# Environmental Product Declaration

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

## Precast concrete massive wall

from

## INHUS Prefab, UAB

| | |
|---|---|
| Programme: | The International EPD® System, www.environdec.com |
| Programme operator: | EPD International AB |
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*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*

# Company information

Owner of the EPD:
INHUS Prefab, UAB
E-mail: prefab@inhus.eu
Tel. +370 5 2600120
ihttps://www.inhusprefab.eu/en

Description of the organisation: 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:

- 2 factories in Vilnius and Kaunas (Žarijų str. 6, 02300 Vilnius and Bituko str. 5, 52366 Kaunas)
- 200 000 $m^2$ of wall panel produced annually
- 200 000 $m^2$ of hollow core slabs produced annually
- 6 500 $m^3$ of frame constructions produced annually

INHUS Prefab is a part of INHUS - one of the leading “design-build” project developers in the Nordic region with sales of 60 million Euro and approximately 550 employees in 2021. INHUS cooperates with the largest Lithuanian and Scandinavian building enterprises and real estate developers to bring simplicity to “design-build” delivery.

INHUS vision is to build buildings without using construction sites - a world where clients only have to worry about their ideas and not the technical execution. Sustainability is at the core of this vision, because it requires to rethink the construction process, materials and the role of their employees. The company currently makes progress with a holistic approach, making net-positive investments into all three dimensions of sustainability - social, environmental and economical.

To create maximum value to their customers and to the environment, INHUS takes full responsibility for the entire production process; from the design and manufacturing of building components, to the development of logistic solutions and finally the construction itself. The company innovates in production methods, implements modern technologies, ensures efficient use of resources and invests in its employee’s development. INHUS has also developed a carbon reduction strategy, outlining its planned steps and obligations up to 2030.

Finally, the company is a member of Lithuanian Builders Association, Lithuanian Construction Industry Association, Lithuanian Construction Product Testing Laboratory and is recognized for meeting the management system standards - ISO 9001: 2015 (quality standard) and ISO 14001: 2015 (environmental protection standard).

Visit https://www.inhusprefab.eu/en to learn more.

Name and location of production site(s):
INHUS Prefab, UAB, Žarijų str. 6, 02300 Vilnius, Lithuania.

## Product information

Product name: Precast concrete massive wall

Product identification: Massive one layer wall elements are certified and manufactured in accordance with the harmonized European standard EN 14992 Precast concrete products - Wall elements. It holds the CE mark and the declaration of performance issued by the manufacturer in accordance with requirements of Regulation (EU) No. 305.2011 of the European Parliament and of the Council issued on 2011 March 9th.

Product description: Massive wall - precast wall of any shape produced as one solid unit including reinforcement and fixtures. Massive one layer wall elements are made of concrete, reinforcement, inserts and other components for electrical wiring. They are manufactured and used as partitions between rooms (non-load-bearing) and as load-bearing external or internal walls. Massive one layer wall elements are made with or without door or window openings.

Massive one layer wall can be various sizes, with one or two window pockets and/or one or two door pockets, with or without console. Also, walls can be produced with electrical installation.

The products are manufactured in the following dimensions and technical features:

- Thickness: 70 mm - 250 mm,
- Height: 300mm - 4300 mm,
- Length: 300 mm - 11500 mm,
- Concrete type: C 30/37 - C 50/60.

Massive one layer wall elements are used in various buildings (residential and public buildings - supermarkets, schools, hospitals, etc.). Massive one layer wall elements can be produced as load-bearing and non-load-bearing, can be used indoors and outdoors.

UN CPC code: 375

Geographical scope: Lithuania, Sweden, Denmark, Poland, United Kingdom

## LCA information

Functional unit / declared unit: In accordance with the PCR the declared unit is 1 metric tonne of the product.

Reference service life: The reference service life for the precast concrete massive walls is set at 50 years.

Time representativeness: Primary data was collected internally. The production data refers to the average of the year 2020.

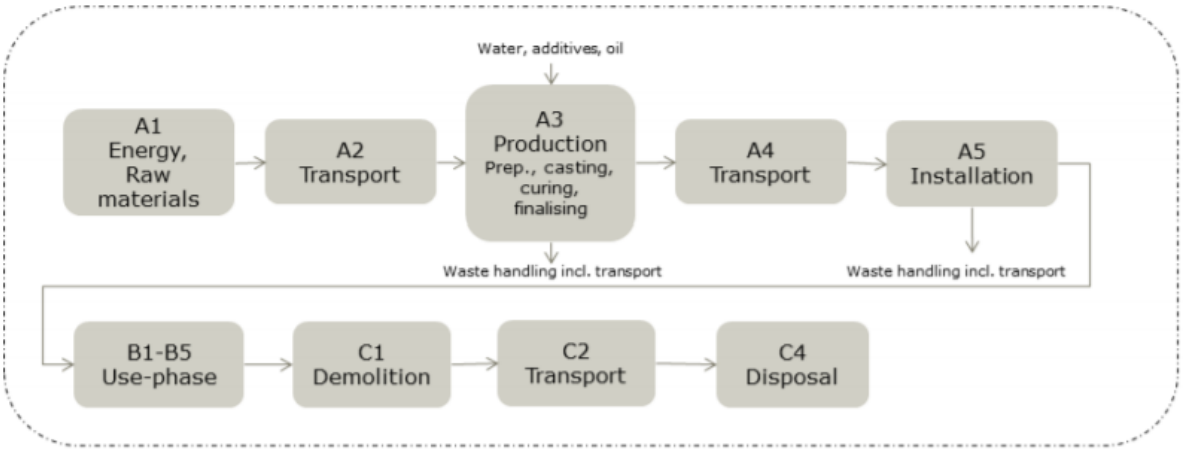
Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and process materials obtained from the background system. The used database is Ecoinvent 3.6. The LCA software used is One Click LCA.

Description of system boundaries: Cradle to gate with options, modules C1-C4 and module D. The LCA was carried out considering the Product stage phases (A1, A2, A3), Distribution (A4), Installation (A5), End of life (C1, C2, C3, C4), Potential environmental benefits (D) in accordance with EN 15804.

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

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

System diagram:




System boundary:

| | Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | | Resource recovery stage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Modules declared | X | X | X | X | X | MND | MND | MND | MND | MND | MND | MND | X | X | X | X | X |
| | 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 |

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

Product stage:

A1: This stage 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 stage includes the manufacture of products and packaging. It has considered all the energy consumption and waste generated in the production plant.

## Production process description

Massive (one layer) walls are produced on reversible tables/pallets. Reinforcement framework is produced in reinforcement production bar and transported to the production bar by trolley. Framework is put on the pallet by crane. Broadsides from plywood are installed. Inserts, loops, etc. are placed (if needed). Concrete produced in concrete batching plant is transported to the production bar by dolly for moulding. After moulding concrete surface is smoothened and the table/pallet is turned into the curing chamber. After the concrete has reached the strength of not less than 70%, the walls are demoulded, inspected and transported to the warehouse by trolly.

Construction process stage:
A4: This stage includes transport from the production gate to the construction site where the product shall be installed. Transportation distances has been calculated using a most likely scenarios, an export to Lithuania, Sweden, Denmark, Poland, United Kingdom with the parameters described in the following table. The transportation doesn't cause losses as products are packaged properly.

| Scenario parameter | Distance, km | Value kgCO2e/tonkm |
|---|---|---|
| **1) Lithuania** | | |
| Truck, Euro 5 | 30 | 0.0909 |
| Ferry | - | - |
| **2) Lithuania** | | |
| Truck, Euro 5 | 100 | 0.0909 |
| Ferry | - | - |
| **3) Sweden** | | |
| Truck, Euro 6 | 200 | 0.0863 |
| Ferry | 413 | 0.0094 |
| **4) Sweden** | | |
| Truck, Euro 6 | 300 | 0.0863 |
| Ferry | 413 | 0.0094 |
| **5) Denmark** | | |
| Truck, Euro 6 | 400 | 0.0863 |
| Ferry | 862 | 0.0094 |
| **6) Denmark** | | |
| Truck, Euro 6 | 500 | 0.0863 |
| Ferry | 862 | 0.0094 |
| **7) United Kingdom** | | |
| Truck, Euro 6 | 400 | 0.0863 |
| Ferry | 2070 | 0.0094 |
| **8) United Kingdom** | | |
| Truck, Euro 6 | 500 | 0.0863 |
| Ferry | 2070 | 0.0094 |
| **9) Poland** | | |
| Truck, Euro 5 | 500 | 0.0909 |
| Ferry | | - |
| **10) Poland** | | |
| Truck, Euro 5 | 800 | 0.0909 |
| Ferry | - | - |

Capacity of utilization for truck is 56% of the capacity in volume. Capacity of utilization for ferry is 50% of the capacity in volume.

A5: This stage considers the installation of the product into the building.
Tower cranes powered by electricity are used for the installation. Walls are delivered to the construction site by truck and erected directly from the truck platform, in the spaces allocated for these structures by design. Walls can be exterior or interior, load-bearing (taking loads from other structures) or self-supporting. They are mounted on foundations or slabs. After the wall has been erected in its design position, it is supported by props. There are two ways of connecting the wall to the wall: PVL connectors or insert fittings. In the case of insert fittings, they are secured by welding through the plates. Gaps between walls are filled with non-shrink fine-grained concrete mix.

Use stage:
In normal use scenario, it is assumed that no maintenance (B2), repair (B3), replacement (B4) and refurbishment (B5) is needed.

End of Life stage:
This stage includes the following modules:

**C1, Deconstruction, dismantling, demolition**

Consumption of fuel in demolition process is calculated according to transported mass. Energy consumption for demolition is 10 kWh/1000 kg = 0,01 kWh/kg. The source of energy is diesel fuel used by work machines.

**C2, Transport of the discarded product to the processing site**

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 with the declared product. Whole 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 lorry which is the most common.

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

Based on European average 90% of steel are transformed into secondary material at a recycling plant. According to European Commission Waste Framework Directive, 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 by 2020. It is assumed that 70% of the concrete waste is recycled.

**C4, Discharge (disposal)**

The remaining 30 % of concrete and 10 % of steel are assumed to be sent to the landfill.

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. The scrap content in the studied product has been acknowledged and only the mass of primary steel in the product provides the benefit in order to avoid double counting. Crushed concrete is made into rubble that can be used as a raw material in concrete production for road gravel.

## Content information

| Product components | Weight, kg | Weight, % |
|---|---|---|

| | | |
|---|---|---|
| Sand | 388.5 | 38.8 |
| Stone | 406.0 | 40.6 |
| Cement | 132.2 | 13.2 |
| Water | 44.9 | 4.5 |
| Reinforcement | 24.7 | 2.5 |
| Embedded details | 2.8 | 0.3 |
| Additives | 0.9 | 0.1 |
| TOTAL | 1000.0 | 100.0 |

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

## Packaging

Distribution packaging: wooden gaskets.

After use, packaging materials can be re-used or recycled.

# Environmental Information

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

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

| Results per functional or declared unit | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator | Unit | A1 | A2 | A3 | Tot.A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| GWP-total | kg $CO_2$ eq. | 1,58E+02 | 7,542E−1 | 9,97E+00 | 1,69E+02 | See below | 7,35E+00 | 3,30E+00 | 4,55E+00 | 3,32E+00 | 1,55E+00 | −5,694E0 |
| GWP-fossil | kg $CO_2$ eq. | 1,56E+02 | 7,535E−1 | 9,92E+00 | 1,66E+02 | See below | 7,31E+00 | 3,30E+00 | 4,54E+00 | 3,35E+00 | 1,55E+00 | −5,618E0 |
| GWP-biogenic | kg $CO_2$ eq. | 2,15E+00 | 5,472E−4 | 2,678E−2 | 2,18E+00 | See below | 3,936E−2 | 9,168E−4 | 3,3E−3 | −3,54E−2 | 3,073E−3 | −6,94E−2 |
| GWP-luluc | kg $CO_2$ eq. | 5,487E−2 | 2,268E−4 | 2,462E−2 | 7,972E−2 | See below | 6,157E−3 | 2,785E−4 | 1,368E−3 | 9,46E−4 | 4,603E−4 | −7,29E−3 |
| ODP | kg CFC 11 eq. | 8,467E−6 | 1,771E−7 | 1,513E−6 | 1,016E−5 | See below | 6,164E−7 | 7,119E−7 | 1,068E−6 | 6,783E−7 | 6,383E−7 | −5,aE−7 |
| AP | mol $H^+$ eq. | 5,144E−1 | 3,165E−3 | 6,217E−2 | 5,798E−1 | See below | 3,804E−2 | 3,448E−2 | 1,909E−2 | 3,611E−2 | 1,471E−2 | −3,67E−2 |
| EP-freshwater | kg P eq. | 3,171E−3 | 6,13E−6 | 5,898E−4 | 3,767E−3 | See below | 2,602E−4 | 1,333E−5 | 3,697E−5 | 5,452E−5 | 1,873E−5 | −3,61E−4 |
| EP-marine | kg N eq. | 1,331E−1 | 9,537E−4 | 1,865E−2 | 1,527E−1 | See below | 1,109E−2 | 1,523E−2 | 5,752E−3 | 1,426E−2 | 5,065E−3 | −7,75E−3 |
| EP-terrestrial | mol N eq. | 1,56E+00 | 1,053E−2 | 2,192E−1 | 1,79E+00 | See below | 1,223E−1 | 1,67E−1 | 6,352E−2 | 1,575E−1 | 5,579E−2 | −1,02E−1 |
| POCP | kg NMVOC eq. | 4,329E−1 | 3,387E−3 | 6,275E−2 | 4,991E−1 | See below | 3,826E−2 | 4,592E−2 | 2,042E−2 | 4,326E−2 | 1,621E−2 | −2,58E−2 |
| ADP-minerals & metals* | kg Sb eq. | 1,133E−3 | 1,286E−5 | 1,535E−4 | 1,3E−3 | See below | 2,789E−4 | 5,034E−6 | 7,754E−5 | 3,909E−5 | 1,416E−5 | −6,20E−4 |
| ADP-fossil* | MJ | 1,02E+03 | 1,17E+01 | 1,58E+02 | 1,19E+03 | See below | 7,39E+01 | 4,54E+01 | 7,07E+01 | 4,62E+01 | 4,33E+01 | −8,054E1 |
| WDP | $m^3$ | 4,42E+01 | 4,36E−2 | 3,06E+00 | 4,73E+01 | See below | 2,65E+00 | 8,462E−2 | 2,629E−1 | 1,939E−1 | 2,00E+00 | −1,005E1 |
| Acronyms | | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | | | | | |

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

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

| Results per functional or declared unit (only scenarios of A4 stage) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lithuania | | Sweden | | Denmark | | UK | | Poland | |
| | | 30 km | 100 km | 613 km | 713 km | 1262 km | 1362 km | 2470 km | 2570 km | 500 km | 800 km |
| Indicator | Unit | A4 LT (1) | A4 LT (2) | A4 SWE (3) | A4 SWE (4) | A4 DK (5) | A4 DK (6) | A4 UK (7) | A4 UK (8) | A4 PL (9) | A4 PL (10) |
| GWP-total | kg $CO_2$ eq. | 2,73E+00 | 9,11E+00 | 2,14E+01 | 3,01E+01 | 4,31E+01 | 5,18E+01 | 5,45E+01 | 6,32E+01 | 4,55E+01 | 7,29E+01 |
| GWP-fossil | kg $CO_2$ eq. | 2,73E+00 | 9,11E+00 | 2,14E+01 | 3,01E+01 | 4,30E+01 | 5,18E+01 | 5,44E+01 | 6,32E+01 | 4,55E+01 | 7,28E+01 |
| GWP-biogenic | kg $CO_2$ eq. | 7,739E−5 | 2,58E−4 | −1,58E−3 | −1,32E−3 | −3,35E−3 | −3,00E−3 | −9,5E−3 | −9,24E−3 | 1,29E−3 | 2,064E−3 |
| GWP-luluc | kg $CO_2$ eq. | 8,221E−4 | 2,74E−3 | 8,145E−3 | 1,089E−2 | 1,652E−2 | 1,926E−2 | 2,431E−2 | 2,705E−2 | 1,37E−2 | 2,192E−2 |
| ODP | kg CFC 11 eq. | 6,421E−7 | 2,14E−6 | 5,066E−6 | 7,208E−6 | 1,02E−5 | 1,234E−5 | 1,249E−5 | 1,463E−5 | 1,07E−5 | 1,712E−5 |
| AP | mol $H^+$ eq. | 6,418E−3 | 2,139E−2 | 1,694E−1 | 1,908E−1 | 3,497E−1 | 3,712E−1 | 7,199E−1 | 7,413E−1 | 1,07E−1 | 1,711E−1 |
| EP-freshwater | kg P eq. | 1,948E−4 | 6,492E−4 | 1,453E−3 | 2,102E−3 | 2,919E−3 | 3,569E−3 | 3,371E−3 | 4,02E−3 | 3,246E−3 | 5,194E−3 |
| EP-marine | kg N eq. | 9,182E−4 | 3,061E−3 | 3,722E−2 | 4,029E−2 | 7,716E−2 | 8,022E−2 | 1,681E−1 | 1,712E−1 | 1,53E−2 | 2,449E−2 |
| EP-terrestrial | mol N eq. | 9,806E−3 | 3,269E−2 | 4,109E−1 | 4,436E−1 | 8,519E−1 | 8,846E−1 | 1,86E+00 | 1,90E+00 | 1,634E−1 | 2,615E−1 |
| POCP | kg NMVOC eq. | 5,412E−3 | 1,804E−2 | 1,252E−1 | 1,432E−1 | 2,583E−1 | 2,763E−1 | 5,192E−1 | 5,372E−1 | 9,02E−2 | 1,443E−1 |
| ADP-minerals & metals* | kg Sb eq. | 4,661E−5 | 1,554E−4 | 3,397E−4 | 4,951E−4 | 6,819E−4 | 8,373E−4 | 7,665E−4 | 9,218E−4 | 7,769E−4 | 1,243E−3 |
| ADP-fossil* | MJ | 4,20E+01 | 1,40E+02 | 3,30E+02 | 4,70E+02 | 6,635E | 8,04E+02 | 8,08E+02 | 9,48E+02 | 7,00E+02 | 1,12E+03 |
| WDP | $m^3$ | 3,26E+01 | 1,09E+02 | 2,271E | 3,36E+02 | 4,55E+02 | 5,64E+02 | 4,84E+02 | 5,93E+02 | 5,43E+02 | 8,69E+02 |
| Acronyms | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | | | | | |

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

## Use of resources

| Results per functional or declared unit | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator | Unit | A1 | A2 | A3 | Tot.A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| PERE | MJ | 7,22E+01 | 1,475E−1 | 2,54E+02 | 3,27E+02 | See below | 4,90E+00 | 2,454E−1 | 8,897E−1 | 1,57E+00 | 3,503E−1 | −6,876E0 |
| PERM | MJ | 0,00E+00 | 0,00E+00 | 1,20E+02 | 1,20E+02 | See below | 4,83E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 7,22E+01 | 1,475E−1 | 3,74E+02 | 4,47E+02 | See below | 9,73E+00 | 2,454E−1 | 8,897E−1 | 1,57E+00 | 3,503E−1 | −6,876E0 |
| PENRE | MJ | 1,02E+03 | 1,17E+01 | 1,58E+02 | 1,19E+03 | See below | 7,39E+01 | 4,54E+01 | 7,07E+01 | 4,62E+01 | 4,33E+01 | −8,054E1 |
| PENRM | MJ. | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | See below | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PENRT | MJ | 1,02E+03 | 1,17E+01 | 1,58E+02 | 1,19E+03 | See below | 7,39E+01 | 4,54E+01 | 7,07E+01 | 4,62E+01 | 4,33E+01 | −8,054E1 |
| SM | kg | 2,45E+01 | 0,00E+00 | 0,00E+00 | 2,45E+01 | See below | 8,058E−1 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| RSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | See below | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| NRSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | See below | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| FW | $m^3$ | 2,43E+00 | 2,44E−3 | 3,212E−2 | 2,46E+00 | See below | 1,167E−1 | 4,007E−3 | 1,472E−2 | 6,876E−3 | 4,74E−2 | −8,03E−1 |
| 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 | | | | | | | | | | |

## Use of resources

| Results per functional or declared unit (only scenarios of A4 stage) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lithuania | | Sweden | | Denmark | | UK | | Poland | |
| | | 30 km | 100 km | 613 km | 713 km | 1262 km | 30 km | 100 km | 613 km | 713 km | 1262 km |
| Indicator | Unit | A4 LT (1) | A4 LT (2) | A4 SWE (3) | A4 SWE (4) | A4 DK (5) | DK (6) | A4 UK (7) | A4 UK (8) | A4 PL (9) | A4 PL (10) |
| PERE | MJ | 5,348E−1 | 1,78E+00 | 3,90E+00 | 5,69E+00 | 7,83E+00 | 9,62E+00 | 8,81E+00 | 1,06E+01 | 8,91E+00 | 1,43E+01 |
| PERM | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 5,348E−1 | 1,78E+00 | 3,90E+00 | 5,69E+00 | 7,83E+00 | 9,62E+00 | 8,81E+00 | 1,06E+01 | 8,91E+00 | 1,43E+01 |
| PENRE | MJ | 4,28E+01 | 1,43E+02 | 3,35E+02 | 4,78E+02 | 6,75E+02 | 8,18E+02 | 8,20E+02 | 9,63E+02 | 7,13E+02 | 1,14E+03 |
| PENRM | MJ. | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PENRT | MJ | 4,28E+01 | 1,43E+02 | 3,35E+02 | 4,78E+02 | 6,75E+02 | 8,18E+02 | 8,20E+02 | 9,63E+02 | 7,13E+02 | 1,14E+03 |
| SM | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| RSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| NRSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| FW | $m^3$ | 8,846E−3 | 2,949E−2 | 6,367E−2 | 9,317E−2 | 1,278E−1 | 1,573E−1 | 1,415E−1 | 1,709E−1 | 1,474E−1 | 2,359E−1 |
| Acronyms | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water | | | | | | | | | | |

## Waste production and output flows

### Waste production

| Results per functional or declared unit | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator | Unit | A1 | A2 | A3 | Tot.A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| Hazardous waste disposed | kg | 9,43E+00 | 1,139E−2 | 3,328E−1 | 9,78E+00 | See below | 1,04E+00 | 4,882E−2 | 6,869E−2 | 0,00E+00 | 4,042E−2 | −4,2E−1 |
| Non-hazardous waste disposed | kg | 1,49E+02 | 1,26E+00 | 1,89E+01 | 1,69E+02 | See below | 1,36E+01 | 5,218E−1 | 7,60E+00 | 0,00E+00 | 2,94E+02 | −1,719E1 |
| Radioactive waste disposed | kg | 4,961E−3 | 8,046E−5 | 5,28E−4 | 5,569E−3 | See below | 2,972E−4 | 3,177E−4 | 4,852E−4 | 0,00E+00 | 2,867E−4 | −3,71E−4 |

### Waste production

| Results per functional or declared unit (only scenarios of A4 stage) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lithuania | | Sweden | | Denmark | | UK | | Poland | |
| | | 30 km | 100 km | 613 km | 713 km | 1262 km | 30 km | 100 km | 613 km | 713 km | 1262 km |
| Indicator | Unit | A4 LT (1) | A4 LT (2) | A4 SWE (3) | A4 SWE (4) | A4 DK (5) | DK (6) | A4 UK (7) | A4 UK (8) | A4 PL (9) | A4 PL (10) |
| Hazardous waste disposed | kg | 4,129E−2 | 1,376E−1 | 3,334E−1 | 4,711E−1 | 6,719E−1 | 8,096E−1 | 8,419E−1 | 9,795E−1 | 6,882E−1 | 1,10E+00 |
| Non-hazardous waste disposed | kg | 4,57E+00 | 1,52E+01 | 3,12E+01 | 4,64E+01 | 6,24E+01 | 7,77E+01 | 6,46E+01 | 7,98E+01 | 7,61E+01 | 1,22E+02 |
| Radioactive waste disposed | kg | 2,917E−4 | 9,723E−4 | 2,296E−3 | 3,269E−3 | 4,622E−3 | 5,595E−3 | 5,643E−3 | 6,616E−3 | 4,861E−3 | 7,778E−3 |

### Output flows

| Results per functional or declared unit | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator | Unit | A1 | A2 | A3 | Tot.A1-A3 | A4 (all) | A5 | 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 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling | kg | 0,00E+00 | 0,00E+00 | 7,33E+01 | 7,33E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 7,06E+02 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 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 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

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

| Results per functional or declared unit | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **Tot.A1-A3** | **A4 SWE (3)** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| GWP | kg $CO_2$ eq. | 1,54E+02 | 7,469E−1 | 9,77E+00 | 1,65E+02 | 2,12E+01 | 7,15E+00 | 3,27E+00 | 4,50E+00 | 3,32E+00 | 1,52E+00 | −5,498E0 |
| ODP | kg CFC 11 eq. | 7,236E−6 | 1,408E−7 | 1,227E−6 | 8,604E−6 | 4,025E−6 | 5,152E−7 | 5,634E−7 | 8,491E−7 | 5,421E−7 | 5,058E−7 | −4,65E−7 |
| AP | mol $H^+$ eq. | 3,587E−1 | 1,533E−3 | 3,724E−2 | 3,975E−1 | 1,385E−1 | 2,205E−2 | 4,866E−3 | 9,246E−3 | 8,769E−3 | 6,133E−3 | −2,26E−2 |
| EP | kg $PO_4^{3-}$ eq. | 1,366E−1 | 3,097E−4 | 1,464E−2 | 1,515E−1 | 1,876E−2 | 1,101E−2 | 8,573E−4 | 1,868E−3 | 2,648E−3 | 1,187E−3 | −1,22E−2 |
| POCP | kg Ethenee | 2,026E−2 | 9,715E−5 | 3,05E−3 | 2,34E−2 | 4,772E−3 | 2,055E−3 | 5,011E−4 | 5,858E−4 | 6,364E−4 | 4,497E−4 | −1,85E−3 |
| ADP-minerals & metals* | kg Sb eq. | 1,133E−3 | 1,286E−5 | 1,535E−4 | 1,3E−3 | 3,397E−4 | 2,789E−4 | 5,034E−6 | 7,754E−5 | 3,909E−5 | 1,416E−5 | −6,20E−4 |
| ADP-fossil* | MJ | 1,02E+03 | 1,17E+01 | 1,58E+02 | 1,19E+03 | 3,33E+02 | 7,39E+01 | 4,54E+01 | 7,07E+01 | 4,62E+01 | 4,33E+01 | −8,054E1 |
| Acronyms | | GWP = Global Warming Potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential; EP = Eutrophication potential; POCP = Formation of ozone of lower atmosphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | | | | | |

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

# General information

## Programme information

| | |
|---|---|
| Programme: | The International EPD® System |
| Address: | EPD International AB<br>Box 210 60<br>SE-100 31 Stockholm<br>Sweden |
| Website: | www.environdec.com |
| E-mail: | info@environdec.com |

| |
|---|
| CEN standard EN 15804 serves as the Core Product Category Rules (PCR) |
| Product category rules (PCR): PCR 2019:14 Construction products (version 1.1);<br>Complementary PCR (c-PCR):C-PCR-003 (TO PCR 2019:14) - Concrete and concrete elements, version: 2019-12-20; |
| PCR review was conducted by: The International EPD® System |
| Independent third-party verification of the declaration and data, according to ISO 14025:2010<br><br>☐ EPD process certification ☒ EPD verification |
| Third party verifier: Silvia Vilčeková, Silcert, s.r.o<br>Approved by: The International EPD® System  |
| Procedure for follow-up of data during EPD validity involves third party verifier:<br><br>☐ Yes ☒ No |

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

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

During revision (2022-01-03) A5 stage calculations were added to the EPD.

## References


- General Programme Instructions of the International EPD® System. Version 3.01;
- PCR 2019:14 Construction products (version 1.1);
- C-PCR-003 (TO PCR 2019:14) - Concrete and concrete elements, version: 2019-12-20;
- EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products;
- ISO 14044:2006/Amd 2:2020 Environmental management. Life Cycle Assessment. Requirements and guidelines.
- ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations. Principles and procedures.


## Tools and database

- One Click LCA tool;
- Ecoinvent 3.6 database

## Contact information

| | |
|---|---|
| EPD owner: | INHUS Prefab, UAB<br>https://www.inhusprefab.eu/en |
| LCA author: | Vesta Consulting, UAB<br>https://www.vestaconsulting.lt/ |
| Programme operator: | The International EPD® System<br>https://www.environdec.com |

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