ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804+A2 & ISO 14025

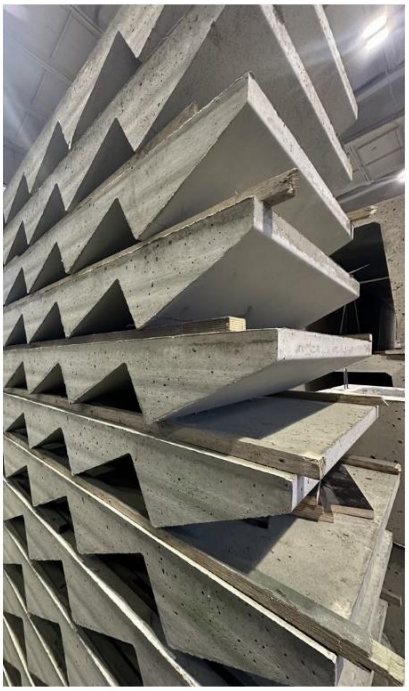
PRECAST CONCRETE PRODUCTS

FROM UAB "TILSTA"

TILSTA

Programme operator: Rakennustieto Oy
EPD registration number: RTS_348_25
Publication date: 21.1.2025
Valid until: 21.1.2030

EPD of multiple products, based on worst-case results



GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	UAB "Tilsta"
Address	Granito st. 6, Vilnius, Lithuania, LT-02241
Contact details	info@tilsta.lt
Website	https://www.tilsta.lt/

PRODUCT IDENTIFICATION

Product name	Precast concrete products
Place(s) of production	Lithuania
CPC code	37550 – prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone

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 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. For further information about comparability, see EN 15804 and ISO 14025.

EPD INFORMATION

EPD program operator	Rakennustieto Oy
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	Urtė Valdavičė and Sigita Židonienė, UAB "Vesta Consulting"
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
Verification date	2025-01-13
EPD verifier	Mari Kirss, Rangi Maja OÜ
EPD number	RTS_348_25
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EPD valid until	21.1.2030

Jukka Seppänen
RTS EPD Committee Secretary

Laura Apilo
Managing Director

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Precast concrete products are essential for infrastructure, offering robust and durable solutions for bridges, abutments, foundation piles, and other structural applications. These components are manufactured in controlled environments, ensuring high quality and consistency for projects that demand reliability. Ideal for heavy-duty infrastructure, precast concrete enhances construction efficiency and longevity across various civil engineering projects.

PRODUCT APPLICATION

Precast concrete products are widely used in the construction, reconstruction, and repair of essential infrastructure like roads, railways, and pedestrian bridges. These versatile materials are also crucial for tunnels, viaducts, overpasses, embankments, buildings, and other civil engineering structures. Product durability and strength make them ideal for projects due to structural integrity and long-lasting performance.

TECHNICAL SPECIFICATIONS AND PRODUCT STANDARDS

Production is carried out in accordance with LST EN 13369 "General rules for precast concrete products", LST EN 15050 "Precast concrete products. Bridge elements" and LST EN 12794 "Precast concrete products. Foundation piles" standards and according to internal production control systems according to LST EN ISO 9001, LST EN ISO 14001, LST ISO 45001.

PHYSICAL PROPERTIES OF THE PRODUCT

Precast concrete products are manufactured in a variety of sizes, shapes, and lengths to accommodate a wide range of construction needs. The concrete used in these products spans strength classes from C20/25 to C60/75, providing options tailored to different load-bearing requirements. The primary concrete classes utilized in precast concrete production are C35/45, C40/45, and C45/55, accounting for approximately 68%, 28%, and 4% of total production, respectively. Consequently, this EPD covers precast concrete products up to strength class of C45/55. These products are reinforced with steel rods ranging in diameter from 6 mm to 42 mm, ensuring enhanced stability and durability for challenging infrastructure projects.

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at https://www.tilsta.lt/

PRODUCT RAW MATERIAL COMPOSITION

Product Material	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-%	Biogenic material, kg C/DU
Ready-mix concrete	916.09	0	0	0
Reinforcement steel	83.56	7.83 %	0	0
Welding wire	0.29	0	0	0
Additives	0.07	0	0	0
Total	1000.00	0.65 %	0	0

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	8.38 %	EU
Minerals	91.61 %	EU
Fossil materials	0.01 %	EU
Water	0	0
Bio-based materials	0	0

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

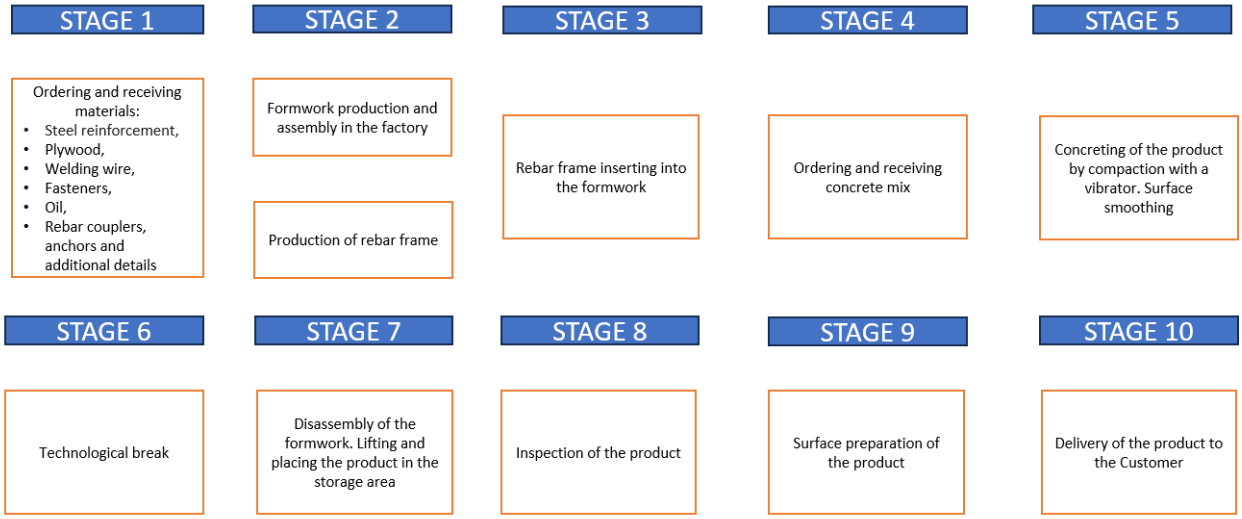
A1: This module considers the extraction and processing of raw materials.

A2: The raw materials are transported to the production site. Vehicle capacity utilization volume factor is assumed to be 1 which means full load. Empty returns are not considered.

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

MANUFACTURING PROCESS

The manufacturing process for precast concrete products involves a sequence of specialized steps. First, raw materials such as rebar, plywood, welding wire and necessary additives are obtained. Formwork is then assembled; if a metal formwork for a specific product isn't available (a frequent case with custom orders), a plywood formwork is created instead. This formwork is coated with a thin layer of oil to facilitate release. The steel rebar is cut, bent, and arranged to form the product's framework, which is placed into the formwork along with any required additives. Concrete, sourced from batching plants, is poured into the formwork and smoothed to achieve a uniform surface. After curing for 12–48 hours, the formwork is carefully removed. The finished product undergoes quality inspection, surface preparation and is transferred to storage, where it awaits client delivery.



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. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

C1: Demolition is assumed to be done by mobile machinery (10 kWh/t) and that that 100% of the waste is collected and treated.

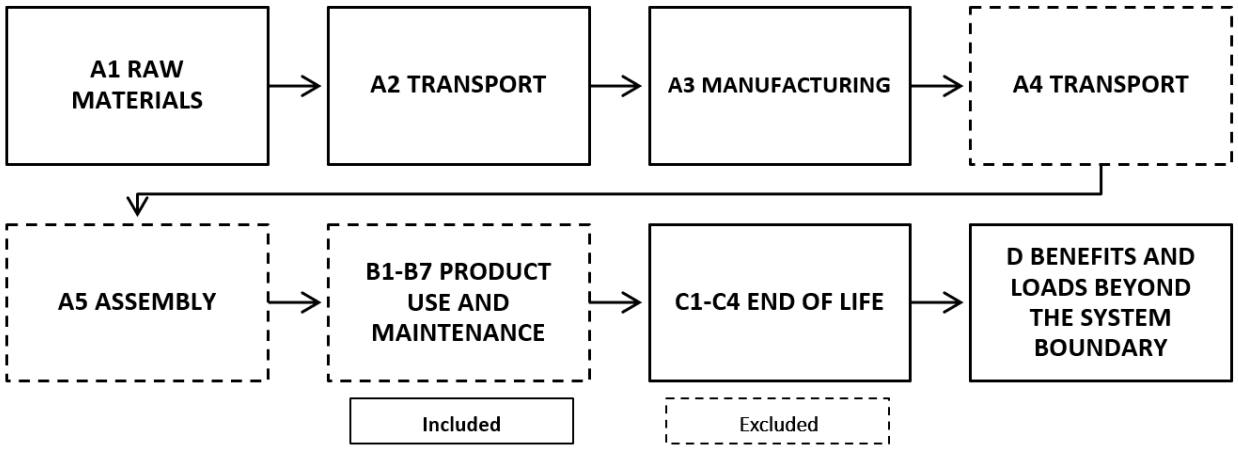
C2: It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. All the end-of-life products are assumed to be sent to the closest facilities such as recycling and landfill. Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is assumed as lorry which is the most common option.

C3: According to the European commission Waste Framework Directive by 2020, the preparation 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, hence it is assumed that 70% of the concrete waste is recycled. Moreover, it is assumed that 90% of steel is transformed into secondary material in a recycling plant, based on Europe average.

C4: According to the European commission Waste Framework Directive it is assumed that 30 % of concrete and 10 % of steel is collected with construction waste and is sent to landfills.

D: The recycled concrete has been modelled to avoid gravel production. The impact of concrete crushing for use as gravel is also considered. The recycled steel has been modelled to avoid use of primary materials (assumed recycled content 59.30%).

THE PROCESS DIAGRAM



CALCULATION RULES FOR AVERAGING DATA

This EPD is an EPD of multiple products from a company based on worst-case results. The grouped products are with identical or similar functions, manufactured by a single company at several manufacturing sites, with the same major steps in the A3/core processes. For each indicator and module A-C, the highest result of the included products is declared, and for module D, the lowest benefit of avoided processes and the highest load of included processes is declared.

The “best case” scenario product is manufactured with concrete class C20/25 (due to the lowest amount of cement used) and the “worst case” scenario product is manufactured with concrete C45/55 (highest amount of cement used). The A1-A3 GWP total value for the worst-case scenario is 2.65E+02 kg CO_2e, while the A1-A3 GWP total value for the best-case scenario is 2.15+02 kg CO_2e. Therefore, the difference between the worst-case and best-case scenarios is approximately 18.87%. The worst-case scenario is evaluated, as A1-A3 GWP value differs more than 10%.

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2023
EPD type	EPD of multiple products, based on worst-case results

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 tonne
Mass per declared unit	1000 kg

SYSTEM BOUNDARY

This EPD covers the cradle to gate with options scope with following modules: A1 (Raw material supply), A2 (Transport), and A3 (Manufacturing), modules C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included. Geographical area for end of life and module D is assumed to be EU.

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.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the Standards and PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. The cut-off criteria were applied in the study due to the minimal contribution of the additives input, which accounted for only 0.01% of the total mass of the declared unit. The total excluded input and output flows 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 3.10 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804. The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP). Scenarios included in the LCA are based on realistic scenarios which are currently in use and are representative for one of the most likely scenario alternatives.

BIOGENIC CARBON CONTENT

The product and product packaging do not have biogenic carbon content.

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.

Usage of results from A1-A3 without considering the results of module C is not encouraged.

Precast concrete products are with identical or similar functions, manufactured by a single company at a single manufacturing site, with the same major steps in the A3/core processes. LCA results represent the worst-case scenario product which had the highest GWP value in modules A1-A3, at the year 2023.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF (REFERENCE PACKAGE EF3.1)

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	2,65E+02	3,61E+00	5,39E+00	4,52E+00	1,77E+00	-5,00E+01
GWP – fossil	kg CO_2e	2,65E+02	3,61E+00	5,39E+00	4,52E+00	1,77E+00	-5,00E+01
GWP – biogenic	kg CO_2e	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	1,66E-01	3,13E-04	2,16E-03	2,27E-03	9,20E-04	-8,25E-03
Ozone depletion pot.	kg $CFC_{-11}e$	7,72E-06	5,52E-08	7,94E-08	6,59E-08	5,12E-08	-1,93E-07
Acidification potential	mol H^+e	9,76E-01	3,25E-02	1,84E-02	4,57E-02	1,25E-02	-2,11E-01
EP-freshwater[2)]	kg Pe	5,71E-03	1,27E-05	4,92E-05	9,34E-05	1,74E-05	-2,09E-03
EP-marine	kg Ne	2,40E-01	1,51E-02	5,96E-03	1,61E-02	4,75E-03	-4,44E-02
EP-terrestrial	mol Ne	2,76E+00	1,65E-01	6,57E-02	1,79E-01	5,22E-02	-5,32E-01
POCP ("smog") 3)	kg NMVOCe	8,35E-01	4,93E-02	2,71E-02	5,34E-02	1,87E-02	-1,74E-01
ADP-minerals & metals; 4)	kg Sbe	1,40E-02	1,29E-06	1,50E-05	1,22E-04	2,81E-06	-4,55E-04
ADP-fossil resources; 4)	MJ	2,29E+03	4,72E+01	7,82E+01	5,97E+01	4,34E+01	-4,73E+02
Water use 5)	m^3e depr.	1,01E+02	1,15E-01	3,76E-01	4,98E-01	1,21E-01	-1,68E+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	C1	C2	C3	C4	D
Renew. PER as energy[6)]	MJ	4,28E+02	2,89E-01	1,03E+00	4,48E+00	4,03E-01	-3,38E+01
Renew. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	4,28E+02	2,89E-01	1,03E+00	4,48E+00	4,03E-01	-3,38E+01
Non-re. PER as energy	MJ	2,27E+03	4,72E+01	7,82E+01	5,97E+01	4,34E+01	-4,73E+02
Non-re. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	2,27E+03	4,72E+01	7,82E+01	5,97E+01	4,34E+01	-4,73E+02
Secondary materials	kg	6,44E+01	1,96E-02	3,33E-02	4,32E-02	1,09E-02	6,67E+02
Renew. secondary fuels	MJ	1,39E-02	5,12E-05	4,22E-04	1,34E-03	2,26E-04	-4,18E-03
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m3	4,45E+00	3,06E-03	1,13E-02	1,45E-02	4,50E-02	-3,21E-01

6) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste	kg	5,76E+01	5,27E-02	1,33E-01	1,91E-01	4,82E-02	-1,50E+01
Non-hazardous waste	kg	4,26E+02	7,20E-01	2,47E+00	5,97E+00	1,10E+00	-1,23E+02
Radioactive waste	kg	9,44E-03	5,18E-06	1,69E-05	5,39E-05	6,75E-06	2,90E-04

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	4,84E+01	0,00E+00	0,00E+00	7,17E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	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	0,00E+00

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

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
GWP – total	kg CO_2e	2,65E-01	3,61E-03	5,39E-03	4,52E-03	1,77E-03	-5,00E-02
ADP-minerals & metals	kg Sbe	1,40E-05	1,29E-09	1,50E-08	1,22E-07	2,81E-09	-4,55E-07
ADP-fossil	MJ	2,29E+00	4,72E-02	7,82E-02	5,97E-02	4,34E-02	-4,73E-01
Water use	m^3e depr.	1,01E-01	1,15E-04	3,76E-04	4,98E-04	1,21E-04	-1,68E-02
Secondary materials	kg	6,44E-02	1,96E-05	3,33E-05	4,32E-05	1,09E-05	6,67E-01
Biog. C in product[7)]	kg C	0,00E+00	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

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

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value	Source
Renewable energy from the grid	0.0259 kg CO2e/kWh	Average Lithuanian green energy mix of 2024 has been modelled according to Lithuanian green electricity production distributed by solar, wind, hydro and biomass sources (https://www.litgrid.eu/index.php/paslaugos/kilmes-garantiju-suteikimas/kilmes-garantiju-statistiniai-duomenys/563) Data sources: ecoinvent 3.10
Diesel, burned in building machine	0.1 kg CO2e / MJ	Data sources: ecoinvent 3.10 Country: World

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1000.00 kg
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	716.79 kg
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	283.22 kg
Scenario assumptions e.g. transportation	Transported 50 km with an average lorry.

BIBLIOGRAPHY

1. Rakennustieto Oy. (2018). RTS Environmental Product Declaration (EPD) Guideline (RTS EPD No. 180221). https://tiedostot.rakennustieto.fi/ymparisto/epd/rts-epd-guideline-_180221_valid-3.pdf
2. Rakennustieto Oy. (2020). RTS Product Category Rules (PCR), English version (26.8.2020).
3. EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
4. ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
5. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
6. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines. O. Bozdag and M. Secer, “Energy Consumption of RC Buildings during Their Life Cycle,” Sustainable Construction, Materials and Practices: Challenge of the Industry for the New Millennium, Minho, 12-14 September 2007, pp. 480-487.
7. European Commission. (2008). Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. Official Journal of the European Union, L 312, 3–30. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32008L0098
8. EuRIC. (2020, February). Metal Recycling Factsheet. European Circular Economy Stakeholder Platform. Retrieved from https://circulareconomy.europa.eu/platform/en/knowledge/metal-recycling-factsheet-euric
9. Precast concrete products LCA background report 13.12.2024
10. Ecoinvent database v3.10 (2023) and One Click LCA database.

ABOUT THE MANUFACTURER

The history of the company dates to 1959. In 2013 UAB "Fegda", one of the main Lithuanian road construction company groups, became the main shareholder of UAB "Tilsta". UAB "Tilsta" builds communications and other transport structures, such as bridges, viaducts, tunnels and flyovers, builds and repairs railways, water ports, hydraulic engineering and other purpose structures. Also manufactures reinforced concrete products and metal constructions for all specified structures. Certified production control and quality management systems installed in the company ensure the highest quality and project success.

The company has implemented a quality management, environmental management, worker safety and health management system that meets the requirements of the standards LST EN ISO 9001:2015, LST EN ISO 14001:2015, LST ISO 45001:2018. Quality, sustainability, durability and reliability are the four core principles of our production."

Manufacturer	UAB "Tilsta"
EPD author	Urtė Valdavičė and Sigita Židonienė, UAB "Vesta Consulting"
EPD verifier	Mari Kirss, Rangi Maja OÜ
EPD program operator	Rakennustieto Oy
Background data	This EPD is based on Ecoinvent 3.10 (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 3.1.