



ENVIRONMENTAL PRODUCT DECLARATION

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

CALCIUM ALUMINATE CEMENT

GÓRKAL 40
GÓRKAL 40M



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.

Programme:
**The international
EPD System;**
www.environdec.com

Programme
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EPD International AB

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number:
S-P-07662

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2028-02-09

Geographical
scope:
International



1. Company description / Goal & Scope

Our company is based in the town of Trzebinia, located on the motorway connecting Krakow and Katowice. Here, for more than 100 years, we have been manufacturing cement sold throughout Europe. In the meantime, Europe has changed, the countries and regimes have changed. In our country, the technology of production, types of cements (previously Portland cements, now calcium aluminate and high alumina cements) and sales markets have changed.

Since 2000, we have been a part of MAPEI. Supplying GÓRKAL cements to our customers in more than 60 countries on a daily basis, including our friends from the MAPEI Group, we learned responsibility for our products and flexibility in operation.

The goal of the study is to provide necessary data and documentation to produce an EPD according to the requirements of PCR 2019:14 Environdec (version 1.11, 2021-02-05) under EN 15804:2012+A2:2019/AC:2021 and to have more comprehension about the environmental impacts related to **GÓRKAL 40** and **GÓRKAL 40M** manufactured in Górka Cement PL located in Trzebinia (Poland), in year 2020, including packaging of the finished product. Target audiences of the study are customers and other parties with an interest in the environmental impacts of **GÓRKAL 40** and **GÓRKAL 40M**. This analysis shall not support comparative assertions intended to be disclosed to the public.



Figure 1: GÓRKAL CEMENT Trzebinia Plant

2. Product description

GÓRKAL 40 and **GÓRKAL 40M** are hydraulic binders for refractory and building applications. Fast strength development and short setting time are their advantages. Thanks to stable phase composition with perfect mechanical properties, they can be used in building chemistry mortars and concrete as well as part of refractory castables or shaped products. They are available in 25 kg multiply bags, 1000 kg big bag and in bulk.

For more information about the products see the TDS (Technical Data Sheet) on Górká Cement website.

3. Content declaration

The main components and ancillary materials of the products included in this EPD are the following:

Table 1: Composition referred to 1000kg of bulk product

MATERIALS	PERCENTAGE (%) BY MASS
Clinker	100%
Additives	not more than 0,2%

The product does not contain a concentration higher than 0,1% (by unit weight) of either carcinogenic substances or substances of very high concern (SVHC) on the REACH Candidate List published by the European Chemicals Agency.

4. Declared Unit and Reference Service Life

The declared unit is 1 ton of finished product delivered in bulk.

Due to the selected system boundary, the reference service life of the products is not specified.

Figure 2: Factory sidings



5. System Boundaries and additional technical information

The approach is “cradle to gate” (A1–A3);

A1, A2, A3 (Product stage): extraction and processing of raw materials and packaging (A1), transportation up to the factory gate (A2), manufacturing of the finished product (A3);

Table 2: System boundaries

	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Geography	EU, PL	EU	PL	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data	> 90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Composition based on annual average					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not-relevant					-	-	-	-	-	-	-	-	-	-	-	-

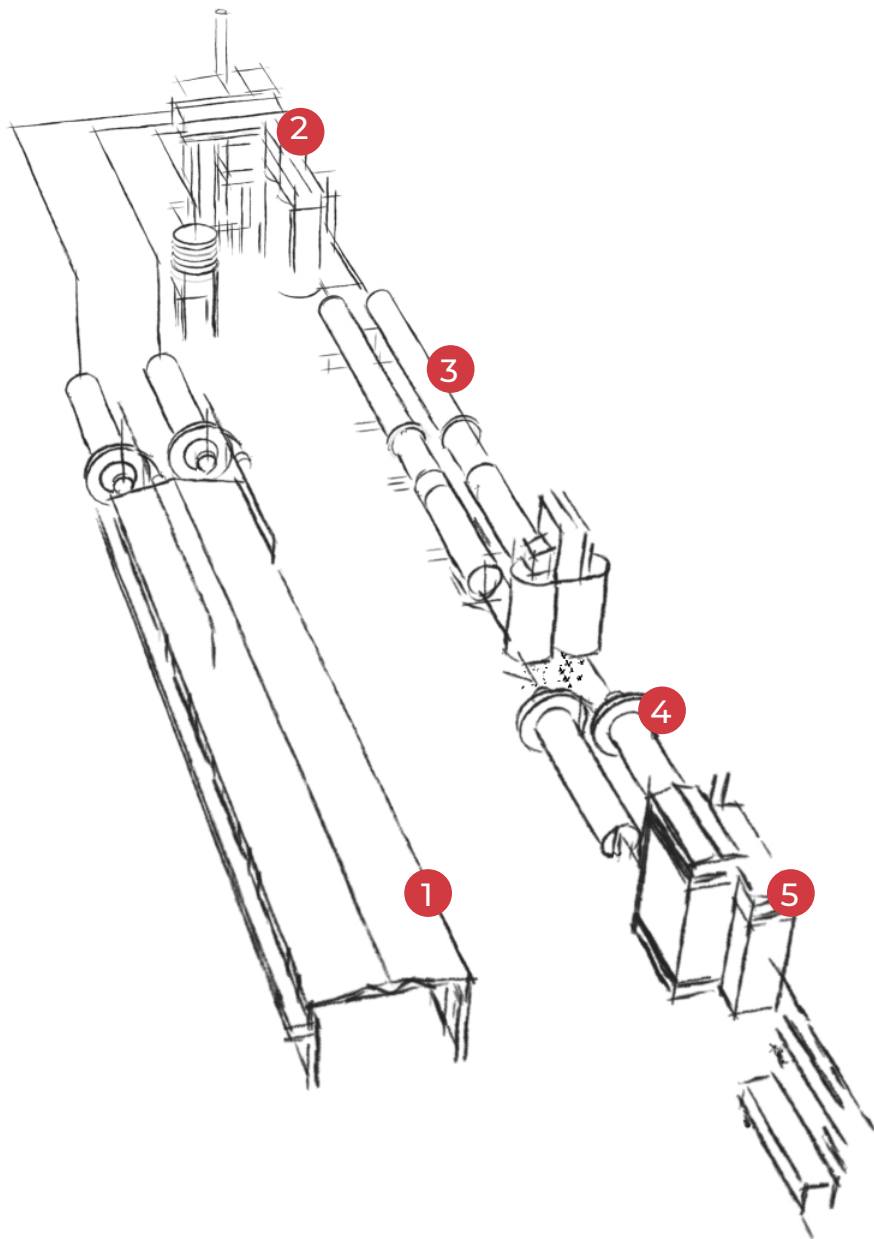


Figure 3: Production process

A sketch description of production process is the following:
 Calcium aluminate cements (e.g. GÓRKAL 40, GÓRKAL 40M) are made from two materials: bauxite and limestone. ①

Depending on the desired type of cement, we make corrections to the premix to obtain an approved slurry, consistent with the requirements of the technological process. ② Thus obtained intermediate product is transported to a rotary kiln.

The main stage of the production process, sintering is carried out in rotary kilns ③ with a length of 85 meters, fired by natural gas. This method allows us to achieve a very homogeneous product with the desired mineralogical composition. As a result of sintering the slurry, we obtain clinker, which, after the properly conducted cooling process and after confirming the requirements as to the parameters, using physico-chemical testing, is transported to a grinding mill. ④ Grinding is carried out in rotary ball mills, which use grinders with an increased grindability index. The cement resulting from the grinding process is stored in silos, ⑤ made of both steel and concrete.

6. Cut-off rules and allocation

Criteria for the exclusion of inputs and outputs (cut-off rules) in the LCA, information modules and any additional information are intended to support an efficient calculation procedure. They are not applied in order to hide data. The following procedure is applied for the exclusion of inputs and outputs:

- All inputs and outputs to a unit process, for which data are available, are included in the calculation
- Cut-off criteria, where applied, are described in Table 3

Figure 4: Clinker silos



Input flows are covered for the whole formula.

Table 3: Cut-off criteria

PROCESS EXCLUDED FROM STUDY	CUT-OFF CRITERIA	QUANTIFIED CONTRIBUTION FROM PROCESS
A3: production (auxiliary materials)	Less than 10^{-5} kg/kg of finished product	Sensitivity study demonstrates a relative contribution lower than 0,5%
A3: waste and particle emission	Less than 10^{-4} kg/kg of finished product	Sensitivity study demonstrates a relative contribution lower than 0,5%

For the allocation procedure and principles consider the following table (Table 4):

Table 4: Allocation procedure and principles

PROCESS EXCLUDED FROM STUDY	CUT-OFF CRITERIA
A1	All data are referred to 1 ton of product. A1: electricity is allocated to the whole production plant.
A3	All data are referred to 1 ton of packaged product. A3-wastes: all data are allocated to the whole production plant .

7. Environmental performance and interpretation

The following tables show the environmental impacts for the products considered according to the requirements of EN15804:2012+A2:2019/AC:2021. The results refer to the declared unit (see § 4). The additional environmental indicators are not declared.

GÓRKAL 40M (1000 kg of product in bulk)

Table 5: GÓRKAL 40M: Potential environmental impact – mandatory indicators according to EN 15804 referred to 1000 kg of bulk product

INDICATOR	UNIT	A1	A2	A3	A1-A3
GWP _{TOTAL}	(kg CO ₂ eq.)	3,27E+02	3,39E+01	3,58E+02	7,19E+02
GWP _{FOSSIL}	(kg CO ₂ eq.)	3,27E+02	3,40E+01	3,58E+02	7,18E+02
GWP _{BIOGENIC}	(kg CO ₂ eq.)	-4,45E-02	-1,41E-01	7,20E-01	5,34E-01
GWP _{LULUC}	(kg CO ₂ eq.)	1,23E-02	1,25E-01	9,90E-03	1,47E-01
ODP	(kg CFC 11 eq.)	5,37E-07	4,32E-11	1,48E-11	5,37E-07
AP	(mol H ⁺ eq.)	3,34E-01	5,55E-01	2,73E-01	1,16E+00
EP _{FRESHWATER}	(kg P eq.)	6,41E-04	7,69E-05	2,51E-05	7,43E-04
EP _{MARINE}	(kg N eq.)	6,19E-02	1,55E-01	1,27E-01	3,43E-01
EP _{TERRESTRIAL}	(mol N eq.)	7,65E-01	1,70E+00	1,40E+00	3,86E+00
POCP	(kg NMVOC eq.)	1,76E-01	4,13E-01	3,55E-01	9,44E-01
ADP _{MINERALS&METALS} *	(kg Sb eq.)	3,78E-05	3,08E-06	2,12E-05	6,21E-05
ADP _{FOSSIL} *	(MJ)	1,35E+03	4,46E+02	5,75E+03	7,54E+03
WDP*	(m ³ world eq.)	1,31E+01	8,63E-01	9,28E-01	1,49E+01

GWP_{TOTAL}: Global Warming Potential total; 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; EP_{FRESHWATER}: Eutrophication Potential, freshwater; EP_{MARINE}: Eutrophication Potential, marine; EP_{TERRESTRIAL}: Eutrophication Potential, terrestrial; POCP: Formation potential of tropospheric ozone; ADP_{MINERALS&METALS}: Abiotic Depletion Potential for non-fossil resources; ADP_{FOSSIL}: Abiotic Depletion Potential for fossil resources; WDP: Water Deprivation Potential.

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

Table 6: GÓRKAL 40M: Potential environmental impact – additional mandatory and voluntary indicators referred to 1000 kg of bulk product.

INDICATOR	UNIT	A1	A2	A3	A1-A3
GWP-GHG	(kg CO ₂ eq.)	3,25E+02	3,35E+01	3,54E+02	7,12E+02
GWP-GHG: 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.					

Table 7: GÓRKAL 40M: Use of resources referred to 1000 kg of bulk product.

INDICATOR	UNIT	A1	A2	A3	A1-A3
PERE	MJ	2,62E+02	4,54E+01	1,23E+01	3,19E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,62E+02	4,54E+01	1,23E+01	3,19E+02
PENRE	MJ	1,35E+03	4,47E+02	5,75E+03	7,54E+03
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,35E+03	4,47E+02	5,75E+03	7,54E+03
SM	kg	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
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	6,47E-01	4,70E-02	2,99E-02	7,24E-01
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 (primary energy and primary energy resources used as raw materials); 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 resources (primary energy and primary energy resources used as raw materials); SM: Use of secondary material; RSF: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels; FW: Net use of fresh water.					

Table 8: GÓRKAL 40M: Waste production and output flows referred to 1000 kg of bulk product.

INDICATOR	UNIT	A1	A2	A3	A1-A3
HWD	kg	5,42E-08	6,28E-09	1,12E-06	1,18E-06
NHWD	kg	6,06E-01	9,21E-02	1,65E+00	2,34E+00
RWD	kg	2,51E-02	8,68E-03	1,46E-03	3,52E-02
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	1,01E+01	1,01E+01
Materials for energy recovery	kg	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
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00

PHWD: Hazardous waste disposed; NHWD: Non-Hazardous waste disposed; RWD: Radioactive waste disposed

Table 9: GÓRKAL 40M: Information on biogenic carbon content at the factory gate referred to 1000 kg of bulk product.

BIOGENIC CARBON CONTENT	UNIT	QUANTITY
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in packaging	kg C	0,00E+00

GÓRKAL 40 (1000 kg of product in bulk)

Table 10: GÓRKAL 40: Potential environmental impact – mandatory indicators according to EN 15804 referred to 1000 kg of bulk product

INDICATOR	UNIT	A1	A2	A3	A1-A3
GWP _{TOTAL}	(kg CO ₂ eq.)	3,25E+02	3,39E+01	3,58E+02	7,18E+02
GWP _{FOSSIL}	(kg CO ₂ eq.)	3,25E+02	3,39E+01	3,58E+02	7,17E+02
GWP _{BIOGENIC}	(kg CO ₂ eq.)	-6,32E-02	-1,40E-01	7,20E-01	5,16E-01
GWP _{LULUC}	(kg CO ₂ eq.)	1,07E-02	1,25E-01	9,90E-03	1,46E-01
ODP	(kg CFC 11 eq.)	3,68E-07	4,32E-11	1,48E-11	3,69E-07
AP	(mol H ⁺ eq.)	3,23E-01	5,55E-01	2,73E-01	1,15E+00
EP _{FRESHWATER}	(kg P eq.)	7,35E-05	7,68E-05	2,52E-05	1,76E-04
EP _{MARINE}	(kg N eq.)	6,03E-02	1,55E-01	1,27E-01	3,42E-01
EP _{TERRESTRIAL}	(mol N eq.)	7,45E-01	1,70E+00	1,40E+00	3,84E+00
POCP	(kg NMVOC eq.)	1,71E-01	4,13E-01	3,55E-01	9,39E-01
ADP _{MINERALS&METALS} *	(kg Sb eq.)	6,44E-06	3,08E-06	2,12E-05	3,07E-05
ADP _{FOSSIL} *	(MJ)	1,33E+03	4,46E+02	5,75E+03	7,52E+03
WDP*	(m ³ world eq.)	1,17E+01	8,63E-01	9,28E-01	1,35E+01

GWP_{TOTAL}: Global Warming Potential total; 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; EP_{FRESHWATER}: Eutrophication Potential, freshwater; EP_{MARINE}: Eutrophication Potential, marine; EP_{TERRESTRIAL}: Eutrophication Potential, terrestrial; POCP: Formation potential of tropospheric ozone; ADP_{MINERALS&METALS}: Abiotic Depletion Potential for non-fossil resources; ADP_{FOSSIL}: Abiotic Depletion Potential for fossil resources; WDP: Water Deprivation Potential.

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

Table 11: GÓRKAL 40: Potential environmental impact – additional mandatory and voluntary indicators referred to 1000 kg of bulk product

INDICATOR	UNIT	A1	A2	A3	A1-A3
GWP-GHG	(kg CO ₂ eq.)	3,23E+02	3,35E+01	3,54E+02	7,11E+02

GWP-GHG: 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.

Table 12: GÓRKAL 40: Use of resources referred to 1000 kg of bulk product

INDICATOR	UNIT	A1	A2	A3	A1-A3
PERE	MJ	2,60E+02	4,54E+01	1,23E+01	3,18E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,60E+02	4,54E+01	1,23E+01	3,18E+02
PENRE	MJ	1,33E+03	4,47E+02	5,75E+03	7,52E+03
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,33E+03	4,47E+02	5,75E+03	7,52E+03
SM	kg	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
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	6,15E-01	4,70E-02	2,99E-02	6,92E-01

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 (primary energy and primary energy resources used as raw materials); 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 resources (primary energy and primary energy resources used as raw materials); SM: Use of secondary material; RSF: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels; FW: Net use of fresh water.

Table 13: GÓRKAL 40: Waste production and output flows referred to 1000 kg of bulk product

INDICATOR	UNIT	A1	A2	A3	A1-A3
HWD	kg	5,42E-08	6,28E-09	1,12E-06	1,18E-06
NHWD	kg	6,06E-01	9,21E-02	1,65E+00	2,34E+00
RWD	kg	2,51E-02	8,69E-03	1,46E-03	3,52E-02
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	1,01E+01	1,01E+01
Materials for energy recovery	kg	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
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00

PHWD: Hazardous waste disposed; NHWD: Non-Hazardous waste disposed; RWD: Radioactive waste disposed

Table 14: GÓRKAL 40: Information on biogenic carbon content at the factory gate referred to 1000 kg of bulk product

BIOGENIC CARBON CONTENT	UNIT	QUANTITY
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in packaging	kg C	0,00E+00

8. Data Quality

Table 15: Data quality

DATASET & GEOGRAPHICAL REFERENCE	DATABASE (SOURCE)	TEMPORARY REFERENCE
A1; A3		
Clinker	Sphera Database; ecoinvent 3.8	2022; 2015-2021
Additives (GLO)	Sphera Database; ecoinvent 3.8	2022; 2015-2021
Electricity grid mix (PL)	Sphera Database;	2020
A2		
Truck, Euro 5, 27t payload (GLO)	Sphera Database	2020
Diesel for transport (EU)	Sphera Database	2017

All data included in table above refer to a period between 2015 and 2022; the most relevant ones are specific from supplier, while the others (i.e. transport and minor contribution dataset), come from European and global databases. All dataset are not more than 10 years old according to EN 15804 §6.3.8.2 “Data quality requirements”.

The quality level concerning datasets used in the EPD can be considered as “very good” or “good” according to Annex E of the EN 15804.

Primary data concern the year 2020 and represent the whole annual production.

More details about electrical mix used in this EPD, is shown below:

	DATA SOURCE	GWPTOTAL	UNIT
Residual electricity grid mix (PL) – 2021	AIB	0,827*	kg CO ₂ -eqv/kWh

* According to CML 2001 – Jan. 2016 Methodology

Tables from 5 to 14 show absolute results for all the environmental categories considered.

The main contribution to almost all the environmental impacts categories in the product life cycle comes from extraction and processing of raw materials (module A1). Its relative contribution is over 80% in some categories (such as acidification, eutrophication, resource use and water use). Also, the production stage (module A3) has a relevant contribution up to 40% in some environmental impact categories such as the climate change total. Instead, module A2 has a negligible contribution.

9. Verification and Registration

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

CEN STANDARD EN15804 SERVED AS THE CORE PRODUCT CATEGORY RULES (PCR)

PCR:	PCR 2019:14 Construction products (EN 15804:A2), Version 1.11, 2021-02-05, UN CPC code 54
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact .
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	<input checked="" type="checkbox"/> EPD Process Certification <input type="checkbox"/> EPD Verification
Third party verifier:	Certiquality S.r.l. Number of accreditations: 003H rev15
Accredited or approved by:	Accredia
Procedure for follow-up of data during EPD validity involves third-party verifier	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

10. References

- GENERAL PROGRAMME INSTRUCTIONS OF THE INTERNATIONAL EPD® SYSTEM. VERSION 3.01
- ISO 14025 ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE III ENVIRONMENTAL DECLARATIONS - PRINCIPLES AND PROCEDURES
- ISO 14044 ENVIRONMENTAL MANAGEMENT – LIFE CYCLE ASSESSMENT – REQUIREMENTS AND GUIDELINES
- PCR 2019:14 CONSTRUCTION PRODUCTS (EN 15804: A2), UN CPC CODE 54; VERSION 1.11
- EN 15804: SUSTAINABILITY OF CONSTRUCTION WORKS - ENVIRONMENTAL PRODUCT DECLARATIONS - CORE RULES FOR THE PRODUCT CATEGORY OF CONSTRUCTION PRODUCTS
- EUROPEAN RESIDUAL MIXES VERSION 1.0, 2022-05-31 (AIB: ASSOCIATION OF ISSUING BODIES)
- c-PCR-001 CEMENT AND BUILDING LIME (EN 16908) (2022-05-18)



Figure 4: Quality control

11. Contact information

EPD owner:



Górka Cement Sp. z o.o.
www.gorka.com.pl

LCA author:



Mapei SpA
www.mapei.it;
Environmental Sustainability Office

Programme
operator:



The International EPD® System
Address: EPD International AB
Box 210 60
SE-100 31 Stockholm
Sweden

www.environdec.com
info@environdec.com



Górka Cement Sp. z o.o.
ul. Lipcowa 58
32-540 Trzebinia
Poland

gorka.com.pl