

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with EN 15804:2012+A2:2019 and
ISO 14025:2010. Third party verified.



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Valid to: 18.11.2029



for Limestone aggregates



Type III Environmental Product Declaration No. 707/2024

EPD program operator:

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BASIC INFORMATION

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804:2012+A2:2019 and ISO 14025:2010. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025:2010.

EPD type:

Cradle to gate (A1 – A3)

Declared Unit:

The declaration refers to declared unit (DU) – 1 ton of limestone aggregates.

The year of preparing the EPD:

2024

Product norms & standards:

Aggregates produced by Trzuskawica S.A. (Sitkówka Plant) meet the requirements of the following standards:

- PN-EN 12620+A1:2010 – Kruszywa do betonu (EN 12620:2002+A1:2008 *Aggregates for concrete*)
- PN-EN 13043:2004 - Kruszywa do mieszanek bitumicznych i powierzchniowych utrwalanych stosowanych na drogach, lotniskach i innych powierzchniach przeznaczonych do ruchu (EN 13043:2002 *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*)
- PN-EN 13242+A1:2010 - Kruszywa do niezwiązanych i związań hydraulicznych materiałów stosowanych w obiektach budowlanych i budownictwie drogowym (EN 13242:2002+A1:2007 *Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*)
- PN-EN 13383-1:2003 - Kamien do robót hydrotechnicznych (EN 13383-1:2002 *Armourstone - Part 1: Specification*)

Reference Service Life (RSL):

Due to the fact that only modules A1 - A3 are subject to declaration, indication of a reference service life is not required.

PCR:

ITB-PCR A, V1.6 based on PN-EN 15804:2012+A2:2020-03

Reasons for performing LCA:

Business-to-business (B2B)

Representativeness:

European, 2023

MANUFACTURER



Figure 1. A view of The Sitkowka Plant, Trzuskawica S.A. in Sitkowka, Poland

Trzuskawica S.A.

The history of company dates back to 1910. That is when stone mining began on an industrial scale. Since 2003, the plant in Sitkowka has belonged to the Irish CRH group - a global leader in the production of building materials. Trzuskawica S.A. consists of: based in Sitkowka includes two aggregate production plants: Sitkowka Plant - located in approximately 10 km from Kielce towards Krakow and the Basalt Mine Targowica is located between Strzelin and Zabkowice Slaskie.

Trzuskawica S.A. has implemented:

- Quality Management System according to ISO 9001
- Environment Management System according to 14001
- Energy Management System according to 50001
- Sustainable Development Policy
- Maintenance Policy
- Health and Safety Policy

Sitkowka plant

Sitkowka plant includes two production areas: "Trzuskawica" and "Kowala", which are separated by the company's railway line with an unloading station. The production of aggregates based on limestone from the Devonian period, extracted in its own mines "Trzuskawica" and "Kowala". Stone mining is done by shooting.

Limestone and aggregates produced from it are used for the construction and maintenance of roads, for the production of concrete, prefabrication, mineral-bituminous mixtures and for the main or auxiliary foundation using the mechanical stabilization method.

PRODUCTS DESCRIPTION

The products are limestone aggregates of various grain sizes. Produced from Devonian limestone extracted from the deposit Sitkowka near Kielce, Poland. Limestone has a compact structure, light and dark gray in color.

Table 1. The range of limestone aggregates produced by Trzuskawica S.A. in Sitkowka plant

Product group	Name of the product
Coarse aggregates	Natural coarse aggregate for concrete 2/8 mm
Coarse aggregates	Natural coarse aggregate for M concrete 2/8 mm
Coarse aggregates	Natural coarse aggregate for bituminous and surface coating mixes 2/8 mm
Coarse aggregates	Limestone aggregate 8-16 mm
Coarse aggregates	Natural coarse aggregate for concrete 8/16 mm
Coarse aggregates	Natural coarse aggregate for M concrete 8/16 mm
Coarse aggregates	Natural coarse aggregate for bituminous and surface coating mixes 8/16 mm
Coarse aggregates	Limestone aggregate 16-22 mm
Coarse aggregates	Natural coarse aggregate for concrete 16/22 mm
Coarse aggregates	Natural coarse aggregate for bituminous and surface coating mixes 16/22 mm
Coarse aggregates	Natural coarse aggregate for bituminous and surface coating mixes 4/8 mm
Coarse aggregates	Natural coarse aggregate for concrete 4/11 mm
Coarse aggregates	Natural coarse aggregate for bituminous and surface coating mixes 4/11 mm
Others	Limestone aggregate 0-80 mm
Others	Limestone aggregate 22-63 mm
Others	Natural aggregate for unbound mixes 20/45 mm
Others	Limestone aggregate 22-63 mm
Others	Limestone aggregate 40-80 mm
Others	Coarse natural stone 80/150 mm for hydrotechnical works
Others	Limestone aggregate 80-150 mm
Others	Oxide-carbonate mixture aggregate, loose
Fine aggregates	Natural fine aggregate for bituminous and surface coating mixes 0/2 mm
Fine aggregates	Limestone aggregate 0-4 mm
Fine aggregates	Natural fine aggregate for concrete 0/4 mm
Fine aggregates	Natural, continuous graded aggregates for bituminous and surface coating mixes 0/4 mm
Fine aggregates	Natural fine aggregate for bituminous and surface coating mixes 0/2 mm
Mixes	Continuous graded natural aggregate for bituminous and surface coating mixes 0/63 mm
Mixes	Continuous graded natural aggregate for unbound mixes 0/63 mm
Mixes	Continuous graded natural aggregate for bituminous and surface coating mixes 0/31,5 mm
Mixes	Continuous graded natural aggregate for unbound mixes for improved subbase U 0/31,5 mm
Mixes	Continuous graded natural aggregate for unbound mixes 0/31,5 mm
Mixes	Natural aggregate for unbound mixes 2/31,5 mm

APPLICATION OF PRODUCTS

Coarse-grained aggregates:

- mineral - asphalt concrete subgrade
- binding and reinforcing courses of asphalt concrete
- surface course of asphalt concrete
- surface coating mixes
- concrete precasting
- concrete mixtures

Continuous graded aggregates:

- subbase and subgrade courses mechanically stabilized
- cement-stabilized course
- improved subgrade course: frost-resistant course and filter course
- unbound mixtures subbases
- filler for mixtures and surfaces
- filler for concretes

Hydrotechnical stone:

- protection for escarpments and slopes
- filling of gabions (wire and stone constructions)
- floodbanks (especially in the sealing process)
- securing bridge pillars and bridge abutments
- use in metallurgy, paper and energy industries

LIFE CYCLE ASSESSMENT (LCA) – general rules applied:

Allocation

The allocation rules used for this EPD are based on general ITB-PCR A. The allocation of flows from a particular quarry is proportional to its production mass output based on life cycle inventory data during considered period (1.1.2023 – 31.12.2023).

System limits

The life cycle analysis (LCA) of the declared products covers: product stage – modules A1-A3 (see Figure 2), in accordance with EN 15804:2012+A2:2019 and ITB PCR A v. 1.6. The technical report for the product provides information regarding the details of limits of the system. The calculation takes into account all materials, energy consumed, fuels and production of wastes.

Modules A1-A3: Raw materials supply, transport and production

Raw and auxiliary materials were included in A1 phase. Mining includes extraction by excavation and by blasting using gel explosives. Materials such as lubricants, oils, rollers, belts, filters, and bearings come from Polish suppliers. Aggregate wash water is mainly rainwater, sometimes topping up with a deep well. The mine has a closed run of wash water. Internal transportation includes dump trucks and forklift trucks. European standards for average combustion were used for calculations. The Figure 2 shows the production process of the limestone aggregates in Sitkowka plant.

System boundaries adopted in the analysis: A1 – A3 "from cradle to gate"

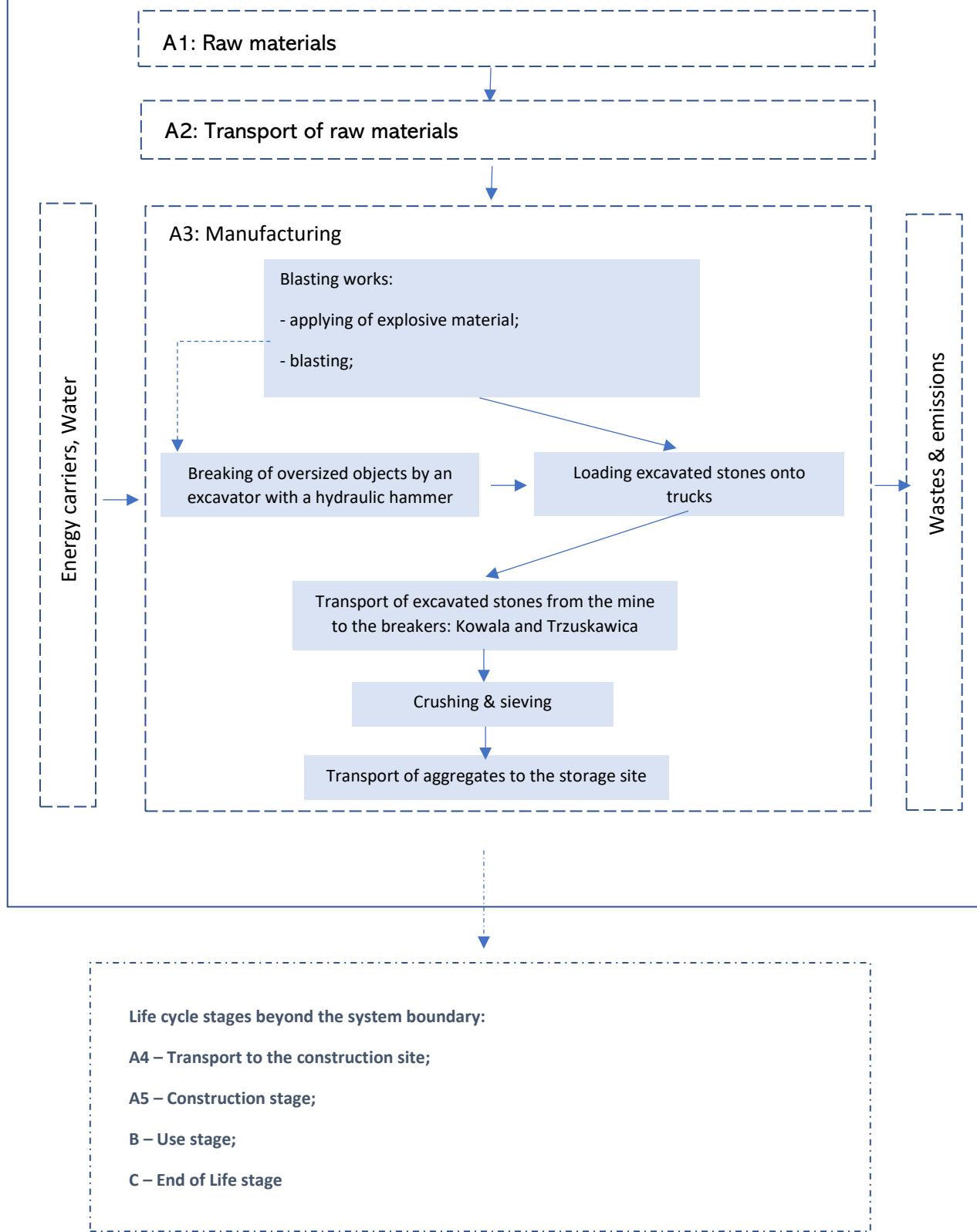


Figure 2. Flow chart of the processes included in the analysis

Time representativeness

Primary data was collected internally. The production data refers to the average of the period 2023 January – 2023 December.

Data quality

Data flows have been modelled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources. The quality of the data is assessed as good and appropriate were collected consistently and based on the period between 01.01.2023 and 31.12.2023. Secondary data are taken from the Ecoinvent 3.10 database.

Assumptions and estimates

The environmental impacts of the representative of limestone aggregates were calculated using weighted average. Limestone products taken into account during inventory are presented in Table 1.

Calculation rules

Life Cycle Assessment was performed in accordance with the requirements of PN-EN 15804:2012 +A2:2020 and General ITB-PCR A version 1.6.

Cut-off criteria

All the basic materials used as raw materials, utilized energy carriers, internal fuel consumption and electricity consumption, any direct production waste, and all emission measurements available have been included. Any auxiliary materials (e.g. belts and rolls for conveyors, filters, tyres, lubricants) were included in calculation. Machines and facilities required during production have been treated as capital goods and their production is therefore not included in the LCA. Also transportation of workers was excluded from the LCA analysis.

Sum of processes and impacts omitted in the calculations does not exceed 5% of all impact categories in accordance with the EN 15804+A2.

Database(s)

The data for the processes comes from Ecoinvent v. 3.10.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The environmental impacts refer to 1 ton of the limestone aggregates (DU, declared unit) extracted in Sitkowka Plant, Trzuskawica S.A.

Table 2. Declared life cycle stages

Product stage			Construction installation stage		Use stage						End-of-life stage			Benefits and loads beyond the system boundaries		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction 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
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

X = included in life cycle assessment; ND = module not declared

Table 3. Core environmental impact indicators

Indicator	Unit	A1	A2	A3	A1-A3
GWP – total	kg CO ₂ eq.	0.79	0.010	2.48	3.27
GWP – fossil	kg CO ₂ eq.	7.83E-01	9.83E-03	2.48E+00	3.27E+00
GWP – biogenic	kg CO ₂ eq.	-8.99E-03	5.63E-06	1.41E-02	5.12E-03
GWP – luluc	kg CO ₂ eq.	8.45E-04	3.34E-06	8.02E-04	1.65E-03
ODP	kg CFC 11 eq.	6.55E-09	1.97E-10	1.40E-08	2.07E-08
AP	mol H ⁺ eq.	4.13E-03	4.42E-05	1.81E-02	2.23E-02
EP – freshwater	kg PO ₄ eq.	1.56E-04	6.76E-07	2.61E-03	2.77E-03
EP – marine	kg N eq.	6.65E-04	1.74E-05	3.33E-03	4.01E-03
EP – terrestrial	mol N eq.	1.08E-02	1.89E-04	3.15E-02	4.24E-02
POCP	kg NMVOC eq.	2.22E-03	6.79E-05	9.16E-03	1.14E-02
ADP – minerals and metals	kg Sb eq.	6.75E-06	3.13E-08	3.58E-06	1.04E-05
ADP – fossil	MJ, net calorific value	7.14E+00	1.41E-01	2.87E+01	3.59E+01
WDP	m ³ world eq. deprived	3.22E-01	7.01E-04	4.89E-01	8.12E-01

GWP – total: Climate change – total, Global Warming Potential total; **GWP – fossil:** Climate change – fossil, Global Warming Potential fossil fuels; **GWP – biogenic:** Climate change – biogenic, Global Warming Potential biogenic; **GWP – luluc:** Climate change – land use and land use change, Global Warming Potential land use and land use change; **ODP:** Ozone Depletion, Depletion potential of the stratospheric ozone layer; **AP:** Acidification, Acidification potential, Accumulated Exceedance; **EP – freshwater:** Eutrophication aquatic freshwater, Eutrophication potential, fraction of nutrients reaching freshwater and compartment; **EP – marine:** Eutrophication aquatic marine, Eutrophication potential, fraction of nutrients reaching marine and compartment; **EP – terrestrial:** Eutrophication terrestrial, Eutrophication potential, Accumulated Exceedance; **POCP:** Photochemical ozone formation, Formation potential of tropospheric ozone; **ADP – minerals & metals:** Depletion of abiotic resources – minerals and metals, Abiotic depletion potential for non – fossil resources; **ADP – fossil:** Depletion of abiotic resources – fossil fuels, Abiotic depletion for fossil resources potential; **WDP:** Waters use, Water (user) deprivation potential, deprivation – weighted water consumption;

Table 4. Additional environmental impact indicator

Parameter	Unit	A1	A2	A3	A1-A3
PM	Disease incidence	4,47E-08	9,52E-10	9,13E-08	1,37E-07
IRP	kBq U235 eq.	1,48E-02	1,87E-04	8,03E-02	9,53E-02
ETP – fw	CTUe	3,96E+00	3,66E-02	7,48E+00	1,15E+01
HTP – c	CTUh	4,48E-09	6,65E-11	3,92E-09	8,46E-09
HTP – nc	CTUh	6,89E-09	1,00E-10	3,27E-08	3,97E-08
SQP	dimensionless	2,61E+00	1,05E-01	6,21E+00	8,92E+00

PM: Particulate Matter emissions, Potential incidence of disease due to PM emissions; IRP: Ionizing radiation, human health, Potential Human exposure efficiency relative to U235; ETP – fw: Eco-toxicity (freshwater), Potential Comparative Toxic Unit for ecosystems; HTP – c: Human toxicity, cancer effects, Potential Comparative Toxic Unit for humans; HTP – nc: Human toxicity, non – cancer effects, Potential Comparative Toxic Unit for humans; SQP – Land use related impacts / Soil quality, Potential soil quality index;

Table 5. Parameters describing resource use

Parameter	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	5,86E-01	2,43E-03	2,82E+00	3,41E+00
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources	MJ, net calorific value	5,86E-01	2,43E-03	2,82E+00	3,41E+00
Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	6,91E+00	1,41E-01	2,85E+01	3,55E+01
Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value	2,27E-01	0,00E+00	2,09E-01	4,35E-01
Total use of non-renewable primary energy resources	MJ, net calorific value	7,14E+00	1,41E-01	2,87E+01	3,59E+01
Use of secondary materials	kg	4,11E-03	6,38E-05	4,22E-03	8,40E-03
Use of renewable secondary fuels	MJ, net calorific value	7,37E-04	7,81E-07	1,80E-05	7,56E-04
Use of non-renewable secondary fuels	MJ, net calorific value	8,87E-05	2,12E-06	7,25E-06	9,80E-05
Net use of fresh water	m3	7,40E-03	1,98E-05	7,82E-02	8,56E-02

Table 6. Other environmental describing waste categories

Parameter	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	kg	7,80E-02	2,03E-04	2,71E-01	3,49E-01
Non-hazardous waste disposed	kg	1,24E+00	4,30E-03	1,27E+01	1,40E+01
Radioactive waste disposed	kg	3,62E-06	4,64E-08	1,98E-05	2,34E-05

*There is never radioactive waste from a Sitkowka plant (A3), but there might be small amounts associated with the secondary LCI datasets used for the upstream chain (A1 & A2), which are taken into account here from Ecoinvent 3.10 database.

Table 7. Environmental information describing output flows

Parameter	Unit	A1	A2	A3	A1-A3
Component for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	6,34E-04	1,08E-06	2,31E-03	2,94E-03
Materials for energy recovery	kg	1,67E-06	6,80E-09	3,50E-07	2,03E-06
Exported Energy	MJ	4,16E-03	8,52E-05	3,37E-02	3,79E-02

Table 8. Information describing the biogenic carbon content at the factory gate

Parameter	Unit	A1	A2	A3	A1-A3
Biogenic carbon content in product	kgC	0,00E+00	0,00E+00	0,00E+00	0,00E+00
biogenic carbon content in accompanying packaging	kgC	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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.

Table 8. Verification table

The basis for LCA analysis was EN 15804 and ITB PCR A	
Independent verification corresponding to ISO 14025 (sub clause 8.1.3.)	
<input checked="" type="checkbox"/> external	<input type="checkbox"/> internal
External verification of EPD: Halina Prejzner, PhD. Eng.	
LCA, LCI audit and input data verification: Konrad Witczak, PhD., D.Sc., Eng.	
LCA verification: Michał Piasecki, PhD., D.Sc., Eng.	

Note 1: The declaration owner has the sole ownership, liability, and responsibility for the information provided and contained in EPD. Declarations of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (see ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform - Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

REFERENCES:

- PN-EN ISO 14025:2010 - Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- PN-EN ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- PN-EN 15804 :2012 + A2:2020 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- General ITB-PCR A version 1.6, 2022
- Regulation (EC) No 1907/2006, Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Michał Piasecki, PhD. D.Sc. eng.

/Qualified electronic signature/



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CERTIFICATE № 707/2024 of TYPE III ENVIRONMENTAL DECLARATION

Products:
LIMESTONE AGGREGATES

Manufacturer:
Trzuskawica S.A.
Sitkowka 24, 26-052 Nowiny, Poland

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

EN 15804+A2

**Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.**

This certificate, issued on 18th November 2024 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physics, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD

Deputy Director
for Research and Innovation


Krzysztof Kućzyński, PhD



Warsaw, November 2024