

STARGRES®



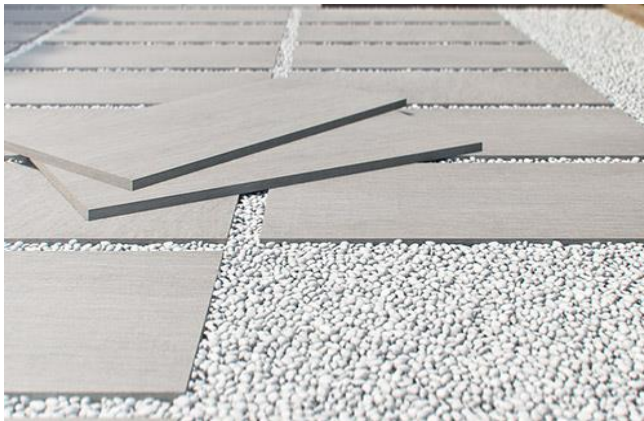
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GLAZED TILES GROUP Bla

“STAR-GRES”, “STAR-DUST”, “CERAMIKA KOŃSKIE”

and TECHNICAL TILES “CERAMIKA KOŃSKIE”



Owner of the EPD:

„STAR-GRES” Sp. z o.o.
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EPD Program Operator:

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ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).

Life cycle analysis (LCA): A1-A3, C3, C4 and D modules in accordance with EN 15804

(Cradle-to-Gate with options)

The year of preparing the EPD: 2021

Product standard: PN-EN 14411:2012

Service Life: 60 years for standard product

PCR: ITB-PCR A (PCR based on EN 15804)

Declared unit: 1 kg

Reasons for performing LCA: B2B

Representativeness: Polish, European, Global

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MANUFACTURER

“STAR-GRES” Sp. z o.o. is a Polish producer of stoneware, present on the market since 2005. In the company’s portfolio, there are tiles for the interior and for the exterior, in a wide range of formats and structures. The design of STAR-GRES’s tiles is the result of the work of Polish, Spanish and Italian design studios. A combination of modern design and commitment to the quality of production and finishing makes the products of “STAR-GRES” attractive for the recipients not only in Poland and in Europe, but also in Asia and in Africa.

PRODUCTS DESCRIPTION AND APPLICATION

The glazed tiles group Bla and the technical tiles are product composed of clay, sand, feldspar, pigments and other additives, manufactured according to the requirements of PN-EN 14411:2012 standard. The products are intended for internal as well as external applications as coverings of floors and walls of various type of buildings, including residential, commercial and institutional.

Table 1. Properties of the glazed tiles group Bla and the technical tiles produced by “STAR-GRES” Sp. z o.o.

Properties	Test according to	Parameters	
WATER ABSORPTION (%)	ISO 10545-3	EB ≤ 0.5	
MODULUS OF RUPTURE (N/mm ²)	ISO 10545-4	MIN. 35	
BREAKING FORCE*(N)	10545-4	MIN. 7000	
ABRASION CLASS PEI	ISO 10545-7	4	
CRAZING RESISTANCE	ISO 10545-11V	RESISTANT	
FROST RESISTANCE	ISO 10545-12	RESISTANT	
RESISTANCE TO CHEMICALS	ISO 10545-13	AMMONIUM CHLORIDE	GA
		SODIUM HYPOCHLORITE	GA
		HYDROCHLORIC ACID L	GLA
		CITRIC ACID	GLA
		POTASSIUM HYDROXIDE L	GLA
RESISTANCE TO STAINING	ISO 10545-14	CLASS 5	
SLIP RATING	DIN 51130	R9÷R12	

Table 2. Specification of the glazed tiles group Bla and the technical tiles produced by “STAR-GRES” Sp. z o.o.

Product	Size	Thickness, mm	Producer
Glazed tiles, calibrated	31x31	8.0	SG
Glazed tiles, calibrated	33x33	7.2	SG
Glazed tiles, calibrated	33x33	8.0	SG
Glazed tiles, rectified	30x60	9.0	SG
Glazed tiles, rectified, lappato	30x60	9.5	SG
Glazed tiles, rectified	60x60	9.0	SG
Glazed tiles, rectified, lappato	60x60	9.5	SG
Glazed tiles, rectified	75x75	9.5	SG
Glazed tiles, rectified, lappato	75x75	9.5	SG

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Glazed tiles, rectified, polished	59x59	9.5	SG
Glazed tiles, rectified, polished	59x118	10.0	SG
Glazed tiles, rectified	20x120	10.0	SG
Glazed tiles, rectified	30x120	10.0	SG
Glazed tiles, rectified	60x120	10.0	SG
Glazed tiles, rectified, polished	60x120	10.0	SG
Glazed tiles, calibrated	75x75	10.0	SG
Glazed tiles, calibrated	30.5x30.5	7.0	CK
Glazed tiles, calibrated	30.5x30.5	12.0	CK
Glazed tiles, calibrated	30.5x61	8.0	CK
Glazed tiles, calibrated	15.5x62	7.8	CK
Glazed tiles, calibrated	31x62	8.0	CK
Glazed tiles, rectified	60x60	9.0	CK
Glazed tiles, calibrated	33.3x33.3	7.2	CK
Glazed tiles, rectified	60x60	9.0	SD
Glazed tiles, rectified	60x60	20.0	SD
Glazed tiles, rectified	60x60	30.0	SD
Glazed tiles, rectified	60x120	20.0	SD
Glazed tiles, rectified	45x90	30.0	SD
Glazed tiles, rectified	90x90	30.0	SD

Abbreviations: SG – "STAR - GRES" Sp. z o. o., CK – "CERAMIKA - KONSKIE" Sp. z o. o.; SD – "STAR - DUST" Sp. z o. o.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Allocation

The allocation rules used for this EPD are based on general ITB PCR A. Production of the glazed tiles group Bla and the technical tiles is a line process conducted in four factories of "STAR-GRES" Sp. z o.o. located in Końskie (Poland). Allocation was done on product mass basis. All impacts from raw materials extraction and processing are allocated in module A1 of the LCA. Impacts from the global line production of "STAR-GRES" Sp. z o.o. were inventoried and 100% were allocated to the glazed tiles group Bla and the technical tiles production. Water and energy consumption, associated emissions and generated wastes are allocated to module A3. Packaging materials were taken into consideration.

System limits

The life cycle analysis (LCA) of the declared products covers: product stage – modules A1-A3, end of life – modules C3, C4 and benefits and loads beyond the system boundary – module D (cradle-to-gate with options) in accordance with EN 15804+A1 and ITB PCR A. Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculations. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804+A1, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Modules A1 and A2: Raw materials supply and transport

Clay, feldspar, sand, pigments, additives, ancillary materials and packaging materials come from both local and foreign suppliers. Means of transport include railway and lorries. For calculation purposes Polish and European fuel averages were applied.

Module A3: Production

The production of the glazed tiles group Bla and the technical tiles production is carried out in four Polish factories of “STAR-GRES” Sp. z o.o.:

- „STAR-GRES” Sp. z o.o. address: Mechaniczna 1; 26-200 Końskie;
- „CERAMIKA KOŃSKIE” Sp. z o.o., address: Górna 2C, 26-200 Końskie;
- „STAR-DUST” Sp. z o.o. address: Fabryczna 8C; 26-200 Końskie;
- „STAR-DUST” Sp. z o.o., address: Warszawska 52; 26-200 Końskie;

A scheme of the glazed tiles group Bla and the technical tiles production process by “STAR-GRES” Sp. z o.o is presented in Fig. 1.

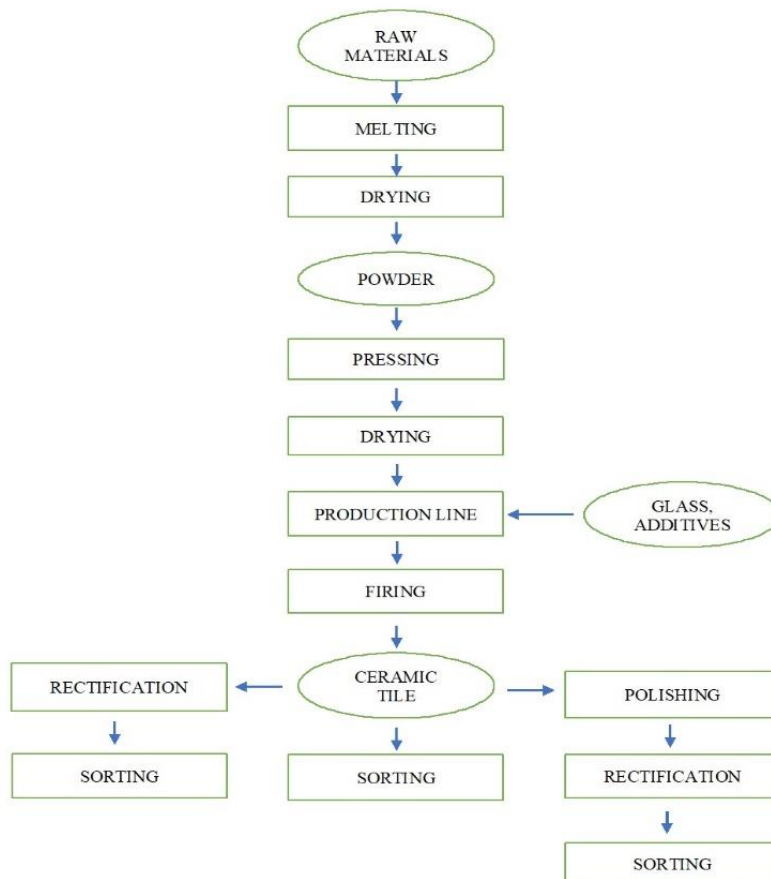


Fig. 1. The scheme of the glazed tiles group Bla and the technical tiles production process by “STAR-GRES” Sp. z o.o.

Modules C3, C4 and D: End-of-life (EoL)

Deconstruction of the glazed tiles group Bla and the technical tiles can be performed as a part of the refurbishment or demolition process of a building. Therefore, the environmental impact of C1 module is considered to be minor (<1%) and is neglected. There are no specific deconstruction methods, applied in Poland, in regards with the glazed tiles group Bla and the technical tiles. During the demolition process the major amount of the products contribute to the construction and demolition wastes which can be processed on site or in a waste processing plant. At the EoL 100% of the

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product is recovered. In the adapted scenario 50% of the glazed tiles group Bla and the technical tiles is recycled using a mobile crusher station equipped system (estimated efficiency 150 t/h) and further used as aggregate for road foundation or ballast (credits presented in module D) while remaining 50% is forwarded to landfill in the form of mixed construction and demolition wastes.

Table 3. End-of-life scenario for the glazed tiles group Bla and the technical tiles produced by “STAR-GRES” Sp. z o.o.

Material	Material recovery	Recycling	Landfilling
tiles	100%	50%	50%

Data quality

The values determined to calculate the LCA originate from verified “STAR-GRES” Sp. z o.o. inventory data.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2020 – 31.12.2020 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

Assumptions and estimates

The impacts of the representative of glazed tiles group Bla and technical tiles were aggregated using weighted average. Impacts were inventoried and calculated for all products of the glazed tiles group Bla and the technical tiles.

Calculation rules

LCA was done in accordance with ITB PCR A document.

Databases

The data for the processes come from the following databases: Ecoinvent v.3.7.1, specific EPDs, ITB-Database. Specific data quality analysis was a part of external ISO 14001 audit.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 kg of the glazed tiles group Bla and the technical tiles produced by “STAR-GRES” Sp. z o.o.

Table 4. System boundaries for the environmental characteristic of the glazed tiles group Bla and the technical tiles

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life			Benefits and loads beyond the system boundary	
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD

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Table 5. Life cycle assessment (LCA) results of the glazed tiles group Bla and the technical tiles manufactured by "STAR-GRES" Sp. z o.o.

Environmental impacts: (DU) 1 kg								
Indicator	Unit	A1	A2	A3	A1-A3	C3	C4	D
Global warming potential	kg CO ₂ eq.	2.52E-01	1.26E-03	2.77E-01	5.31E-01	4.91E-04	1.33E-03	4.10E-03
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	3.40E-08	0.00E+00	4.99E-08	8.40E-08	8.37E-11	2.13E-10	3.17E-10
Acidification potential of soil and water	kg SO ₂ eq.	8.10E-04	1.87E-05	5.87E-05	8.87E-04	1.57E-06	9.61E-06	2.23E-05
Formation potential of tropospheric ozone	kg Ethene eq.	5.66E-05	1.36E-06	2.36E-06	6.03E-05	6.30E-08	3.82E-07	1.33E-06
Eutrophication potential	kg (PO ₄) ³⁻ eq.	1.79E-04	3.30E-06	8.54E-06	1.91E-04	3.40E-07	2.23E-06	9.91E-06
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	3.77E-06	0.00E+00	1.03E-06	4.80E-06	1.95E-10	5.41E-10	3.88E-08
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	3.36E+00	1.71E-02	3.06E+00	6.43E+00	6.70E-03	1.79E-02	6.93E-02
Environmental aspects on resource use: (DU) 1 kg								
Indicator	Unit	A1	A2	A3	A1-A3	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8.74E-01	1.20E-03	1.49E-01	1.02E+00	3.49E-05	1.39E-04	1.97E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.45E+00	1.80E-02	3.21E+00	6.67E+00	6.70E-03	1.88E-02	5.09E-02
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	1.07E-02	9.00E-04	0.00E+00	1.16E-02	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	9.55E-04	0.00E+00	0.00E+00	9.55E-04	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	m ³	INA	INA	INA	INA	INA	INA	INA
Other environmental information describing waste categories: (DU) 1 kg								
Indicator	Unit	A1	A2	A3	A1-A3	C3	C4	D
Hazardous waste disposed	kg	9.52E-06	5.81E-11	2.36E-05	3.32E-05	1.82E-08	4.62E-08	1.16E-07
Non-hazardous waste disposed	kg	7.66E-02	2.60E-08	4.76E-04	7.70E-02	8.13E-06	5.00E-01	9.83E-04
Radioactive waste disposed	kg	6.12E-06	1.50E-10	0.00E+00	6.12E-06	4.69E-08	1.19E-07	3.14E-07
Components for re-use	kg	0.00E+00	0.00E+00	7.15E-02	7.15E-02	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	5.46E-02	5.46E-02	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3.) <input checked="" type="checkbox"/> external <input type="checkbox"/> internal
External verification of EPD: PhD. Eng. Halina Prejzner LCA, LCI audit and input data verification: PhD. Eng. Justyna Tomaszewska, j.tomaszewska@itb.pl Verification of LCA: PhD. D.Sc. Eng. Michał Piasecki, m.piasecki@itb.pl

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A1:2013 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- PN-EN 14411:2012 Płytki ceramiczne -- Definicje, klasyfikacja, właściwości, ocena zgodności i znakowanie
- Department for Business, Energy & Industrial Strategy. Calorific values and density of fuels, 2021. <https://www.gov.uk/>
- KOBiZE Wskaźniki emisyjności CO₂, SO₂, NO_x, CO i pyłu całkowitego dla energii elektrycznej. Grudzień 2020

p.o. KIEROWNIKA
Zakładu Fizyki Ciepłej, Akustyki i Środowiska
dr inż. Agnieszka Winkler-Skałna



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02-656 Warsaw, Ksawerów 21

CERTIFICATE No 252/2021 of TYPE III ENVIRONMENTAL DECLARATION

Products:

GLAZED TILES GROUP Bla "STAR-GRES", "STAR-DUST", "CERAMIKA KOŃSKIE"
and TECHNICAL TILES "CERAMIKA KOŃSKIE"

Manufacturer:

"STAR-GRES" Sp. z o.o.

ul. Ceramiczna 5, 26-200 Końskie, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

PN-EN 15804+A1

Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

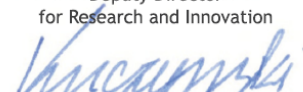
This certificate, issued for the first time on 26th August 2021 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kuczyński, PhD

Warsaw, 26 August 2021