ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Precast concrete products

from

Gelmesta UAB

Programme operator	The Building Information Foundation RTS sr
EPD number	RTS_328_24
Publishing date	14.10. 2024
EPD valid until	14.10.2029

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Gelmesta UAB
Address	Statybininkų g. 1b, Vievis, Lithuania
Contact details	pardavimai@gelmesta.lt, Tel. +.37061883331
Website	www.gelmesta.lt

PRODUCT IDENTIFICATION

Product name	Precast concrete products
Product number / reference	-
Place(s) of production	Lithuania
CPC code	37550

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must comply with EN15804, 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.

EPD INFORMATION

EPD program operator	The Building Information Foundation RTS sr
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used.
EPD author	Silvija Serapinaitė, Vesta Consulting UAB
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
Verification date	20.09.2024
EPD verifier	Mari Kirss, Rangi Maja OÜ
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Jukka Seppänen
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PRODUCT INFORMATION

PRODUCT DESCRIPTION

Reinforced concrete products are construction materials composed of concrete and steel reinforcement, which together form a strong and reliable structure. The concrete and steel components are tightly bonded, allowing them to act as a single unit under load. The concrete layer can be smooth or textured, depending on project requirements.

Our product range includes a variety of structural components, such as linear elements, foundations, walls, bridges, retaining walls, stairs, slabs, and other products. We specialize in producing a wide range of items across all concrete classes, tailored to meet customer specifications and technical requirements.

PRODUCT APPLICATION

Precast concrete products are valued for its strength, fire resistance, and longevity, making it a versatile material with a wide range of applications. The main areas where it is used include:

- Structural Elements;
- Bridges and Viaducts;
- Engineering Structures;
- Industrial Buildings;
- Residential and Commercial Buildings;
- Manufactured Products;
- Architectural Elements.

TECHNICAL SPECIFICATIONS

Products are available in various sizes, shapes and lengths. Hight: 90 mm - 3400 mm, width: 90 mm - 6000 mm length: 10 mm - 13000 mm, up to 10 tons. Type of concrete is C8/10 - C45/55.

PRODUCT STANDARDS

Precast concrete products has CE marking and represents that products comply with the EU's New Approach Directives. Precast concrete products are manufactured in compliance with these European standards which specifies all requirements for factory made precast concrete products:

a) EN 13369
b) EN 13225
c) EN 14991
d) EN 14992
e) EN 14843
f) EN 15050

Company is certified with certification ISO 9001:2015 (Quality Standard), ISO 14001:2015 (Environmental Standard), ISO 45001:2018 (Occupational health and safety management systems), EN 13225:2013 (Linear structural elements), EN 14991:2007 (Precast concrete products - Foundation elements), EN 14992:2007+A1:2012 (Precast concrete products - Wall elements), EN 14843:2007 (Precast concrete products - Stairs), EN 15050;2007+A1;2012 (Precast concrete products - Bridge elements).

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.gelmesta.lt.

PRODUCT RAW MATERIAL COMPOSITION

Materials	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-%	Biogenic material, kg C/DU
Sand	342.13	0	0	0
Cement	189.05	0	0	0
Granite rubble	367.45	0	0	0
Water	69.31	0	0	0
Reinforcing steel	32.07	90.65	0	0
	1000	2.91	0	0

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	3.21	EU
Minerals	70.96	LT
Fossil materials	18.91	EU
Bio-based materials	0.00	-
Other (water)	6.93	LT

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2023
EPD type	Worst case scenario is evaluated, as A1-A3 GWP value differs by more than 10% (the highest compared to the lowest). Worst case scenario – Precast concrete products with C40/50 type of concrete.

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 tonne
Mass per declared unit	1000 kg

SYSTEM BOUNDARY

The type of scope for this study is cradle to gate, modules C1–C4 and module D and covers impacts of raw materials' production, their transportation to the production plant, manufacturing process, and end-of-life stage.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.

2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.

3. Allocation should be based on economic values.

The allocations in the Ecoinvent 3.8 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804'.

The EN 15804 reference package used is based on EF 3.0.

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

A1: This module considers the extraction and processing of raw materials.

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

A3: This module includes the manufacture of products. It has considered all the energy consumption and waste generated in the production plant.

MANUFACTURING PROCESS

Design and planning. The product is designed if no design is received. The project includes dimensions, placement of fittings, specific technical requirements.

Material Preparation. Materials and products needed to make the product are ordered. Steel reinforcement (rods or nets) is prepared and cut according to the lengths provided in the project. The reinforcement is tied or welded according to design requirements. Reinforcement (rods or nets) is prepared and cut according to the lengths provided in the project. The reinforcement is tied or welded according to design requirements.

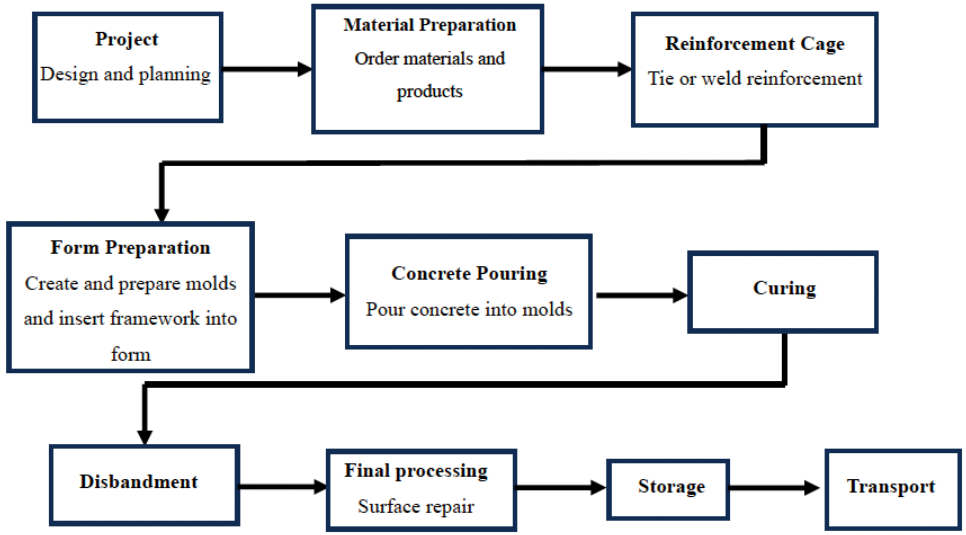
Form Preparation. Molds are created and prepared to define the shape and dimensions of the reinforced concrete product. Molds can be made of wood, metal, or plastic and must be sturdy and smooth to ensure the final product is precise. The framework is inserted into the form while maintaining the protective layer provided for in the project.

Concrete Pouring. The required quantity of concrete of the required class is ordered. The prepared concrete is poured into the molds. It is important to ensure that the concrete is evenly distributed and that there are no air bubbles, which can reduce its strength. To remove air bubbles and ensure that the concrete is evenly distributed, vibrators are used.

Curing. After pouring, the concrete must dry and cure in the forms. This process typically takes several days, during which time it is crucial to keep the concrete properly moist and protected from excessive drying or cold.

Disbandment. When the concrete has completely hardened, it is removed from the form. This is done carefully so as not to damage the surface or structure of the final product.

Final Processing. Additional surface treatments may be required, such as grinding or sealing, to meet aesthetic and functional requirements.



TRANSPORT AND INSTALLATION (A4-A5)

This EPD does not cover the transport and installation stage. The GWP (global warming potential) of A4 stage is less than 20% of the GWP of modules A1–A3 and less than 1000 km, so it is not mandatory to declare.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.

PRODUCT END OF LIFE (C1-C4, D)

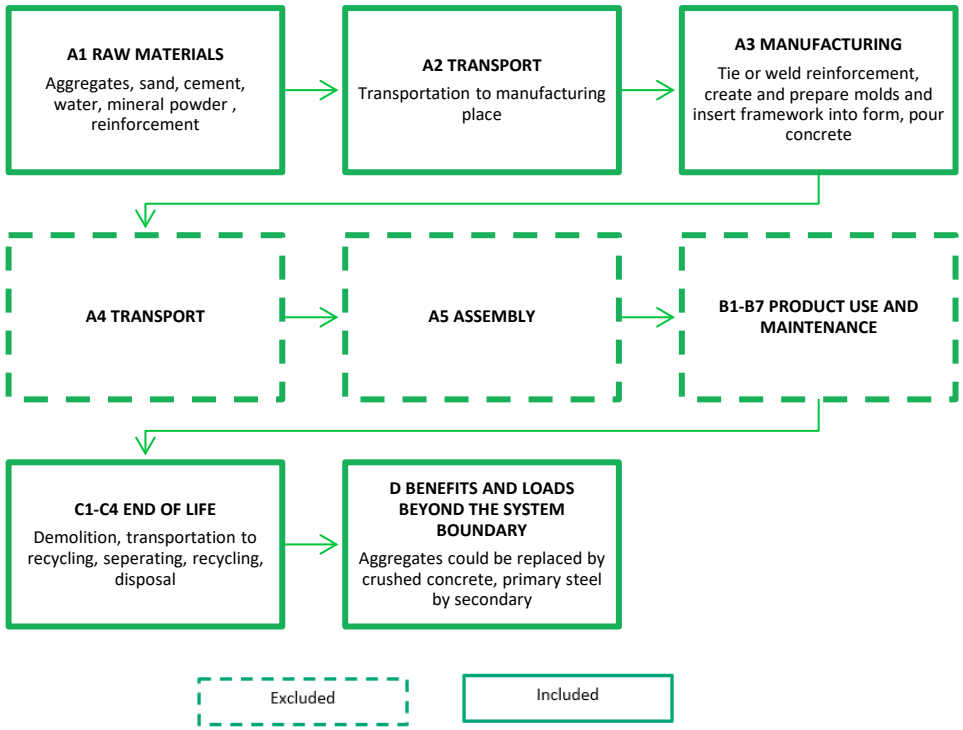
Energy consumption for demolition is 10 kWh/1000 kg = 0,01 kWh/kg. The source of energy is diesel fuel used by work machines. Based on Europe average 90% of steel are transformed into secondary material in a recycling plant. According to European commission Waste Framework Directive by 2020, the preparing for re-use, recycling and other material recovery of non-hazardous construction and demolition waste shall be increased to a minimum of 70% by weight. It is assumed that 70% of the concrete waste is recycled. The remaining 30% of concrete and 10% of steel are assumed to be sent to the landfill. Transportation distance to the closest recycling facility or landfill is estimated as 50 km and the transportation method is lorry which is the most common. Study evaluates end of life scenarios for EU location.

Benefits and loads beyond the system boundary (D):

Benefits of recyclable waste generated in the phase C3 are taken into account in the phase D. The recycled steel has been modelled to avoid use of primary materials. If there is more recycled material than material sent to recycling, load is accounted at the D stage.

Crushed concrete is made into rubble that can be used as a raw material in concrete production for road gravel.

THE PROCESS DIAGRAM



ENVIRONMENTAL IMPACT DATA

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

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	2,22E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,31E+00	4,69E+00	3,35E+00	1,55E+00	-5,27E+00
GWP – fossil	kg CO_2e	2,22E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,31E+00	4,69E+00	3,35E+00	1,55E+00	-5,26E+00
GWP – biogenic	kg CO_2e	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	1,03E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,30E-04	1,73E-03	1,10E-03	1,46E-03	-7,69E-03
Ozone depletion pot.	kg CFC_{-11}e	8,90E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,07E-07	1,08E-06	6,60E-07	6,25E-07	-4,39E-07
Acidification potential	mol H^+e	7,13E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,44E-02	1,99E-02	3,63E-02	1,45E-02	-3,46E-02
EP-freshwater[2)]	kg Pe	5,47E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,10E-05	3,84E-05	4,29E-05	1,62E-05	-3,08E-04
EP-marine	kg Ne	2,29E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,52E-02	5,90E-03	1,42E-02	5,03E-03	-7,64E-03
EP-terrestrial	mol Ne	2,39E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,67E-01	6,51E-02	1,57E-01	5,53E-02	-9,75E-02
POCP ("smog")[3)]	kg NMVOCe	6,68E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,59E-02	2,08E-02	4,31E-02	1,61E-02	-2,45E-02
ADP-minerals & metals[4)]	kg Sbe	7,57E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,68E-06	1,10E-05	8,65E-05	3,55E-06	-4,71E-05
ADP-fossil resources	MJ	1,32E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,45E+01	7,05E+01	4,52E+01	4,24E+01	-7,72E+01
Water use[5)]	m^3e depr.	2,95E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,20E-01	3,15E-01	2,65E-01	1,34E-01	-1,05E+01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	1,23E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,54E-01	7,94E-01	1,73E+00	3,68E-01	-6,85E+00
Renew. PER as material	MJ	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	1,23E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,54E-01	7,94E-01	1,73E+00	3,68E-01	-6,85E+00
Non-re. PER as energy	MJ	1,21E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,45E+01	7,05E+01	4,52E+01	4,24E+01	-7,72E+01
Non-re. PER as material	MJ	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	1,21E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,45E+01	7,05E+01	4,52E+01	4,24E+01	-7,72E+01
Secondary materials	kg	3,41E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,74E-02	1,96E-02	2,39E-02	8,91E-03	7,06E+02
Renew. secondary fuels	MJ	2,59E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,70E-05	1,97E-04	5,43E-04	2,33E-04	-5,93E-04
Non-ren. secondary fuels	MJ	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,98E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,70E-03	9,13E-03	7,25E-03	4,64E-02	-2,45E-01

8) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	4,50E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,96E-02	9,34E-02	1,07E-01	0,00E+00	-3,44E-01
Non-hazardous waste	kg	1,21E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,19E-01	1,54E+00	2,20E+00	2,94E+02	-1,32E+01
Radioactive waste	kg	6,38E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,13E-04	4,71E-04	3,08E-04	0,00E+00	-3,93E-04

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	1,30E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	2,34E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	7,06E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	1,04E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	2,22E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,31E-03	4,70E-03	3,36E-03	1,55E-03	2,22E-01
ADP-minerals & metals	kg Sbe	3,39E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,65E-09	1,07E-08	8,64E-08	3,50E-09	3,39E-07
ADP-fossil	MJ	8,65E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,45E-02	7,05E-02	4,52E-02	4,24E-02	8,65E-01
Water use	m^3e depr.	2,95E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,20E-04	3,15E-04	2,65E-04	1,34E-04	2,95E-02
Secondary materials	kg	3,41E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,74E-05	1,96E-05	2,39E-05	8,91E-06	0.71E+00
Biog. C in product[9)]	kg C	0,00E+00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	0,00E+00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

9) Biog. C in product = Biogenic carbon content in product

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value	Source
Residual mix (Lithuania)	0.527 kg CO_2e/kWh	Average Lithuanian residual mix of last three last years (2021, 2022 and 2023) has been modelled according to the Association of Issuing Bodies data (https://www.aib-net.org/facts/european-residual-mix). Data sources: ecoinvent 3.8
Solar PV on the roof	0.0789 kg CO_2e/kWh	Electricity production, photovoltaic, 570kWp open ground installation, multi-Si. Data sources: ecoinvent 3.8

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1000
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	706.41
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	293.59
Scenario assumptions e.g. transportation	End-of-life product is transported 50 km with average lorry

BIBLIOGRAPHY

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

Ecoinvent database v3.8 (2021) and One Click LCA database.

Precast concrete product LCA background report 22.08.2024

ABOUT THE MANUFACTURER

The company was founded in 1995. Main activities: production and installation of Reinforced concrete products, production of polystyrene, production of concrete. The mission is to provide the highest quality concrete, standard and non-standard Reinforced products of concrete products that meet the expectations and needs of customers. The company aims to be a leader in the sector of concrete products, while adhering to high standards of ethics, safety and environmental responsibility. The vision of UAB "Gelmesta" is to become a leading concrete and Reinforced concrete product manufacturing company in Lithuania. The company aims to build long-term relationships with clients, partners, and the communities in which it operates.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Gelmesta UAB
EPD author	Silvija Serapinaitė, Vesta Consulting UAB
EPD verifier	Mari Kirss, Rangi Maja OÜ
EPD program operator	The Building Information Foundation RTS sr
Background data	This EPD is based on Ecoinvent 3.8 (Allocation, cut-off, EN15804) and One Click LCA databases
LCA software	The LCA and EPD have been created using One Click LCA tool. The EN 15804 reference package used is based on EF 3.0.