) []	1,12E-04	1,12E-07	4,27E-05	0,00E+00	8,56E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,19E-10	9,00E-09	0,00E+00	2,13E-09	1,12E-04
ADP-fossil (MJ) []	1,85E+02	2,83E+01	1,06E+02	0,00E+00	1,27E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,98E-01	2,04E+00	0,00E+00	6,90E-01	3,64E+01
WDP (m^3) []	8,37E+00	3,74E-02	3,72E+00	0,00E+00	1,12E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,76E-03	2,83E-03	0,00E+00	9,51E-04	2,91E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; 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 (user) deprivation potential, deprivation-weighted water consumption														

[] 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.

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG [2] (kg CO_2 eq.)	1,29E+01	2,13E+00	7,18E+00	0,00E+00	8,78E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,30E-02	1,51E-01	0,00E+00	5,37E-02	2,93E+00

[2] 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+A1:2013.

Information on biogenic carbon content

Results per functional unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in packaging	kg C	6,97E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Use of resources

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B2**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE (MJ)	6,54E+00	4,25E-02	7,88E+00	0,00E+00	7,16E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,03E-02	3,00E-03	0,00E+00	0,00E+00	3,27E-03
PERM (MJ)	1,97E+00	0,00E+00	-1,97E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT (MJ)	8,50E+00	4,25E-02	5,91E+00	0,00E+00	7,16E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,03E-02	3,00E-03	0,00E+00	0,00E+00	3,27E-03
PENRE (MJ)	1,84E+02	2,83E+01	1,07E+02	0,00E+00	1,30E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,98E-01	2,04E+00	0,00E+00	2,11E-02	6,59E-02
PENRM (MJ)	9,60E-01	0,00E+00	-9,39E-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	0,00E+00	0,00E+00	-2,11E-02	0,00E+00
PENRT (MJ)	1,85E+02	2,83E+01	1,07E+02	0,00E+00	1,30E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,98E-01	2,04E+00	0,00E+00	0,00E+00	6,59E-02
SM (kg)	1,65E+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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW (m^3)	1,82E-01	1,11E-03	9,13E-02	0,00E+00	5,26E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,44E-05	8,13E-05	0,00E+00	3,00E-05	2,32E-03
Acronyms	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; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water														

Waste production and output flows

Waste production

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed (kg)	7,54E-04	1,83E-04	2,59E-04	0,00E+00	1,49E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,22E-07	1,37E-05	0,00E+00	4,44E-06	2,54E-07
Non-hazardous waste disposed (kg)	1,10E+00	6,45E-03	2,56E+00	0,00E+00	4,28E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,58E-04	5,17E-04	0,00E+00	1,99E+01	1,46E-04
Radioactive waste disposed (kg)	3,16E-04	1,02E-06	9,03E-05	0,00E+00	1,33E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,17E-07	7,14E-08	0,00E+00	4,09E-08	4,36E-08

Output flows

Results per functional unit															
Indicator	**Tot.A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (kg)	5,62E-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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal (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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional information

1. Recycled content

Recycled and recovered material content	**9,65%**

The total purchased recycled material is divided to total purchased materials.

2. Indoor pollution

Ceramic tiles manufactured by BARDELLI GROUP are obtained by an industrial process in which the firing phase is oxidant and it is performed at high temperature (ranging from 950 °C to 1200 °C), depending on the type of product.
During firing, in the presence of oxygen, any organic compounds in the ceramic product become oxidised (combustion), with consequent emission of combustion gases. No organic compounds can be present in the fired material.

At the end of the productive process a protective product is used (HYDROCER 271): this is the only process after the firing phase.
This substance is water-based and don't contain VOCs.
No surface treatments used contain formaldehyde-based resins.

3. Industrial and construction mineral extraction

At least 90% mineral material suppliers provided the following documentation required by Gruppo Bardelli if their product are virgin material:
- quarry location and authorization provided to competent body;
- copy of EIA screening and EIA report;
- copy of rehabilitation management plan provided;
- declaration on invasive species;
- declaration on the habitats and birds Directive.

4. Restricted substances

Gruppo Bardelli declares under their sole responsibility that the product listed in this document do not contain any "Substance of very high concern" (SVHC) included in the "REACH Authorisation, Restriction and candidate list", at the date of this document, in concentration above 0,1% weight and neither do their packaging.
Gruppo Bardelli declares that products don't contain substances or mixtures in concentration above 0,1% weight with those hazardous classes, hazard categories and related hazard statement codes in accordance with Regulation (EC) No. 1272/2008:
- Group 1 hazards: Category 1A or 1B carcinogenic, mutagenic and/or toxic for reproduction (CMR): H340, H350, H350i, H360, H360F, H360D, H360FD, H360Fd, H360Df.
- Group 2 hazards: Category 2 CMR: H341, H351, H361, H361f, H361d, H361fd, H362; Category 1 aquatic toxicity: H400, H410; Category 1 and 2 acute toxicity: H300, H310, H330; Category 1 aspiration toxicity: H304; Category 1 specific target organ toxicity (STOT): H370, H372.
- Group 3 hazards: Category 2, 3 and 4 aquatic toxicity: H411, H412, H413; Category 3 acute toxicity: H301, H311, H331; Category 2 STOT: H371, H373.

5. Fitness for use

Gruppo Bardelli declares to have a quality management system in place for the production site(s) and a procedure for dealing with customer complaints.
Gruppo Bardelli products comply with EN14411 standard.

6. User information

User can find details about relevant technical performance, correct preparation and installation, instructions on proper cleaning and maintenance and information about correct disposal (of both

product and packaging materials) at the end of technical manual, on the packaging and at the following links:
https://www.gruppobardelli.com/
https://www.gruppobardelli.com/blog/consigli-sulla-posa-e-manutenzione/
The packaging is made by cardboard and pallet: on the packaging there are information about the correct disposal.

7. Fuel consumption for drying and firing

Specific spray-dried powder energy consumption (MJ/kg)	1,45
Specific kiln & ware dryer fuel consumption (MJ/kg)	4,35

8. CO_2 emissions

Specific emissions	**Spray drying powder phase**	**Kiln & ware dryer phase**
Fuel combustion emissions	82 kg CO_2/t	246 kg CO_2/t

9. Process water consumption and wastewater management

Gruppo Bardelli production facility has a zero liquid discharge system.

Specific process water consumption	6,30 l/kg

10. Emission of dust, HF, NO_x and SO_x to air

	Spry dryer powder emission (mg/kg)	**Kiln emission (mg/kg)**
Dust	24,12	1,34
HF	-	1,96
NO_x	-	110
SO_x	-	

11. Reuse of process waste

Fraction of process waste reused	99,4%

12. Glazes and inks

The Lead (Pb) and Cadmium content in glazes and inks are <0,10% wt.

13. Variability on indicators results

The variability of results declared below is between the average product and the minimum/maximum product considering A to C modules.

Potential environmental impacts	**% MIN**	**% MAX**
Climate change - Fossil	-1,24E+01	5,33E+01
Climate change - Biogenic	-1,20E+01	6,83E+01
Climate change - Land use and LU change	-1,11E+00	3,82E+01
Climate change	-1,23E+01	5,32E+01
Ozone depletion	-2,18E+01	4,55E+01
Acidification	-1,57E+01	6,75E+01
Eutrophication, freshwater	-1,66E+01	8,01E+01
Eutrophication, marine	-1,13E+01	5,28E+01
Eutrophication, terrestrial	-1,32E+01	5,06E+01
Photochemical ozone formation	-1,16E+01	5,44E+01
Resource use, minerals and metals	-6,75E+01	9,67E+01
Resource use, fossils	-1,15E+01	6,07E+01

Water use	-1,05E+01	8,91E+01
Use of resources	**% MIN**	**% MAX**
PERE	-1,71E+01	9,68E+01
PERM	0,00E+00	0,00E+00
PERT	-1,71E+01	9,68E+01
PENRE	-1,15E+01	6,07E+01
PENRM	0,00E+00	0,00E+00
PENRT	-1,15E+01	6,07E+01
SM	-6,62E+00	3,17E+01
RSF	0,00E+00	0,00E+00
NRSF	0,00E+00	0,00E+00
FW	-4,45E+00	4,02E+01
Waste production	**% MIN**	**% MAX**
Hazardous waste disposed	-1,42E+01	6,13E+01
Non-hazardous waste disposed	-6,00E+00	5,82E+01
Radioactive waste disposed	-1,52E+01	8,89E+01
Output flow	**% MIN**	**% MAX**
Components for re-use	0,00E+00	0,00E+00
Material for recycling	-6,62E+00	3,17E+01
Materials for energy recovery	0,00E+00	0,00E+00
Exported energy, electricity	0,00E+00	0,00E+00
Exported energy, thermal	0,00E+00	0,00E+00

Differences versus previous versions

First emission of EPD.

References

- General Programme Instructions of the International EPD® System. Version 4.0.
- PCR 2019:14. CONSTRUCTION PRODUCTS. Version 1.3.4
- c-PCR-002 Ceramic tiles (EN 17160) of PCR 2019:14 version 2024-04-30
- EN 17160:2019 Product category rules for ceramic tiles
- ISO 14040:2006 Environmental management-Life Cycle Assessment - Principles and framework
- ISO 14044:2006 Environmental management-Life Cycle Assessment - Requirements and guidelines
- ISO 14025:2010 Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures
- EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works — Environmental product declarations
- Project report rev.1 of 18/12/2024 – Life cycle assessment: Porcelain stoneware

EPD®

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