

# Environmental Product Declaration



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

## ***Low heat of hydration and sulfate resisting blast furnace cement CEM III/B 32,5N -LH/SR***

**AB AKMENES CEMENTAS**

Publication date:

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Valid until:

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## Company information

Owner of the EPD:

Akmenes cementas, AB

E-mail [info@cementas.lt](mailto:info@cementas.lt)

Tel (8 425) 58323

<https://www.cementas.lt/en/>

Description of the organisation: AB Akmenes Cementas is located in the Northern edge of Lithuania, in the town of Naujoji Akmene, about 300 km north-west away from Vilnius, capital of Lithuania. Construction of cement plant was started in 1947 in Karpėnai village Akmenės district. Operation of the first clinker burning rotary kiln was started in 1952. Dry process technology to produce clinker is used from the 25th of July 2015. Capacity of new production line is about 1,5-million-ton cement per year.

The company has implemented quality management system in accordance with the standard requirements of LST EN ISO 9001: 2015, environmental management system in accordance with the requirements of LST EN ISO 14001: 2015 and occupational health and safety management system in accordance with the requirements of LST ISO 45001:2018.

Name and location of production site(s): The manufacturing plant of Akmenes Cementas is based in J. Dalinkeviciaus str. 2 LT-85118 Naujoji Akmene, Lithuania.

## Product information

Product name: Low heat of hydration and sulfate resisting blast furnace cement CEM III/B 32,5N -LH/SR

Product description: Cement is a hydraulic binder, i.e., an inorganic material produced by finely grinded clinker with gypsum, when mixed with water, forms a paste which sets and hardens by means of hydration reactions and processes and which, after hardening, retains its strength and stability even under water.

Cements are used in industrial installations to manufacture/formulate hydraulic binders for building and construction work, such as ready-mixed concrete, mortars, renders, grouts, plasters as well as precast concrete.

Common cements and cement containing mixtures (hydraulic binders) are used industrially, by professionals as well as by consumers in building and construction work, indoor and outdoor. The identified uses of cements and cement containing mixtures cover the dry products and the products in a wet suspension (paste).

Product technical data: Conformity of the cements to the product specification standard LST EN 197-1 is indicated by the certificates of constancy of performance issued by Lithuanian certification body of building materials SPSC and the related use of CE conformity mark.

For the placing on the market of the product in the European Union Regulation (EU) No. 305/2011 Construction Product Regulation applies.

UN CPC code: 374

Geographical scope: Europe

## LCA information

Declared unit: 1 tonne of CEM III/B 32,5N -LH/SR

Reference service life: The reference service life for the cement is set at 100 years.

Time representativeness: Primary data were collected internally. The production data refer to an average of the year 2020.

Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and process materials obtained from the background system. The used database is Ecoinvent 3.6. The LCA software used is One Click LCA.

Description of system boundaries: Cradle to gate with options. The LCA was carried out considering the Product stage phases (A1, A2, A3) and Distribution (A4). Modules C1-C4 and module D are not covered by this study because the product is physically integrated with other products during installation so they cannot be physically separated from them at the end of life. Installation process and use stage are also not covered by the study.

Data quality: The foreground data collected internally are based on yearly production amounts and extrapolations of measurements on specific machines and plants. Overall, the data quality can be described as good. The primary data collection has been done thoroughly.

Cut-off criteria: Life cycle inventory data for a minimum of 99% of total material and energy input flows have been included in the life cycle analysis. Although, only materials having in summa less than 1% of weight of product were not used in calculations.

System boundary:

Product stage			Constructi on 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
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Description of the system boundary (X = Included in LCA; MND = Module Not declared)

Product stage:

A1: This stage considers the extraction and processing of raw materials as well as energy consumption.

A2: The raw materials are transported to the manufacturing plant. In this case, the model includes transport of each raw material.

A3: This stage includes the manufacture of products. Specifically, it covers clinker and cement production. Data for the energy and fuels was allocated according to annual production rate in the plant.

### Production process description

Heavy trucks deliver limestone from the quarry and discharge it on to the pallet conveyor, which conveys the limestone to the jaw crusher for primary crushing and after to the hammer crusher for secondary crushing. Crushed limestone is transported to storage hall, in which also is fed crushed clay. Limestone and clay mix and corrective additives – sand and iron ore- are transported to the appropriate bins. After, dosage materials are conveyed to crusher and raw mill, where are ground to desired fineness and dried. The heat provided by the preheater gases is used for raw meal drying. Raw meal fed into the ground and dried meal silo. From the silo elevator lift raw meal to cyclone preheater. Through the 4-stage preheater with integrated calciner hot material fall into the rotary kiln where at a temperature of approx. 1450 °C an artificial mineral-clinker is produced. The kiln is fired by the coal meal. Coal grinding system is used for coal meal preparation. In order to save non-renewable fuel, reduce costs of clinker production and contribute to the increasing amount of waste generation management, the company burns used tires, dried sewage sludge and etc. as an alternative fuel in the clinker production kiln.

Clinker falls from the kiln into the cooler. Cooled clinker is delivered to the clinker silos by bucket conveyor. Clinker, gypsum and granulated blast furnace slag are milled in cement ball mills. Grinding aid is used in cement production for reducing energy consumption and increasing flow ability of cement. Then cement by compressed air is transported to the cement silos. Products from the cement silos are delivered to clients by trucks and railway wagons.

### Construction process stage:

A4: This stage includes transport from the production gate to the building site where the product shall be installed.

Transportation is calculated based on data form manufacturer and a scenario with the parameters described in the following table.

Parameter	Value/Description
Vehicle type used for transport	EURO 5 truck with a trailer with an average load of 32t and freight train
Distance	82 % of production: Truck – 280 km; 18 % of production: Train – 209 km.
Capacity utilization	56 % of the capacity in volume (truck) 28 % of the capacity in volume (train)

## Content information

Materials / chemical substances	Weight, kg	Weight, %
Clinker	223	22.3 %
Gypsum	65	6,5 %
Granulated blast furnace slag	712	71,2 %
Grinding aid	0.69	<0,1%

No dangerous substances from the candidate list of SVHC for Authorisation are included in the product.

### Packaging

Distribution packaging: No packaging, delivered as bulk material.

## Environmental Information

**Note:** Environmental impacts according to EN 15804+A1, CML/ISO 21930 are presented below

### Potential environmental impact – mandatory indicators according to EN 15804:2012+A2:2019

Results per declared unit						
Indicator	Unit	A1	A2	A3	A1-A3	A4
GWP-total	kg CO <sub>2</sub> eq.	2,11E+01	1,13E+01	2,02E+02	2,35E+02	2,27E+01
GWP-fossil	kg CO <sub>2</sub> eq.	2,11E+01	1,13E+01	2,02E+02	2,35E+02	2,27E+01
GWP-biogenic	kg CO <sub>2</sub> eq.	-1,184E-2	-2,045E-4	2,896E-5	-1,202E-2	-2,193E-3
GWP-luluc	kg CO <sub>2</sub> eq.	1,018E-2	1,617E-2	1,565E-2	4,2E-2	8,506E-3
ODP	kg CFC 11 eq.	4,34E-6	1,713E-6	1,627E-6	7,68E-6	5,157E-6
AP	mol H <sup>+</sup> eq.	1,026E-1	9,383E-2	9,972E-2	2,961E-1	6,433E-2
EP-freshwater	kg PO <sub>4</sub> <sup>3-</sup> eq.	2,888E-3	2,901E-3	3,615E-2	4,194E-2	2,233E-3
EP-marine	kg N eq.	3,021E-2	3,687E-2	3,651E-2	1,036E-1	1,251E-2
EP-terrestrial	mol N eq.	3,418E-1	3,992E-1	3,444E-1	1,09E+00	1,341E-1
POCP	kg NMVOC eq.	1,006E-1	1,077E-1	9,241E-2	3,007E-1	5,719E-2
ADP-minerals&metals*	kg Sb eq.	2,942E-3	9,479E-5	9,206E-5	3,129E-3	3,709E-4
ADP-fossil*	MJ	3,16E+02	1,55E+02	1,15E+03	1,62E+03	3,47E+02
WDP	m <sup>3</sup>	2,74E+02	1,85E+02	4,91E+04	4,96E+04	3,98E+02
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					

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

## Use of resources

Results per declared unit						
Indicator	Unit	A1	A2	A3	A1-A3	A4
PERE	MJ	6,63E+00	8,34E+00	3,23E+02	3,37E+02	6,42E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	6,63E+00	8,34E+00	3,23E+02	3,37E+02	6,42E+00
PENRE	MJ	3,24E+02	1,65E+02	1,16E+03	1,65E+03	3,58E+02
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,24E+02	1,65E+02	1,16E+03	1,65E+03	3,58E+02
SM	kg	0,00E+00	0,00E+00	1,439E-1	1,439E-1	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	1,98E+01	1,98E+01	0,00E+00
FW	m <sup>3</sup>	7,417E-1	4,91E-2	8,055E-2	8,713E-1	7,707E-2
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 declared unit						
Indicator	Unit	A1	A2	A3	A1-A3	A4
Hazardous waste disposed	kg	6,159E-1	6,052E-1	9,25E+00	1,05E+01	4,341E-1
Non-hazardous waste disposed	kg	3,06E+01	1,58E+01	1,73E+02	2,20E+02	3,87E+01
Radioactive waste disposed	kg	1,968E-3	8,33E-4	7,447E-4	3,546E-3	2,388E-3

*Remark to waste categories:*

*The waste indicators account wastes from not only clinker and cement production, but also production and transportation of coal and other materials.*

## Output flows


Results per declared unit						
Indicator	Unit	A1	A2	A3	A1-A3	A4
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	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
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

## ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Results per declared unit						
Indicator	Unit	A1	A2	A3	A1-A3	A4
GWP-total	kg CO <sub>2</sub> eq.	2,09E+01	1,11E+01	2,00E+02	2,32E+02	2,25E+01
ODP	kg CFC 11 eq.	3,481E-6	1,391E-6	1,344E-6	6,216E-6	4,117E-6
AP	mol H <sup>+</sup> eq.	8,081E-2	7,021E-2	7,655E-2	2,276E-1	5,418E-2
EP	kg PO <sub>4</sub> <sup>3-</sup> eq.	2,101E-2	2,204E-2	1,241E-1	1,671E-1	1,282E-2
POCP	kg Ethenee	3,452E-3	2,48E-3	3,617E-3	9,549E-3	3,117E-3
ADP-minerals&metals	kg Sb eq.	2,942E-3	9,479E-5	9,206E-5	3,129E-3	3,709E-4
ADP-fossil	MJ	3,16E+02	1,55E+02	1,15E+03	1,62E+03	3,47E+02
Acronyms	GWP = Global Warming Potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential; EP = Eutrophication potential; POCP = Formation of ozone of lower atmosphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential;					



## Declaration information

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)	
Product category rules (PCR): PCR 2019:14 Construction products (version 1.1)	
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	
<input type="checkbox"/> EPD process certification <input type="checkbox"/> EPD verification	
Third party verifier:  Silvia Vilčeková Silcert, s.r.o. silcertsro@gmail.com	
Procedure for follow-up of data during EPD validity involves third party verifier:	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

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.

## References

- C-PCR-001 – Cement and building lime, version 2019-12-20
- PCR 2019:14 Construction products (version 1.1)
- EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products;
- 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.

## Tools and database

- One Click LCA tool;
- Ecoinvent 3.6 database

## Contact information

EPD owner:	 Akmenes Cementas, AB <a href="https://www.cementas.lt/en/">https://www.cementas.lt/en/</a>
LCA author:	 Sustainability Consulting Vesta Consulting, UAB <a href="https://www.vestaconsulting.lt/">https://www.vestaconsulting.lt/</a>