ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

PRECAST CONCRETE ELEMENTS

OÜ TMB ELEMENT

Environmental Product Declaration created with One Click LCA

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	OÜ TMB Element
Address	Betooni 7, 51014 Tartu, Estonia
Contact details	info@tmbelement.ee
Website	www.tmbelement.ee

PRODUCT IDENTIFICATION

Product name	Precast concrete elements
Additional label(s)	CE, FI, BVB, BBC
Place(s) of production	Estonia, Tartu

EPD INFORMATION

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	The Building Information Foundation RTS sr Malminkatu 16 A, 00100 Helsinki, Finland http://cer.rts.fi
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	CEN standard 15804+A2 serves as the core PCR, RTS PCR (Finnish version, 1.6.2020)
EPD author	Anni Oviir, Rangi Maja OÜ, www.lcasupport.com
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	25.09.2020
EPD verifier	Panu Pasanen, Bionova Oy, www.oneclicklca.com
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ECO Platform nr.	-
Publishing date	30.09.2020
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PRODUCT INFORMATION

PRODUCT DESCRIPTION

The precast concrete products include:

- ribbed slabs with pre-stressed reinforcement (TT slabs)
- pre-stressed hollow-core slabs (TAM slab)
- linear structural elements (column, cross-bar, beam)
- staircases
- staircase elements
- other products.

The following materials are used for manufacturing precast concrete elements:

- normal-weight concrete with the strength class of at least C25/37 until C50/60, which manufacturing process and qualities correspond to the requirements of standard EN 206-1
- reinforcing steel for reinforcement, the characteristics of which conform to standard EN 10080
- 7-wire strand as pre-stressed reinforcement, with characteristics conforming to standard prEN 10138-3.

PRODUCT APPLICATION

Products are casted on heated inclinable stands and on a casting molds by molding with formwork (except round columns up to 6m height are produced in vertical position). Squared timber and plywood is used as formwork, the formworks are fastened to the inclinable stand or casting mold with magnetic devices.

Hollow core slabs are produced of normal-weight concrete by press molding with the equipment of extrusion technology. Strand is used in the tension zone of the slabs as pre-stressed longitudinal reinforcement. The initial pre-stress of strand does not exceed 1100Mpa. Hollow core slabs are reinforced only in the longitudinal direction, there is no transverse reinforcement. The width of the concrete strip at casting 1196mm, which is 4mm smaller the nominal width (1200mm) of the slab in order to enable building tolerances.

The quality of products is secured by factory production control. The factory production control includes regular control of all the used equipment and the production process itself and the testing of raw materials.

Precast concrete element can be used to cast any size, shape or texture for other customized structural application.

TECHNICAL SPECIFICATIONS

The technical specifications of the standard precast concrete product (hollow core slab) manufactured at OÜ TMB Element. The studied product is an average of all variations.

Slab type	Slab height, mm	Airborne sound insulation Rw (dB)	Reduced impact noise index L'n,w (dB)	Heat retention Rt (m2K/W)	Maximum fire resistance class
TAM22	220	50	76	0,16	REI 90
TAM27	265	52	75	0,18	REI 90
TAM27E	265	52	75	0,18	REI 120
TAM32R	320	54	74	0,20	REI 120
TAM40	100	55	72	0,22	REI 120

PRODUCT STANDARDS

EVS-EN 13369 Common rules for precast concrete products

PHYSICAL PROPERTIES OF THE PRODUCT

Product properties can be found on the manufacturer website at https://www.tmbelement.ee/en/products/

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.tmbelement.ee.

PRODUCT RAW MATERIAL COMPOSITION

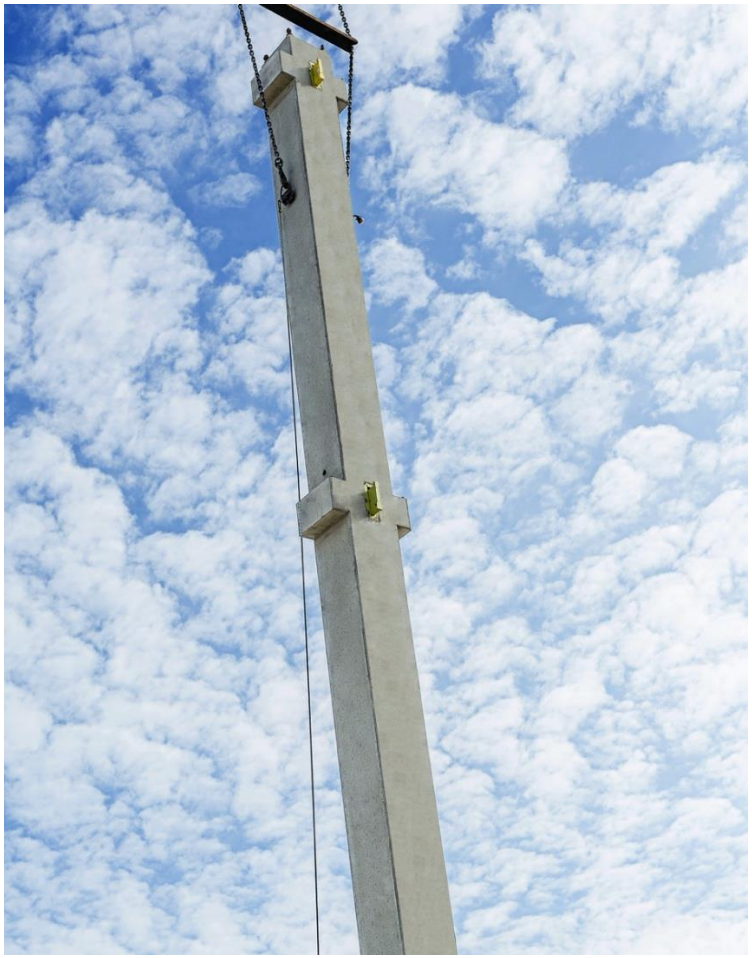
Product raw material	Quantity by mass (%)	Usability			Origin
		Renewable	Non-renewable	Recycled	
Limestone	45.5		x		Estonia
Sand	28.6		x		Estonia
Granite	2.4		x		Finland
Cement	13.9		x		Estonia
Water	6.9		x		Estonia
Steel	2.9			x	EU & non-EU

Material	Quantity by mass (%)	Origin
Metals	2.9	EU & non-EU
Stone-based materials (minerals)	90.2	EU
Water	6.9	Estonia
Fossil minerals	0	
Bio based materials	0	

The material composition is weighted average material composition by mass for the year 2019.

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)

The production of the concrete elements begins with the preparation of the casting mold, which includes cleaning the casting platform. At the same time, reinforcement steel braids are put into place. When the reinforcements are in place, fresh concrete is poured onto the cast. After casting and finishing, the element is covered and left to cure. When the element is cured the casting is removed. The final stage is finishing the product and transporting to the storage. Eventually, the elements are moved out and transported to the construction site.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site cover direct exhaust emissions of fuel, environmental impacts of fuel production, as well as related infrastructure emissions. Optional A5 module is not declared.

PRODUCT USE AND MAINTENANCE (B1-B7)

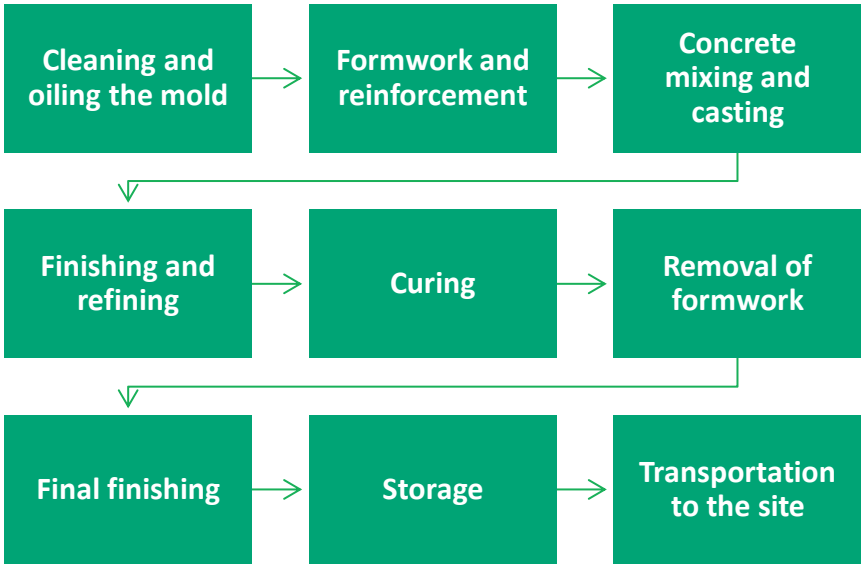
This EPD does not cover use phase. Air, soil and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life, in the demolition phase 100% of the waste is assumed to be collected as separate construction waste (C1). All of end-of-life product is assumed to be sent to the closest facilities (C2).

100% of steel and 92% concrete is recycled (C3) and the remaining is sent to local landfill for disposal (C4). Due to the recycling potential of reinforcement steel and concrete, the end-of-life product is converted into recycled raw materials (D).

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	Manufacturer data for the calendar year 2019 is used.

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 tonne
Mass per declared unit	1000 kg
Functional unit	-

The values can be converted to m2 for a standard product (hollow core slab) using factor 314.3 kg/m2, average thickness 258 mm.

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

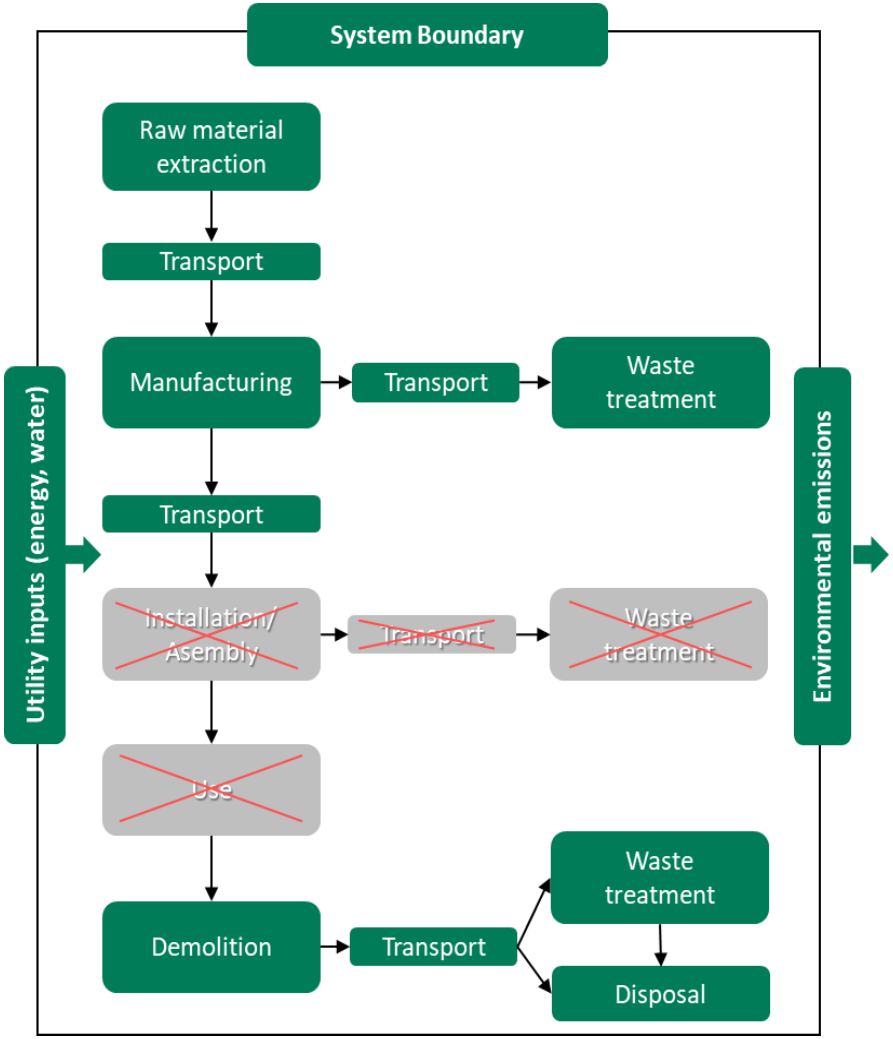
Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	1.79

SYSTEM BOUNDARY

This EPD covers cradle to gate with modules C1-C4 and module D; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport) as well as 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.

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	x	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	MNR	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.



Life cycle stages diagram

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and RTS 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 which data are available for are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows do also not exceed 5% of energy usage or mass. The life cycle analysis includes all industrial processes from raw material acquisition to production, distribution, and end-of-life stages.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy, and water use related to company management and sales activities are excluded.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

The allocation is made in accordance with the provisions of EN 15804. Allocation is based on annual production rate. Heat, electricity and other energy use as well as waste in production are calculated as a weight average per produced tonne of all products using yearly production data and rate for 2019.

Carbonation is not taken into account in the calculations. Carbonation is a natural process occurring when carbon dioxide is emitted during cement production is rebound to the concrete during use and end of life stages of a building.

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs. All estimations and assumptions are given below:

Module A1: Raw material composition is an average value calculated using total annual material consumption for the product by mass within the studied year 2019.

Module A4: Transportation from the manufacturing plant to the building site has been calculated using a most likely scenario, an export to Sweden. The scenario is estimating the distance to be 350 km with a truck and 260 km with a ferry, and the fill rate to be 75%. The transportation doesn't cause losses as products are packaged properly. Bulk density varies depending on product type and thickness and is calculated as an approximate.

Module C1: Energy consumption of demolition process is on the average 10 kWh/m2 (Bozdağ, Ö & Seçer, M. 2007). Basing on

Level(s) project, an average mass of concrete building is about 1000 kg/m2. Therefore, energy consumption demolition is 10 kWh/ 1000 kg=0,01 kWh/kg.

Module C2: It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed that it has the same weight with the declared product. All of the end-of-life product is 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.

Module A2 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emission in total results is small and so the variety in load assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by transportation company to serve needs of other clients.

Module C3: It is assumed that 92% of the concrete waste and 100% of the steel waste is recycled. This assumption is based on information from a study by T.Ideon and M. Osjamets (2010) procured by Estonian Ministry of Environment.

Module C4: The remaining waste materials are assumed to be send to the landfill.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Climate change – total	kg CO2e	1,66E2	8,59E0	3,39E1	2,08E2	2,69E1	MND	MND	3,28E0	4,53E0	6,8E0	4,03E−1	−2,46E1
Climate change – fossil	kg CO2e	1,64E2	8,55E0	1,96E1	1,92E2	2,67E1	MND	MND	3,27E0	4,5E0	6,78E0	4E−1	−2,41E1
Climate change – biogenic	kg CO2e	1,63E0	4,16E−2	1,43E1	1,59E1	1,23E−1	MND	MND	5,54E−3	2,2E−2	1,15E−2	2,54E−3	−4,58E−1
Climate change – LULUC	kg CO2e	4,08E−2	2,6E−3	1,75E−2	6,1E−2	9,36E−3	MND	MND	2,79E−4	1,37E−3	5,78E−4	1,21E−4	−1,88E−2
Ozone depletion	kg CFC11e	7,82E−6	2,03E−6	3,58E−6	1,34E−5	6,22E−6	MND	MND	7,12E−7	1,07E−6	1,48E−6	1,68E−7	−1,68E−6
Acidification	mol H+e	4,48E−1	2,09E−2	1,37E−1	6,05E−1	1,63E−1	MND	MND	5,64E−3	1,07E−2	1,17E−2	1,92E−3	−1,06E−1
Eutrophication, aquatic freshwater	kg PO4e	3,08E−2	6,14E−4	1,61E−3	3,3E−2	1,82E−3	MND	MND	1,2E−4	3,24E−4	2,48E−4	4,22E−5	−1,4E−2
Eutrophication, aquatic marine	kg Ne	1,08E−1	3,06E−3	2,3E−2	1,34E−1	3,42E−2	MND	MND	7,58E−4	1,53E−3	1,57E−3	3,77E−4	−2,01E−2
Eutrophication, terrestrial	mol Ne	1,21E0	3,28E−2	2,34E−1	1,48E0	3,77E−1	MND	MND	8,11E−3	1,63E−2	1,68E−2	4,09E−3	−2,07E−1
Photochemical ozone formation	Kg NMVOCe	3,59E−1	1,75E−2	7,24E−2	4,49E−1	1,22E−1	MND	MND	8,07E−3	9E−3	1,67E−2	1,68E−3	−8,22E−2
Abiotic depletion, minerals & metals	kg Sbe	1,04E−3	1,47E−4	3,91E−5	1,22E−3	4,28E−4	MND	MND	5,03E−6	7,75E−5	1,04E−5	3,73E−6	−9,56E−4
Abiotic depletion of fossil resources	MJ	1,04E3	1,33E2	2,93E2	1,47E3	4,05E2	MND	MND	4,48E1	6,99E1	9,29E1	1,14E1	−3,48E2
Water use	m3e depr.	4,27E3	1,92E2	1,94E3	6,4E3	5,51E2	MND	MND	2,53E1	1,01E2	5,25E1	1,01E1	−1,67E3

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all 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 experienced with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4,5E−6	7,42E−7	1,43E−6	6,67E−6	2,14E−6	MND	MND	8,45E−7	3,92E−7	5,28E−6	7,05E−8	−1,97E−6
Ionizing radiation, human health	kBq U235e	8,36E0	6,82E−1	2,35E0	1,14E1	2,06E0	MND	MND	2,06E−1	3,6E−1	4,27E−1	5,09E−2	−2,55E0
Eco-toxicity (freshwater)	CTUe	1,3E1	5,64E0	2,06E0	2,07E1	1,59E1	MND	MND	2,48E−1	2,98E0	5,14E−1	7,07E−2	−4,1E0
Human toxicity, cancer effects	CTUh	1,58E−7	2,43E−9	1,99E−8	1,81E−7	8,43E−9	MND	MND	8,77E−10	1,28E−9	1,82E−9	1,58E−10	−1,01E−7
Human toxicity, non-cancer effects	CTUh	3,39E−6	1,62E−7	1,98E−7	3,75E−6	4,69E−7	MND	MND	1,85E−8	8,54E−8	3,83E−8	5,99E−9	−1,61E−6
Land use related impacts/soil quality	-	4,64E2	1,97E2	1,44E1	6,75E2	5,41E2	MND	MND	7,02E−1	1,04E2	1,46E0	7,87E0	−7,97E1

EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	0E0	1,69E0	2,69E1	2,86E1	4,91E0	MND	MND	2,45E−1	8,9E−1	0E0	0E0	0E0
Renewable PER used as materials	MJ	6,16E1	0E0	1,42E2	2,04E2	0E0	MND	MND	0E0	0E0	5,09E−1	9,22E−2	−2,08E1
Total use of renewable PER	MJ	6,16E1	1,69E0	1,69E2	2,32E2	4,91E0	MND	MND	2,45E−1	8,9E−1	5,09E−1	9,22E−2	−2,08E1
Non-renew. PER used as energy	MJ	0E0	1,35E2	2,88E2	4,23E2	4,12E2	MND	MND	4,51E1	7,12E1	0E0	0E0	0E0
Non-renew. PER used as materials	MJ	1,16E3	0E0	2,8E1	1,19E3	0E0	MND	MND	0E0	0E0	9,36E1	1,15E1	−3,85E2
Total use of non-renewable PER	MJ	1,16E3	1,35E2	3,16E2	1,61E3	4,12E2	MND	MND	4,51E1	7,12E1	9,36E1	1,15E1	−3,85E2
Use of secondary materials	kg	2,47E1	4,63E−2	6,3E−2	2,48E1	1,45E−1	MND	MND	2,23E−2	2,44E−2	4,62E−2	3,09E−3	−3,07E0
Use of renewable secondary fuels	MJ	3,67E0	5,89E−2	4,93E−1	4,22E0	1,69E−1	MND	MND	6,04E−3	3,11E−2	1,25E−2	2,14E−3	−1,06E0
Use of non-renew. secondary fuels	MJ	1,77E1	1,98E−1	3,52E−1	1,82E1	6,39E−1	MND	MND	8,88E−2	1,04E−1	1,84E−1	1,1E−2	−1,51E1
Use of net fresh water	m3	1,7E1	2,1E0	2,44E0	2,15E1	6,11E0	MND	MND	3,67E−1	1,11E0	7,62E−1	1,64E−1	−2,11E1

PER abbreviation stands for primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Hazardous waste	Kg	9,34E0	1,3E−1	3,62E−1	9,84E0	4,06E−1	MND	MND	4,88E−2	6,87E−2	1,01E−1	1,07E−2	−4,4E0
Non-hazardous waste	Kg	1,67E2	1,44E1	2,21E2	4,02E2	4,01E1	MND	MND	5,22E−1	7,6E0	1,08E0	7,77E1	−6,06E1
Radioactive waste	Kg	4,41E−3	9,24E−4	1,58E−3	6,92E−3	2,83E−3	MND	MND	3,18E−4	4,87E−4	6,6E−4	7,56E−5	−9,67E−4

MND abbreviation stands for Module Not Declared

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Components for reuse	Kg	0E0	0E0	0E0	0E0	0E0	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	2,46E1	4,01E−2	2,41E0	2,71E1	1,33E−1	MND	MND	2,19E−2	2,11E−2	9,23E2	2,9E−3	−3,03E0
Materials for energy recovery	Kg	3,94E−2	6,48E−4	4,16E0	4,2E0	1,86E−3	MND	MND	6,78E−5	3,42E−4	1,41E−4	2,34E−5	−1,1E−2
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	0E0	0E0	0E0	0E0	0E0

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

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Climate change – total	kg CO2e	1,66E−1	8,62E−3	2E−2	1,95E−1	2,69E−2	MND	MND	3,3E−3	4,55E−3	6,84E−3	4,08E−4	2,5E−2
Abiotic depletion, minerals & metals	kg Sbe	1,04E−6	1,47E−7	3,91E−8	1,22E−6	4,28E−7	MND	MND	5,03E−9	7,75E−8	1,04E−8	3,73E−9	−9,56E−7
Abiotic depletion of fossil resources	MJ	1,04E0	1,33E−1	2,93E−1	1,47E0	4,05E−1	MND	MND	4,48E−2	6,99E−2	9,29E−2	1,14E−2	−3,48E−1
Water use	m3e depr.	1,7E−2	2,1E−3	2,44E−3	2,15E−2	6,11E−3	MND	MND	3,67E−4	1,11E−3	7,62E−4	1,64E−4	−2,11E−2
Use of secondary materials	kg	2,47E−2	4,63E−5	6,3E−5	2,48E−2	1,45E−4	MND	MND	2,23E−5	2,44E−5	4,62E−5	3,09E−6	−3,07E−3
Biogenic carbon emissions in product	kg C	0E0	0E0	1.79E-3	0E0	0E0	MND	MND	0E0	0E0	0E0	0E0	0E0

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Market for electricity, high voltage (Reference product: electricity, high voltage), Estonia, Ecoinvent 3.6, year: 2020
Electricity CO2e / kWh	0.86
District heating data source and quality	Heat and power co-generation, natural gas, conventional power plant, 100mw electrical (Reference product: heat, district or industrial, natural gas), Estonia, Ecoinvent 3.6, year: 2020
District heating CO2e / kWh	0.11

Transport scenario documentation

Scenario parameter	Value
A4 Truck >32 metric ton Euro 5, kgCO2e / tonkm	0.0902
A4 average transport distance, Truck, km	350
A4 Ferry, kgCO2e / tonkm	0.0094
A4 average transport distance, ferry, km	260
Transport capacity utilization, %	75
Bulk density of transported products, kg/m^3	2340
Volume capacity utilisation factor for nested packaged products	1

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	924
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	76
S Scenario assumptions for transportation (average distance to recycling facility (km)	50

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.

Ecoinvent database v3.6 and One Click LCA database.

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

RTS PCR EN 15804:2019 RTS PCR in line with EN 15804+A2. Published by the Building Information Foundation RTS (Finnish version, 1.6.2020).

Bozdağ, Ö. & Seçer, M. (2007). Energy consumption of demolition process is on the average

Ideon, T. & Osjamets, M. (2010). Ehitus- ja lammutusjäätmete sortimisuuring *(Construction and demolition waste sorting and recycling)* Study procured by Estonian Ministry of Environment

ABOUT THE MANUFACTURER

OÜ TMB Element is one of the leading producers of concrete elements in the Baltic states. OÜ TMB Element began operating in 1961. As of today, the company manufactures all major concrete elements used in building structures: wall elements, hollow-core slabs, columns, beams, balcony elements, TT-slabs, flights and landings. Production capacity of the company is ca 60 000 m³ of concrete elements per year. Production of TMB Element's factory has production control certificates and CE-marking and in addition Finnish FI-certificate and Swedish BBC-certificate. Management system of the company is certified according to the requirements of the international standards ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007.

EPD AUTHOR AND CONTRIBUTORS

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EPD author	Anni Oviir, Rangi Maja OÜ
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EPD program operator	The Building Information Foundation RTS sr
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) database
LCA software	The LCA has been created using One Click LCA Pre-Verified EPD Generator for Cementitious Products

APPENDIX : ADDITIONAL ENVIRONMENTAL IMPACT DATA

ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential	kg CO2e	1,66E2	8,62E0	2E1	1,95E2	2,69E1	MND	MND	3,3E0	4,55E0	6,84E0	4,08E−1	−2,5E1
Depletion of stratospheric ozone	kg CFC11e	6,64E−6	1,61E−6	2,89E−6	1,11E−5	4,94E−6	MND	MND	5,64E−7	8,49E−7	1,17E−6	1,33E−7	−1,51E−6
Acidification	kg SO2e	3,64E−1	1,81E−2	1,16E−1	4,97E−1	1,34E−1	MND	MND	4,87E−3	9,25E−3	1,01E−2	1,61E−3	−9,18E−2
Eutrophication	kg PO4 3e	1,38E−1	3,6E−3	1,45E−2	1,56E−1	1,92E−2	MND	MND	8,57E−4	1,87E−3	1,78E−3	3,12E−4	−5,29E−2
Photochemical ozone formation	kg C2H4e	2,38E−2	1,12E−3	4,93E−3	2,99E−2	5,28E−3	MND	MND	5,01E−4	5,86E−4	1,04E−3	1,18E−4	−1,27E−2
Abiotic depletion of non-fossil res.	kg Sbe	1,04E−3	1,47E−4	3,91E−5	1,22E−3	4,28E−4	MND	MND	5,03E−6	7,75E−5	1,04E−5	3,73E−6	−9,56E−4
Abiotic depletion of fossil resources	MJ	1,04E3	1,33E2	2,93E2	1,47E3	4,05E2	MND	MND	4,48E1	6,99E1	9,29E1	1,14E1	−3,48E2

ENVIRONMENTAL IMPACTS - TRACI 2.1. / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential	kg CO2e	1,64E2	8,53E0	1,97E1	1,92E2	2,67E1	MND	MND	3,26E0	4,5E0	6,75E0	3,98E−1	−2,37E1
Ozone depletion	kg CFC11e	8,81E−6	2,15E−6	3,86E−6	1,48E−5	6,58E−6	MND	MND	7,51E−7	1,13E−6	1,56E−6	1,77E−7	−2,04E−6
Acidification	kg SO2e	3,78E−1	1,71E−2	1,12E−1	5,07E−1	1,36E−1	MND	MND	4,58E−3	8,73E−3	9,5E−3	1,61E−3	−8,86E−2
Eutrophication	kg Ne	2,58E−1	7,79E−3	2,18E−2	2,88E−1	2,63E−2	MND	MND	1,99E−3	4,1E−3	4,14E−3	5,95E−4	−1,15E−1
Photochemical Smog Formation	kg O3e	6,44E0	1,85E−1	1,34E0	7,96E0	2,15E0	MND	MND	4,62E−2	9,18E−2	9,57E−2	2,34E−2	−1,04E0
Depletion of non-renewable energy	MJ	8,01E1	1,92E1	3,95E1	1,39E2	5,88E1	MND	MND	6,71E0	1,01E1	1,39E1	1,65E0	−1,82E1