Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

PRECAST CONCRETE ELEMENTS

from

INHUS Prefab OÜ

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products, based on worst-case results
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An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

GENERAL INFORMATION

Programme Information	
Programme:	The International EPD System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *PCR 2019:14 Construction products (EN 15804+A2) (version 2.0.1) (2.0.1), UN CPC code - 37550*
PCR review was conducted by: *The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: C Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/contact.*
c-PCR: *PCR 2019:14-c-PCR-003 Being updated - Concrete and concrete elements (EN 16757) (1.0.0)*
c-PCR review was conducted by: *This c-PCR was developed within CEN standardisation and adopted as a complementary PCR by the International EPD System. No additional open consultation or review was conducted beyond the CEN standardisation process.*

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: Anni Oviir, Rangi Maja OÜ Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

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

INFORMATION ABOUT EPD OWNER

Owner of the EPD: INHUS Prefab OÜ

Address: Betooni st. 7, 50411 Tartu, Estonia

Contact: prefab@inhus.eu

Address and contact information of the LCA practitioner commissioned by the EPD owner: Urtė Valdavičė, UAB Vesta Consulting

Description of the organization: INHUS Prefab is a manufacturing company implementing various architectural ideas of buildings, producing brick, coloured, matrix and graphic concrete facade elements, which make every building unique. The company has extensive experience in developing a variety of concrete structures and elements, including prefabricated wall elements, hollow core and balcony slabs, stair and linear structural elements.

Key facts about INHUS Prefab:

- 3 factories in Vilnius, Kaunas and Tartu (Žarijų str. 6, 02300 Vilnius, Bituko str. 5, 52366 Kaunas and Betooni 7, 50411 Tartu)
- 321 000 m^2 of wall panel produced annually
- 316 800 m^2 of hollow core slabs produced annually
- 8 150 m^3 of frame constructions produced annually

INHUS Prefab is part of INHUS - one of the leading design-build project developers in the Nordic region, with sales of 90 million euros and approximately 850 employees in 2025. INHUS collaborates with the largest Lithuanian and Scandinavian construction companies, and real estate developers to bring simplicity to design-build delivery.

INHUS vision is to construct buildings without the need for traditional construction sites - a world where clients only have to focus on their ideas, not the technical execution. Sustainability is at the core of this vision, as it requires rethinking construction processes, materials, and the roles of employees. The company pursues a holistic approach, making net-positive investments across all three dimensions of sustainability: social, environmental, and economic.

To maximize value for customers and the environment, INHUS takes full responsibility for the entire production process - from the design and manufacturing of building components to the development of logistics solutions and, ultimately, construction itself. The company continuously innovates in production methods, implements modern technologies, ensures efficient resource use, and invests in employee development. INHUS has also developed a carbon reduction strategy, outlining its planned actions and commitments through 2030.

Product-related or management system-related certifications: Finally, the company is a member of Lithuanian Builders Association, Lithuanian Construction Industry Association and is recognized for meeting the management system standards - ISO 9001: 2015 (Quality management systems), ISO 14001: 2015 (Environmental management systems) and ISO 45001:2018 – (Occupational health and safety management systems).

PRODUCT INFORMATION

Product name: Precast concrete elements

UN CPC code: 37550 – prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone

Product description: The precast concrete products manufactured by INHUS Prefab include a wide range of structural and architectural elements such as:

- Ribbed slabs with pre-stressed reinforcement (TT slabs)
- Pre-stressed hollow-core slabs (TAM slabs)
- Linear structural elements (columns, crossbars, beams)
- Staircases and staircase components
- Other custom precast elements

This EPD covers precast concrete elements manufactured using concrete classes ranging from C30/37 to C50/60.

Products application: Precast concrete elements are used as structural components in residential, commercial, and industrial buildings. Typical applications include floors, roofs, walls, columns, beams, and staircases. The elements provide high load-bearing capacity, durability, and dimensional precision, enabling fast installation and long service life in various building types.

Technical specification: The production of precast concrete elements uses the following materials:

- Normal-weight concrete with a strength class ranging from C30/37 to C50/60, in accordance with the requirements of EN 206-1.
- Reinforcing steel complying with EN 10080.
- 7-wire strand used as pre-stressed reinforcement, in compliance with prEN 10138-3.

Product Standards: Precast concrete elements are certified and manufactured in accordance with the harmonized or non-harmonized European standards:

- EN 13224 Precast concrete products - Ribbed floor elements
- EN 1168 Precast concrete products - Hollow core slabs
- EN 13225 Precast concrete products - Linear structural elements
- EN 14843 Precast concrete products - Stairs
- EN 13369 Common rules for precast concrete products

Name and location of production site(s): INHUS Prefab OÜ Betooni 7, 51014 Tartu, Estonia

References to any relevant websites for more information or explanatory materials: Visit https://www.inhusprefab.eu/en to learn more.

CONTENT DECLARATION

In the brackets the range of material composition within the product group is declared, in addition to the worst-case (concrete class C50/60) product composition.

The declared unit is 1 tonne of the worst-case product.

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C / product
Cement	171,97 (136,97-192,62)	0	0	0
Sand	285,09 (318,89-806,86)	0	0	0
Granite	416,55 (0-483,69)	0	0	0
Water	66,21 (65,21-94,17)	0	0	0
Reinforcement	57,07 (32,01-57,07)	0,81	0	0
Additives	3,11 (1,30-3,51)	0	0	0
TOTAL	**1000,00**	**0,81**	**0**	**0**

Total recycled steel content is 64,49% and total recycled material content (post- and pre-consumer) in product is 3,68%.

Packaging materials	Weight, kg	Weight-% (versus the product)	Biogenic material, kg C / product
[1] Wood	0,400	0,04%	0,16
Plastic packaging	0,001	0,00%	0
TOTAL	**0,401**	**0,04%**	**0,16**

[1] Global Warming Potential biogenic: -936,73 kg CO_2e / m^3, density – 620,00 kg/m^3

Note. 1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

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

LCA INFORMATION

Declared unit: the declared unit of the study is 1 tonne of the product supplied to the client. The mass of the product per declared unit is 1000,00 kg.

Time representativeness: primary data was collected internally. The production data refers to the time period of May 2024 – April 2025.

Geographical scope: The geographical scope for modules A1-A2 is based on global data, while modules A3, C1–C4, and module D are based on European data.

Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and processed materials obtained from the background system. The used databases are Ecoinvent 3.11, and One Click LCA. The LCA software used is One Click LCA (version 0.48.0).

Description of system boundaries: cradle-to-gate with modules C1-C4 and module D.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	GLO	GLO	EU	-	-	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Primary data used	52,44%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	>10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	ND			-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

Note. Based on PCR 2019:14 Construction products section 2.2.2.4. Table 2 for type b) EPD A4-A5, B modules are optional to declare, therefore excluded due to lack of relevance.

Data quality: The EPD covers products manufactured in one factory in Tartu (Estonia) which provided data for the period of May 2024 – April 2025. The data collection has been done internally and thoroughly. The data is based on yearly production amounts and extrapolations of measurements on specific machines and plants. The EPD covers raw material supply and transport on a Global scale, and product production and end-of-life on a Europe scale. During the manufacturing process, formwork is prepared, reinforcement is placed, and concrete is mixed and poured. The elements are compacted, cured under controlled conditions, then demoulded, finished, and inspected. The site is powered by residual mix and renewable solar panel energy, additionally district heating and natural gas for heating, diesel for mobile machinery is used. Background data was sourced from the ecoinvent 3.11, and One Click LCA databases. No poor or very poor data was found during the assessment of relevant data using

PEF method (EN 15804:2012+A2:2019, Annex E, only E.2). The data quality assessment is done in accordance with EN 15941:2024. Overall, the data quality can be described as good. The EN 15804 reference package used is based on EF 3.1.

Share of primary data used: The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories. Declaration of data sources, reference years, data categories, and share of primary data is presented below.

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Production of cement (A1)	EPD	Confidential	2024	Primary data	11,14%
Production of reinforcement steel (A1)	EPDs / database	Confidential / ecoinvent 3.11	1997-2024	Primary / secondary data	5,63%
Production of aggregates (A1)	Database	Ecoinvent v 3.11	1994-2024	Secondary data	0,00%
Production of additives (A1)	EPDs	Confidential	2021-2023	Primary data	0,37%
Transport of raw materials to manufacturing site (A2)	Database	Ecoinvent v. 3.11	2009-2024	Primary data	30,25%
Production of packaging (A3)	Databases	Ecoinvent v. 3.11 / OneClickLCA	1993-2024	Secondary data	0,00%
Production ancillary materials (A3)	Database	Ecoinvent v. 3.11	1997-2024	Secondary data	0,00%
Energy used in manufacturing of product (A3)	Database	Ecoinvent v. 3.11	1996-2024	Primary data	5,05%
Total share of primary data, of GWP-GHG results for A1-A3					52,44%

Note. Ecoinvent datapoints are based on older background flows, but updated in 2024 (v.3)

The reported share of primary data is associated with uncertainty, as one or several EPDs that are used as data source lack information on the share of primary data used.

Cut-off criteria: The study does not exclude any modules or processes that are mandatory according to the applicable Standards and PCR. No hazardous materials or substances are excluded. All major raw materials, auxiliary materials (where applicable), and energy inputs, as well as emissions and outputs from the unit processes for which data are available, are fully included in the calculation. No input or output flows were excluded based on cut-off criteria.

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 15804:2012+A2:2019, 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 used in this study follow the system model ‘Allocation, cut-off, 15804:2012+A2:2019’.

The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP).

The origin of the recycled content (pre- vs post-consumer) is unknown; therefore, a conservative approach was taken by assuming the entire recycled portion is post-consumer scrap, in accordance with PCR 2.0.1 section 4.5.3. Under this assumption, the scrap is treated as waste, and waste allocation is applied, meaning no environmental burdens are assigned to the recycled input.

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.

The environmental impacts of capital goods (e.g., production equipment, recycling machinery) and infrastructure (e.g., recycling facilities, transportation systems) have not been included in this assessment.

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.

Calculation rules for averaging data:

The EPD is an EPD of multiple products, based on the worst-case product. Worst-case product calculations were chosen because the difference (in %) between the C30/37 to C50/60 concrete class product GWP-GHG result for modules A1-A3 is above 10%. The grouped products are with identical or similar functions, manufactured by a single company at one manufacturing site, 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 calculations are based on the production weight (allocation by mass).

Product life cycle

Product stage (A1-A3)

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

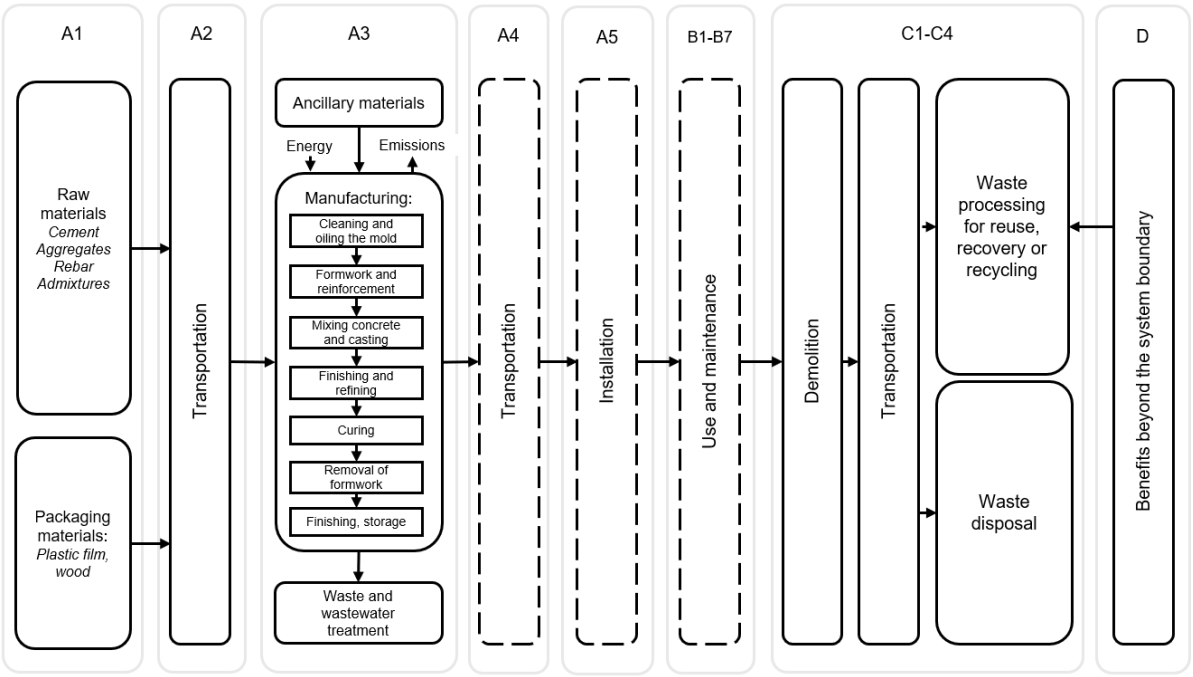
A2: The raw materials are transported to the manufacturing plant. In this case the model includes road transportation of each raw material.

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

Manufacturing process

The production of the precast concrete elements begins with the preparation of the casting mold, which includes cleaning and oiling the casting platform. At the same time, reinforcement steel braids are put into place. When the reinforcements are in place, fresh concrete is mixed and 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.

See the manufacturing diagram below.



Note. The dashed lines indicated that construction and use stage (A4–A5, B1–B7 modules) were not assessed, as their inclusion is not applicable for this type of EPD (as specified in PCR 2019:14 Construction products (EN 15804+A2), version 2.0.1).

Construction process stage (A4-A5)

A4: This EPD does not cover the Transport module.

A5: This EPD does not cover the Installation module.

Use stage (B1-B7)

B1-B7: This EPD does not cover the Use stage.

End of life stage (C1-C4, D)

C1: Deconstruction, dismantling, demolition

Consumption of fuel in demolition process is calculated according to transported mass. Energy consumption for demolition is 10,00 kWh/tonne. The source of energy is diesel fuel burned in building machines.

C2: Transport of the discarded product to the processing site

It is assumed that no mass loss occurs during the use phase; therefore, the product at end of life has the same weight as the declared product. All end-of-life products are considered to be transported to the nearest available waste management facilities, such as recycling or landfill sites. The transport distance to the nearest recycling or disposal facility (80 km) and the transport mode (lorry) are based on the reference values provided in PCR 2019:14, Table 4.

C3: Waste processing for reuse, recovery, and/or recycling

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 reach a minimum of 70 % by weight. Therefore, it is assumed that 70 % of the concrete waste is recycled. In accordance with EN 16757:2022 (6.3.9.4.1), this corresponds to the sub-scenario “Substitution of natural aggregates in fresh concrete”, as the concrete waste is processed into gravel fractions that replace natural aggregates.

For reinforcing steel, based on EuRIC data[1], it is assumed that 90 % of the steel is recycled.

The environmental benefits associated with the substitution of primary materials are reported in Module D. A yield factor of 0,9 is applied, assuming 10 % material losses during the recovery process.

C4: Discharge (disposal)

According to the European Commission Waste Framework Directive, it is assumed that 30 % of the concrete is collected together with construction waste and sent to landfill. In line with EuRIC data, it is further assumed that 10 % of the reinforcing steel is also sent to landfill.

Both materials are chemically inert, non-toxic, and non-leaching, and therefore pose no environmental risks when landfilled. They do not release hazardous substances or undergo decomposition over time.

Benefits and loads beyond the system boundary (D):

In the context of end-of-life scenario D, it is assumed that steel is recovered, subsequently fully recycled into post-consumer waste and has been modelled to avoid use of primary materials. The mass of the primary materials in the product is used to prevent double counting. The concrete has been modelled to avoid gravel production. The impact of concrete crushing for use as gravel is also considered.

[1] EuRIC. (2020, February). Metal Recycling Factsheet. European Circular Economy Stakeholder Platform. Retrieved from https://circulareconomy.europa.eu/platform/en/knowledge/metal-recycling-factsheet-euric

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

Mandatory impact category indicators according to EN 15804, EF 3.1

Results per declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- total	kg CO_2 eq.	2,79E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,62E+00	8,61E+00	4,06E+00	1,81E+00	-2,12E+01
GWP- fossil	kg CO_2 eq.	2,78E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,62E+00	8,61E+00	4,06E+00	1,81E+00	-2,12E+01
GWP- biogenic	kg CO_2 eq.	5,44E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,90E-04	1,95E-03	-3,30E-02	-6,47E-03	0,00E+00
GWP- luluc	kg CO_2 eq.	1,52E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,71E-04	3,85E-03	1,72E-03	1,03E-03	-7,89E-03
ODP	kg CFC 11 eq.	5,69E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,38E-08	1,27E-07	5,84E-08	5,03E-08	-9,65E-08
AP	mol H+ eq.	1,12E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,24E-02	2,94E-02	3,97E-02	1,26E-02	-9,88E-02
EP-freshwater	kg P eq.	3,34E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,17E-04	6,70E-04	8,63E-04	1,58E-04	-1,32E-02
EP-marine	kg N eq.	3,42E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,51E-02	9,65E-03	1,51E-02	4,85E-03	-2,26E-02
EP-terrestrial	mol N eq.	3,76E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,65E-01	1,05E-01	1,67E-01	5,30E-02	-2,56E-01
POCP	kg NMVOC eq.	1,15E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,94E-02	4,33E-02	4,98E-02	1,91E-02	-8,05E-02
ADP-minerals&metals	kg Sb eq.	7,63E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,30E-06	2,40E-05	8,28E-05	2,69E-06	-2,04E-04
ADP-fossil	MJ	2,70E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,72E+01	1,25E+02	5,34E+01	4,42E+01	-2,14E+02
WDP	m^3	1,26E+04	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,21E-01	6,17E-01	4,01E-01	1,91E+00	-1,25E+01
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															

Note: A comma (",") is used as the decimal separator throughout this report. ND = Module Not declared. 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. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3). A portion of data used in this EPD is based on data derived from a 3.0 version of the Emission Factor (EF) database. The use of the older EF version was assessed and determined to yield results that are either identical or conservative in comparison to those that would be obtained using the current EF version 3.1. The biogenic carbon contained in packaging materials in module A3 has been accounted for and balanced within the same life cycle stage (A1–A3). 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.

Additional mandatory and voluntary impact category indicators, EF 3.1

Results per declared unit															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter	Incidence	1,66E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	9,25E-07	8,62E-07	5,84E-06	2,91E-07	-1,71E-06
Ionizing radiation	kBq U235e	7,75E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,01E-02	1,09E-01	1,50E-01	2,65E-02	8,95E-02
Ecotoxicity (freshwater)	CTUe	3,21E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,69E+01	1,77E+01	9,80E+01	2,90E+01	-8,82E+02
Human toxicity, cancer	CTUh	1,35E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,69E-10	1,42E-09	1,32E-09	3,28E-10	-3,88E-09
Human tox. non-cancer	CTUh	2,65E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,80E-09	8,09E-08	7,48E-08	7,37E-09	-1,53E-07
SQP	-	3,01E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,12E+00	1,26E+02	3,24E+01	8,69E+01	-1,15E+02

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

Resource use indicators

Results per declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,84E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,96E-01	1,71E+00	3,09E+00	4,14E-01	-1,90E+01
PERM	MJ	3,96E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-2,77E-01	-1,19E-01	0,00E+00
PERT	MJ	1,84E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,96E-01	1,71E+00	2,82E+00	2,95E-01	-1,90E+01
PENRE	MJ	2,62E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,72E+01	1,25E+02	5,34E+01	4,42E+01	-2,14E+02
PENRM	MJ	1,22E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-8,52E+00	-3,65E+00	0,00E+00
PENRT	MJ	2,63E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,72E+01	1,25E+02	4,49E+01	4,06E+01	-2,14E+02
SM	kg	4,76E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,95E-02	5,32E-02	3,46E-02	1,10E-02	6,03E+02
RSF	MJ	2,73E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,12E-05	6,76E-04	9,27E-04	2,30E-04	-1,98E-03
NRSF	MJ	2,82E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	3,08E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,02E-03	1,85E-02	9,40E-03	4,57E-02	-2,63E-01
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															

Note. Option A was chosen for the calculations of the primary energy indicators. according to on Annex 3 of PCR 2019:14

Waste indicators

Results per declared unit															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1,81E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,29E-02	2,12E-01	1,45E-01	5,03E-02	-5,74E+00
Non-hazardous waste disposed	kg	2,88E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,71E-01	3,92E+00	4,66E+00	2,89E+02	-7,30E+01
Radioactive waste disposed	kg	9,25E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,93E-06	2,66E-05	3,82E-05	6,46E-06	3,13E-05

Output flow indicators

Results per declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	5,62E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	7,11E+02	0,00E+00	0,00E+00
Materials for energy recovery	kg	3,84E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	1,34E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional indicator – GWP-GHG

Results per declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO_2 eq.	2,78E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,62E+00	8,61E+00	4,06E+00	1,81E+00	-2,12E+01

Note. This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Additional LCA results (other environmental performance results) of the product(s)

Additional results for end-of-life 100% scenarios for modules C1-C4, D

End-of-life scenario documentation (corresponding scenario 100% recycling)

Scenario parameter	Value (corresponding scenario 100% recycling)	Value (corresponding scenario 100% disposal)
Collection process – kg collected separately	1000,00	1000,00
Collection process – kg collected with mixed waste	-	-
Recovery process – kg for re-use	-	-
Recovery process – kg for recycling	1000,00	-
Recovery process – kg for energy recovery	-	-
Disposal (total) – kg for final deposition	-	1000,00
Scenario assumptions e.g. transportation	80 km	80 km

Note. Yield factor = 0,9 (assuming 10% of material is lost in the recycling process)

Mandatory impact category indicators according to EN 15804 (corresponding scenario 100% recycling)

Results per declared unit						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- total	kg CO_2 eq.	3,62E+00	8,61E+00	5,39E+00	0,00E+00	-1,40E+03
GWP-fossil	kg CO_2 eq.	3,62E+00	8,61E+00	5,43E+00	0,00E+00	-1,40E+03
GWP-biogenic	kg CO_2 eq.	6,90E-04	1,95E-03	-3,95E-02	0,00E+00	0,00E+00
GWP- luluc	kg CO_2 eq.	3,71E-04	3,85E-03	2,01E-03	0,00E+00	-2,20E-01
ODP	kg CFC 11 eq.	5,38E-08	1,27E-07	7,86E-08	0,00E+00	-4,64E-06
AP	mol H+ eq.	3,24E-02	2,94E-02	5,24E-02	0,00E+00	-5,67E+00
EP-freshwater	kg P eq.	1,17E-04	6,70E-04	9,88E-04	0,00E+00	-1,01E+00
EP- marine	kg N eq.	1,51E-02	9,65E-03	2,07E-02	0,00E+00	-1,26E+00
EP-terrestrial	mol N eq.	1,65E-01	1,05E-01	2,27E-01	0,00E+00	-1,37E+01
POCP	kg NMVOC eq.	4,94E-02	4,33E-02	6,79E-02	0,00E+00	-4,67E+00
ADP-minerals & metals	kg Sb eq.	1,30E-06	2,40E-05	9,23E-05	0,00E+00	-1,53E-02
ADP-fossil	MJ	4,72E+01	1,25E+02	7,13E+01	0,00E+00	-1,29E+04
WDP	m^3	1,21E-01	6,17E-01	4,77E-01	0,00E+00	-3,15E+02

Mandatory impact category indicators according to EN 15804 (corresponding scenario 100% disposal)

Results per declared unit						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- total	kg CO_2 eq.	3,62E+00	8,61E+00	0,00E+00	6,22E+00	0,00E+00
GWP-fossil	kg CO_2 eq.	3,62E+00	8,61E+00	0,00E+00	6,26E+00	0,00E+00
GWP-biogenic	kg CO_2 eq.	6,90E-04	1,95E-03	0,00E+00	-3,95E-02	0,00E+00
GWP- luluc	kg CO_2 eq.	3,71E-04	3,85E-03	0,00E+00	3,58E-03	0,00E+00
ODP	kg CFC 11 eq.	5,38E-08	1,27E-07	0,00E+00	1,75E-07	0,00E+00
AP	mol H+ eq.	3,24E-02	2,94E-02	0,00E+00	4,38E-02	0,00E+00
EP-freshwater	kg P eq.	1,17E-04	6,70E-04	0,00E+00	5,46E-04	0,00E+00
EP- marine	kg N eq.	1,51E-02	9,65E-03	0,00E+00	1,68E-02	0,00E+00
EP-terrestrial	mol N eq.	1,65E-01	1,05E-01	0,00E+00	1,84E-01	0,00E+00
POCP	kg NMVOC eq.	4,94E-02	4,33E-02	0,00E+00	6,63E-02	0,00E+00
ADP-minerals & metals	kg Sb eq.	1,30E-06	2,40E-05	0,00E+00	9,36E-06	0,00E+00
ADP-fossil	MJ	4,72E+01	1,25E+02	0,00E+00	1,53E+02	0,00E+00
WDP	m^3	1,21E-01	6,17E-01	0,00E+00	6,37E+00	0,00E+00

ADDITIONAL ENVIRONMENTAL INFORMATION

Manufacturing energy scenario documentation

Scenario parameter	Value	Source
Grid electricity (national average mix)	0,6700 kg CO_2e / kWh	Data sources: ecoinvent 3.11 Country: Estonia
On-site solar electricity (photovoltaic panels)	0,0774 kg CO_2e / kWh	Data sources: ecoinvent 3.11 Country: World
Natural gas heat for industrial production	0,2714 kg CO_2e / kWh	Data sources: ecoinvent 3.11 Country: Estonia
District heating (Estonia)	0,0764 kg CO_2e / kWh	Data sources: OneCickLCA Country: Estonia
Diesel fuel for mobile machinery	0,3600 kg CO_2e / kWh	Data sources: ecoinvent 3.11 Country: World

End of life scenario documentation (most probable scenario)

Scenario parameter	Value
Collection process – kg collected separately	1000,00
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	711,41
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	288,59
Scenario assumptions e.g. transportation	Transported 80 km with an average lorry.

Note. Yield factor = 0,9 (assuming 10% of material is lost in the recycling process)

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CPC	Central product classification
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq.)
GWP-total	Total Global Warming Potential (kg CO_2 eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H^+ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m^3)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site

Abbreviation	Definition
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
EC No.	European Community Number
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared
REACH	Registration, Evaluation, Authorisation, and Restriction of Chemicals
ppm	Parts per million
PEF	Product Environmental Footprint
PPP	Polluter pays principle
EU	Europe
GLO	Global

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e) PCR 2019:14 Construction products (EN 15804+A2) (version 2.0.1) (2025-06-05)
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g) EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
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k) EuRIC. (2020, February). Metal Recycling Factsheet. European Circular Economy Stakeholder Platform. Retrieved from https://circulareconomy.europa.eu/platform/en/knowledge/metal-recycling-factsheet-euric
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m) Life-cycle assessment background report ”Precast concrete products”
n) Ecoinvent database v3.11 (2024) and One Click LCA database.

VERSION HISTORY

Original Version of the EPD, 2026-04-07

INTERNATIONAL EPD SYSTEM

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