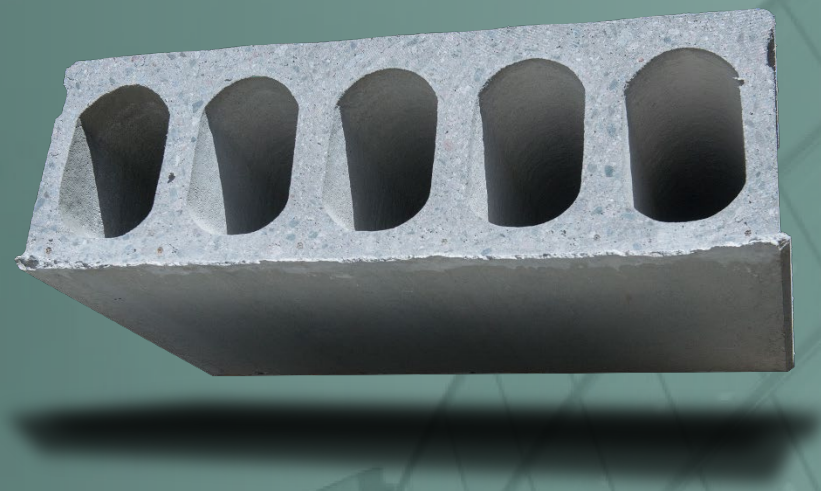
ENVIRONMENTAL PRODUCT DECLARATION

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

HOLLOW CORE CONCRETE SLAB WITH REINFORCING

PIELISEN BETONI OY



An EPD should provide current information and may be updated if conditions change.

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Pielisen Betoni Oy
Address	Tehdastie 12 FIN-81750 Pankakoski Finland
Contact details	media(a)pielisenbetoni.fi, +358 40 3400 127
Website	www.pielisenbetoni.fi

PRODUCT IDENTIFICATION

Product name	Hollow core concrete slab with reinforcing
Place(s) of production	Hollola

The Building Information Foundation RTS sr

EPDs within the same product category but from different programmes may not be comparable.

Jukka Seppänen
RTS EPD Committee Secretary

Laura Apilo
Managing Director

EPD INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs 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
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used.
EPD author	Inkeri Seppälä, Kirsi Wolczkiewicz
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	11-01-2023
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD number	RTS_206_23
Publishing date	24.2.2023
EPD valid until	24.2.2028

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Precast hollow-core slabs consist of top and – bottom flanges. Hollow-core slabs consist of four to eight lengthwise holes depending on the slab type (O20, O27, O32M, O37, O40 and O50).

LCA results are applied to prestressed and reinforced hollow-core slabs. They are reinforced by high strength, low relaxation steel wires. LCA calculations have been conducted for a hollow-core slab with the thickness of 320mm (O32). LCA results can be applied to other thicknesses by using the scaling factors.

PRODUCT APPLICATION

Hollow core slabs are suitable for industrial, commercial, and residential construction. They are used in the upper, lower, and intermediate floors of building, as single-hole, continuous slab and as a pre-stressed slab. It is also used as a load bearing or partition wall, foundation slab and plinth. It can also be optioned as foundation beam in small residential or industrial and agricultural construction.

TECHNICAL SPECIFICATIONS

The size and form of the hollow core slabs depends on the end usage. The product includes rebar and prepressing steel. Compressive strength C40/50.

PRODUCT STANDARDS

Products follow SFS-EN 1168 + A3. Precast concrete products: Hollow-Core Slabs. Hollow-Core Slabs have CE-markings that are in line with Eurostandards.

PHYSICAL PROPERTIES OF THE PRODUCT

Thickness	Unit weight	Scaling factor
200 mm	258 kg / m^2	0,65
265 mm	352 kg / m^2	0,92
320 mm (reference)	382 kg / m^2	1
370 mm	485 kg / m^2	1,26
400 mm	460 kg / m^2	1,17
500 mm	616 kg / m^2	1,52

The given unit is one square meter (m²) of slab. The reference thickness is 320mm, weight 382kg/m² and width 1200mm.

More information at:
https://www.pielisenbetoni.fi/tuotteet/ontelolaatat/

ADDITIONAL TECHNICAL INFORMATION

All our products are manufactured from 100% compensated concrete. Concrete itself is 100% recyclable material and it sustains usage indoors up to 100 years (depending on the use and exposure class).

Additional information www.pielisenbetoni.fi/en

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Cement	54	20	80	Finland, EU
Aggregate, fine	186	20	80	Finland
Aggregate, coarse	91	20	80	Finland
Concrete crush	24	20	80	Finland
Reinforcement steel	5	5	95	EU
Water	22			Finland

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	1,3	EU
Minerals	98,7	Finland, EU
Fossil materials	0	-
Bio-based materials	0	-

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The installation sites are assumed to be on average 110km from the production facility. Due to the long distances, full trailer combination truck is assumed to be used. No losses in transportation are expected.
Optional A5 module is not declared.

PRODUCT USE AND MAINTENANCE (B1-B7)

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

PRODUCT END OF LIFE (C1-C4, D)

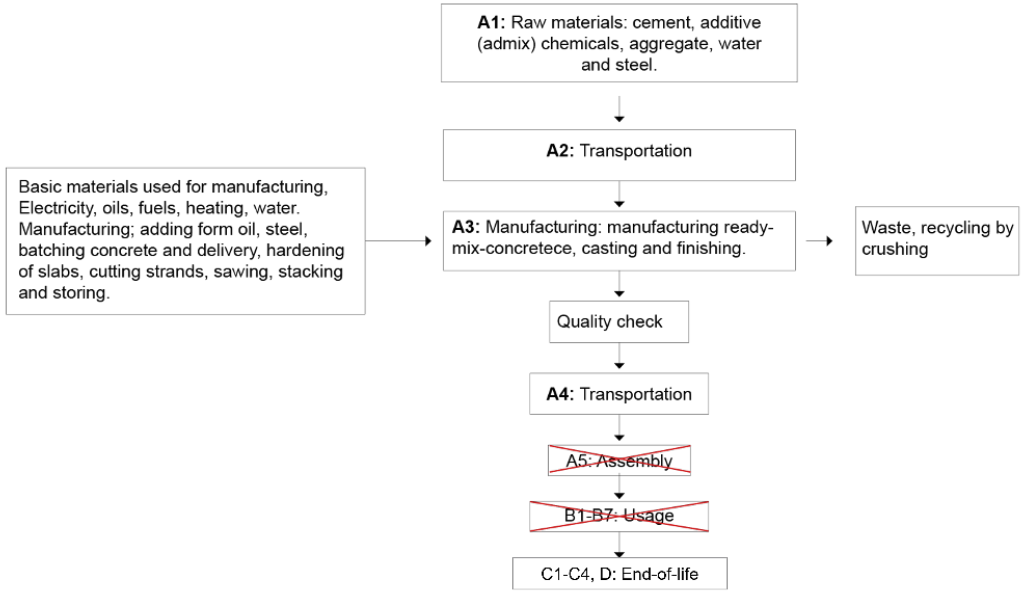
At the end-of-life phase the hollow core slab is demolished. The demolition machinery utilises energy (C1). The demolished hollow core slabs are transported to a construction waste treatment facility (C2). At the facility, recyclable fractions are separated and directed to further use (C3). For steel, the recycling rate is assumed to be 95% and for concrete 80%. Non-recyclable fractions are disposed on landfills (C4). The recyclable fractions can be re-used as secondary raw materials, thus reducing the need for virgin materials (D).

MANUFACTURING PROCESS

Ready-mixed concretes main ingredients are cement, stone aggregate, and water. In the manufacturing process the stone aggregate is taken to the concrete plants' silos, from which it is issued to a conveyor, which is equipped with a scale. The stone aggregate is mixed with the cement. Water and possible additives are added and wet mixed.

Hollow core slabs are produced from concrete, and they are reinforced with steel. The manufacturing process begins with preparing of the casting beds. This process includes cleaning and oiling of the casting beds. Steel strands are tensioned to predetermined load prior to casting slabs. The position of the strands depends on the braiding and fire class (REI60, REI90 or REI120). Once the concrete has been batched, it is poured onto the casting beds. All the needed detailing is done to the slabs before they are covered and left to cure. After curing the strands are cut and slabs are sawn to their required measurements. Casting plugs and individual identifications are added, and the slabs are loaded and stored accordingly to wait for delivery. If the slabs are insulated, they are fitted with insulation before storing. Steel molds are counted as capital good such as machines and equipment, so they are not taken into count in the calculations.

The manufacturing process consumes energy through the machinery and heating of the factory. Waste that is produced are recycled accordingly. The quality and material usage in the manufacturing process are supervised.



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2021

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 m^2 of product
Mass per declared unit	382 kg
Functional unit	-
Reference service life	100 years

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0

SYSTEM BOUNDARY

This EPD covers the cradle to gate with modules scope with the following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing) 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	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

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

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

Construction of the production facility and equipment are excluded from the analysis, as their impacts divided by the number of products produced during the factory and equipment lifetime are considered negligible. Commuting of employees at the facility and similar supporting activities are also excluded.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

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

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

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

Modules A1-A3:
In this EPD it is assumed that the material composition per kg of product remains the same for the different element thicknesses.

In addition to hollow core slabs, some other concrete products are also manufactured at the facility using similar processes and materials. Information on the use of fuel oil, electricity, mould lubricant, service water, as well as generation of wastage concrete and other wastes is only available on plant level. These impacts are allocated by annual production mass.

Module A4: The transportation distance is defined according to RTS PCR. The installation sites are located on average 110km from the production facility. Due to the long distances, full trailer combination truck is assumed to be used. Fill rate of 100% is used, as the transportation provider is assumed to provide their services to other customers on return trips.

Module C1: Energy consumption in the demolition process is estimated to be 0,107 MJ/kg, based on a background report published by VTT.

Module C2: After demolition the hollow core slab is transported to the nearest construction waste treatment facility, which is assumed to be at 50 km distance. Full trailer combination truck is assumed to be used. Fill rate of 100% is used, as the transportation provider is assumed to provide their services to other customers on return trips.

Module C3: For recycling, the hollow slab is crushed and reinforcing steel is separated from the concrete for recycling. A recycling scenario of 80% is used for the concrete. Recycling rate for steel is assumed to be 95%.

Module C4: It is assumed that in the recycling process 20% of concrete and 5% of steel are unexploitable and are taken to landfill.

Module D: Concrete is recycled as aggregate. In the calculations, the share of recycled aggregate used for this product is excluded to avoid double counting. The steel used is already recycled, and thus no additional benefits are calculated for its recycling.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 - standard.

ENVIRONMENTAL IMPACT DATA

Note: additional environmental impact data may be presented in annexes.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO2e	4,51E1	4,65E0	1,67E0	5,14E1	3,79E0	MND	MND	MND	MND	MND	MND	MND	MND	3,74E0	3,19E0	1,96E0	1,08E0	-8,7E-1
GWP – fossil	kg CO2e	4,49E1	4,65E0	1,54E0	5,11E1	3,82E0	MND	MND	MND	MND	MND	MND	MND	MND	3,74E0	3,18E0	1,96E0	1,07E0	-8,36E-1
GWP – biogenic	kg CO2e	1,02E-1	-3,77E-4	1,33E-1	2,35E-1	2,77E-3	MND	MND	MND	MND	MND	MND	MND	MND	1,04E-3	1,7E-3	5,46E-4	1,1E-3	-3,09E-2
GWP – LULUC	kg CO2e	4,97E-2	2,65E-3	5,51E-4	5,29E-2	1,15E-3	MND	MND	MND	MND	MND	MND	MND	MND	3,16E-4	1,13E-3	1,66E-4	2,91E-4	-3,08E-3
Ozone depletion pot.	kg CFC-11e	1,21E-6	9,6E-7	3,45E-7	2,51E-6	8,98E-7	MND	MND	MND	MND	MND	MND	MND	MND	8,08E-7	7,23E-7	4,24E-7	3,07E-7	1,22E-7
Acidification potential	mol H+e	1,33E-1	1,32E-1	6,47E-3	2,72E-1	1,6E-2	MND	MND	MND	MND	MND	MND	MND	MND	3,91E-2	1,3E-2	2,05E-2	9,87E-3	8,03E-4
EP-freshwater3)	kg Pe	4,9E-4	2,25E-5	3,85E-5	5,51E-4	3,11E-5	MND	MND	MND	MND	MND	MND	MND	MND	1,51E-5	2,66E-5	7,94E-6	9,97E-6	-1,52E-4
EP-marine	kg Ne	4,78E-2	3,31E-2	1,64E-3	8,26E-2	4,83E-3	MND	MND	MND	MND	MND	MND	MND	MND	1,73E-2	3,86E-3	9,07E-3	3,87E-3	4,01E-3
EP-terrestrial	mol Ne	5,37E-1	3,68E-1	1,37E-2	9,18E-1	5,34E-2	MND	MND	MND	MND	MND	MND	MND	MND	1,9E-1	4,27E-2	9,95E-2	4,25E-2	3,68E-2
POCP (“smog”)	kg NMVOCe	1,35E-1	9,55E-2	4,43E-3	2,35E-1	1,72E-2	MND	MND	MND	MND	MND	MND	MND	MND	5,21E-2	1,31E-2	2,74E-2	1,19E-2	1,11E-2
ADP-minerals & metals	kg Sbe	5,58E-4	3,86E-5	1,66E-5	6,14E-4	6,52E-5	MND	MND	MND	MND	MND	MND	MND	MND	5,72E-6	8,61E-5	3E-6	9,63E-6	-2,55E-4
ADP-fossil resources	MJ	1,56E2	6,14E1	2,27E1	2,41E2	5,94E1	MND	MND	MND	MND	MND	MND	MND	MND	5,15E1	4,8E1	2,7E1	2,07E1	-1,34E1
Water use2)	m3e depr.	3,9E3	1,38E-1	6,41E-1	3,9E3	2,21E-1	MND	MND	MND	MND	MND	MND	MND	MND	9,61E-2	1,55E-1	5,04E-2	5,45E-1	-4,14E0

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential.
2) 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 experienced with the indicator.
3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e.

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

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	8,32E-7	1,83E-7	1,2E-7	1,13E-6	3,45E-7	MND	MND	MND	MND	MND	MND	MND	MND	1,04E-6	2,22E-7	1,74E-6	5,15E-7	1,38E-6
Ionizing radiation5)	kBq U235e	6,71E-1	2,65E-1	9,67E-2	1,03E0	2,6E-1	MND	MND	MND	MND	MND	MND	MND	MND	2,21E-1	2,1E-1	1,16E-1	8,62E-2	-1,34E-1
Ecotoxicity (freshwater)	CTUe	1,95E2	3,94E1	3,42E1	2,68E2	4,54E1	MND	MND	MND	MND	MND	MND	MND	MND	3,02E1	3,71E1	1,59E1	1,38E1	-2,89E1
Human toxicity, cancer	CTUh	1,65E-8	2,29E-9	1,12E-9	1,99E-8	1,16E-9	MND	MND	MND	MND	MND	MND	MND	MND	1,08E-9	1,08E-9	5,68E-10	4,16E-10	-1,68E-9
Human tox. non-cancer	CTUh	1,68E-7	3,49E-8	2,61E-8	2,29E-7	5,38E-8	MND	MND	MND	MND	MND	MND	MND	MND	2,67E-8	4,19E-8	1,4E-8	1,18E-8	-3,94E-8
SQP	-	8,61E1	1,79E1	1,67E0	1,06E2	8,97E1	MND	MND	MND	MND	MND	MND	MND	MND	1,32E0	4E1	6,94E-1	2,27E1	-2,26E1

4) SQP = Land use related impacts/soil quality.

5) 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	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy	MJ	2,38E1	4,58E-1	1,79E1	4,21E1	7,48E-1	MND	MND	MND	MND	MND	MND	MND	MND	2,79E-1	6,77E-1	1,46E-1	1,9E-1	-3,03E0
Renew. PER as material	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	2,38E1	4,58E-1	1,79E1	4,21E1	7,48E-1	MND	MND	MND	MND	MND	MND	MND	MND	2,79E-1	6,77E-1	1,46E-1	1,9E-1	-3,03E0
Non-re. PER as energy	MJ	1,58E2	6,14E1	2,27E1	2,42E2	5,94E1	MND	MND	MND	MND	MND	MND	MND	MND	5,15E1	4,8E1	2,7E1	2,07E1	-1,34E1
Non-re. PER as material	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	1,58E2	6,14E1	2,27E1	2,42E2	5,94E1	MND	MND	MND	MND	MND	MND	MND	MND	5,15E1	4,8E1	2,7E1	2,07E1	-1,34E1
Secondary materials	kg	3,04E1	0E0	3E-4	3,04E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Renew. secondary fuels	MJ	2,77E1	0E0	0E0	2,77E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	1,35E2	0E0	0E0	1,35E2	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	4,28E-1	6,87E-3	4,82E-2	4,83E-1	1,24E-2	MND	MND	MND	MND	MND	MND	MND	MND	4,55E-3	8,2E-3	2,39E-3	1,35E-2	-3,31E-1

6) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,18E0	6,56E-2	3,59E-2	1,28E0	5,77E-2	MND	MND	MND	MND	MND	MND	MND	MND	5,54E-2	4,87E-2	0E0	2,33E-2	-1,57E-1
Non-hazardous waste	kg	1,33E1	1,87E0	1,46E0	1,67E1	6,39E0	MND	MND	MND	MND	MND	MND	MND	MND	5,93E-1	3,35E0	0E0	7,56E1	-7,28E0
Radioactive waste	kg	6E-4	4,3E-4	1,54E-4	1,18E-3	4,08E-4	MND	MND	MND	MND	MND	MND	MND	MND	3,61E-4	3,29E-4	0E0	1,38E-4	-1,31E-5

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	6,06E-3	0E0	2,61E0	2,61E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,06E2	0E0	0E0
Materials for energy rec	kg	1,82E-2	0E0	1,69E-1	1,87E-1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	1,04E-1	0E0	0E0	1,04E-1	0E0	MND	MND	MND	MND	MND	MND	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	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO2e	4,51E1	4,65E0	1,67E0	5,14E1	3,79E0	MND	MND	MND	MND	MND	MND	MND	MND	3,74E0	3,19E0	1,96E0	1,08E0	-8,7E-1
ADP-minerals & metals	kg Sbe	5,58E-4	3,86E-5	1,66E-5	6,14E-4	6,52E-5	MND	MND	MND	MND	MND	MND	MND	MND	5,72E-6	8,61E-5	3E-6	9,63E-6	-2,55E-4
ADP-fossil	MJ	1,56E2	6,14E1	2,27E1	2,41E2	5,94E1	MND	MND	MND	MND	MND	MND	MND	MND	5,15E1	4,8E1	2,7E1	2,07E1	-1,34E1
Water use	m3e depr.	3,9E3	1,38E-1	6,41E-1	3,9E3	2,21E-1	MND	MND	MND	MND	MND	MND	MND	MND	9,61E-2	1,55E-1	5,04E-2	5,45E-1	-4,14E0
Secondary materials	kg	3,04E1	0E0	3E-4	3,04E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Biog. C in product	kg C	N/A	N/A	0E0	0E0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	N/A	N/A	0E0	0E0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Wind power Finland, >3MWh turbines
Electricity CO2e / kWh	0.0279
District heating data source and quality	-
District heating CO2e / kWh	-

Transport scenario documentation (A4)

Scenario parameter	Value
Specific transport CO2e emissions, kg CO2e / tkm	0.0901
Average transport distance, km	110
Capacity utilization (including empty return) %	100
Bulk density of transported products	1193,75
Volume capacity utilization factor	1

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	382
Collection process – kg collected with mixed waste	-
Recovery process – kg for re-use	-
Recovery process – kg for recycling	306,4
Recovery process – kg for energy recovery	-
Disposal (total) – kg for final deposition	75,6
Scenario assumptions e.g. transportation	End-of-life product is transported 50 km with an average lorry.

BIBLIOGRAPHY

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

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

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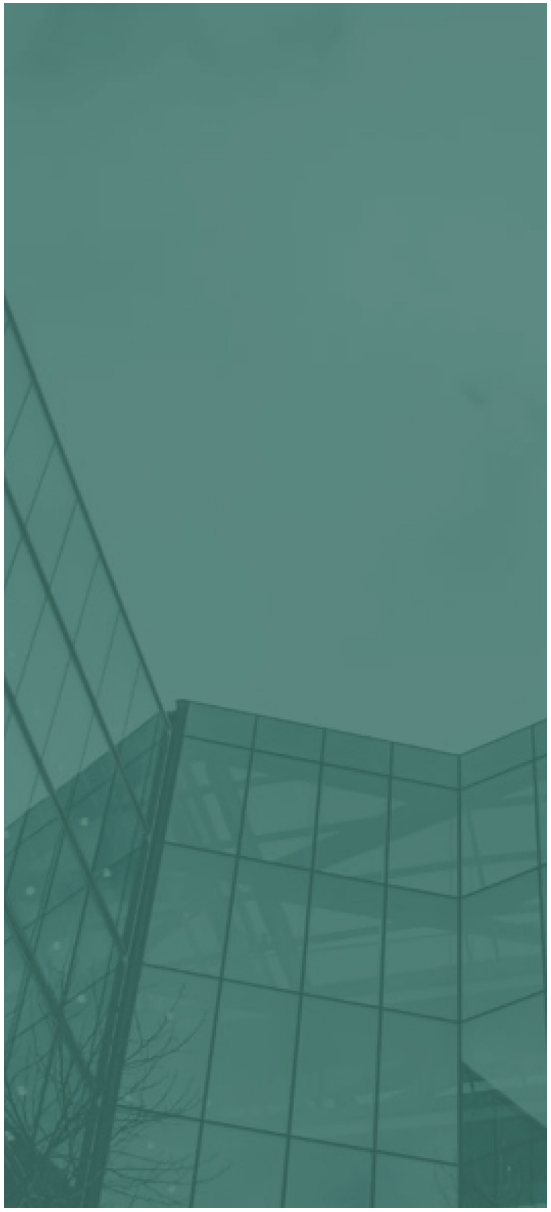
EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

RTS PCR (English version, 26.8.2020)

Hollow core concrete slab with reinforcing LCA background report 5.12.2022



ABOUT THE MANUFACTURER

Pielisen Betoni manufactures concrete elements such as hollow-core slabs, walls, reinforced concrete and pre-stressed concrete beams, columns, and ready-mix concrete. We are well-known for our good quality and reliable delivery. All our concrete is 100% compensated concrete which we call HIBE. Our business idea is the punctual delivery of concrete and the rock-solid quality of our products.

More information at www.pielisenbetoni.fi.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Pielisen Betoni Oy
EPD author	Inkeri Seppälä, Kirsi Wolczkiewicz
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD program operator	The Building Information Foundation RTS sr
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Concrete and cement-based products

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

Why does verification transparency matter? Read more online.

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD verification started on	26-12-2022
EPD verification completed on	11-01-2023
Approver of the EPD verifier	The Building Information Foundation

Author & tool verification	Answer
EPD author	Inkeri Seppälä, Kirsi Wolczkiewicz
EPD Generator module	Concrete-and-cement-based products
Independent software verifier	Anni Oviir, Rangi Maja OÜ
Software verification date	27.06.2020

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of

- the data collected and used in the LCA calculations,
- the way the LCA-based calculations have been carried out,
- the presentation of environmental data in the EPD, and
- other additional environmental information, as present

with respect to the procedural and methodological requirements in ISO 14025:2010 and EN 15804:2012+A2:2019.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

ANNEX 1: ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO2e	4,55E1	4,62E0	1,53E0	5,17E1	3,79E0	MND	MND	MND	MND	MND	MND	MND	MND	3,72E0	3,16E0	1,95E0	1,06E0	-7,96E-1
Ozone depletion Pot.	kg CFC-11e	1,09E-6	7,61E-7	2,8E-7	2,13E-6	7,14E-7	MND	MND	MND	MND	MND	MND	MND	MND	6,4E-7	5,76E-7	3,36E-7	2,44E-7	6,85E-8
Acidification	kg SO2e	9,4E-2	1,05E-1	4,56E-3	2,03E-1	7,77E-3	MND	MND	MND	MND	MND	MND	MND	MND	5,53E-3	6,39E-3	2,9E-3	3,27E-3	-7,45E-3
Eutrophication	kg PO43e	2,62E-2	1,19E-2	1,4E-3	3,95E-2	1,57E-3	MND	MND	MND	MND	MND	MND	MND	MND	9,73E-4	1,31E-3	5,11E-4	6,91E-4	-4,91E-3
POCP (“smog”)	kg C2H4e	5,61E-3	2,74E-3	2,14E-4	8,56E-3	4,92E-4	MND	MND	MND	MND	MND	MND	MND	MND	5,69E-4	4,2E-4	2,99E-4	2,19E-4	-5,42E-4
ADP-elements	kg Sbe	5,58E-4	3,86E-5	1,66E-5	6,14E-4	6,52E-5	MND	MND	MND	MND	MND	MND	MND	MND	5,72E-6	8,61E-5	3E-6	9,63E-6	-2,55E-4
ADP-fossil	MJ	1,56E2	6,14E1	2,27E1	2,41E2	5,94E1	MND	MND	MND	MND	MND	MND	MND	MND	5,15E1	4,8E1	2,7E1	2,07E1	-1,34E1

ANNEX 2: LIFE-CYCLE ASSESSMENT RESULT VISUALIZATION