ENVIRONMENTAL PRODUCT DECLARATION

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

LOW CARBON HOLLOW CORE SLAB

CONSOLIS PARMA

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Consolis Parma
Address	Hiidenmäentie 20 03101 Nummela
Contact details	heini.saloinen@consolis.com
Website	https://www.parma.fi/

PRODUCT IDENTIFICATION

Product name	Low carbon hollow core slab
Additional label(s)	CE EN 1168:2005+A3:2011, FI TR 15:2017
Product number / reference	GP37
Place(s) of production	Hyrylä, Finland

EPD INFORMATION

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

EPD program operator	Building Information Foundation RTS sr / Building Information Ltd Malminkatu 16 A, 00100 Helsinki, Finland
	http://cer.rts.fi
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the The CEN standard EN 15804+A2 serves as the core PCR. In addition, the RTS PCR (Finnish version, 26.8.2020) is used. PCR is used.
EPD author	Heini Saloinen, Consolis Parma
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	21.04.2021
EPD verifier	Anni Oviir, Rangi Maja OÜ, www.lcasupport.com
EPD number	RTS_116_21
Publishing date	29.04.2021
EPD valid until	21.4.2026

Jessica Karhu

RTS EPD Committee secretary

Laura Apilo

Managing Director

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The product is a precast hollow-core slab with a constant thickness of 370 mm. LCA results are applied to hollow core slabs of different thicknesses (GP18M, GP20, GP27, GP32, GP37, GP40, GP40R, GP50, and GP50R) by using the scaling factor table Annex 2. Conversion factors can also be applied to slabs with non-constant thickness (eg. GP37K slabs). This is the new version of P37 hollow core slab ("Ontelolaatta", RTS EPD, RTS_28_19), which includes increased use of recycled material.

PRODUCT APPLICATION

Precast hollow core slabs are used in buildings for floors and roofs. The product is typically used in the upper floors, midsoles or lower floors of terraced houses and multi-storey residential or commercial buildings.

TECHNICAL SPECIFICATIONS

Service life in indoors is 100 years. Service life is defined as project specific.

Slab type: GP37

Compressive strength C50 (options C40, C65)

PRODUCT STANDARDS

The product complies with SFS-EN 1168 + A3:en Precast concrete products - Hollow core slabs. More information can be found at the company website https://www.parma.fi/

PHYSICAL PROPERTIES OF THE PRODUCT

Typical physical properties: Material density 2400 kg/m3
Dimensions: Length according to the project based design, thickness 0,37 m.

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at https://www.parma.fi/.

PRODUCT RAW MATERIAL COMPOSITION

Material	Amount %	Usability		
		Renewable	Non-renewable	Recycled
Aggregate, fine	36		x	
Aggregate, coarse	41		x	
Cementitious and non-cementitious binders and concrete crush	21		x	x
Reinforcement	1		x	x
Admixtures	1		x	

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	1	EU
Minerals	99	EU
Fossil materials		
Bio-based materials		

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The production of the hollow-core slab begins with the preparation of the casting bed, which includes cleaning the casting platform and applying form oil. In this stage, steel strands are pulled to the end of the casting platform. When the strands are in place they are tensioned, after which wet concrete is poured onto the casting bed by a moving casting machine. After casting, the slab is covered and left to cure. When the slab is cured it is cut into the desired size. Before cutting, the strands are cut off. In finishing, cavity plugs are added to the cavities at the open ends of the slab.
Eventually, the elements are moved out and transported to the construction site.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. The transportation distance is defined according to RTS PCR. Average distance of transportation from production plant to building site is assumed as 53 km and the transportation method is assumed to be lorry. Transportation does not cause losses as product are packaged properly. Optional A5 module is not declared.

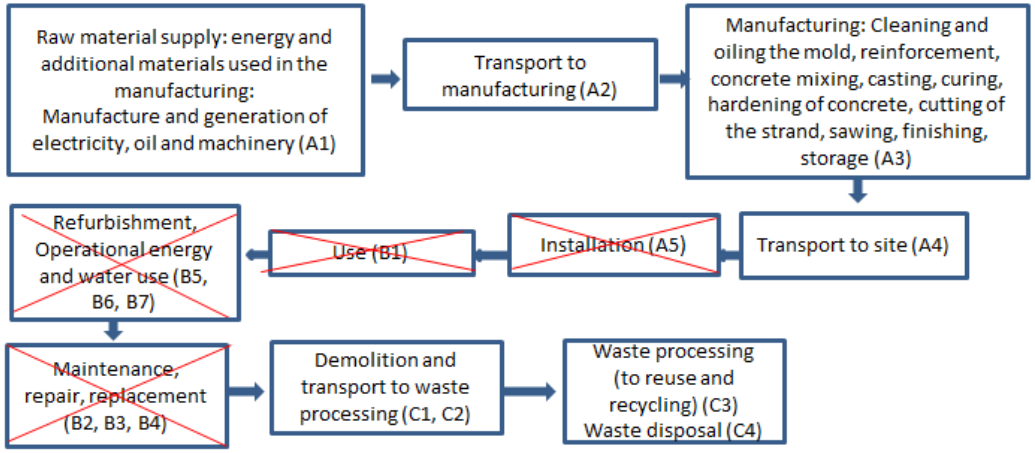
PRODUCT USE AND MAINTENANCE (B1-B7)

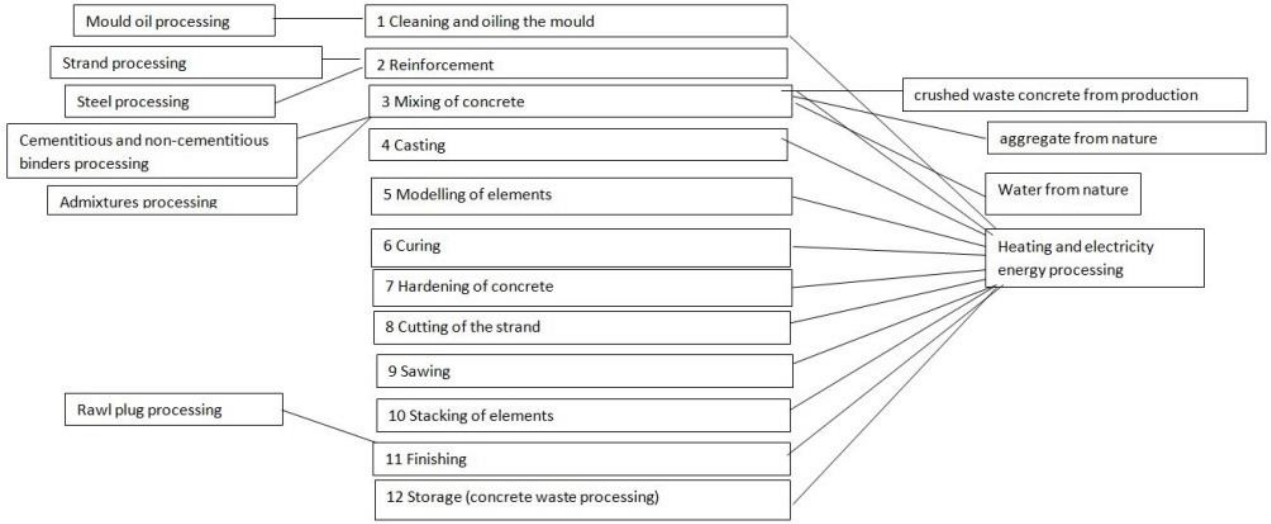
This EPD does not cover use phase. Air, soil and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life, in the demolition phase 100% of the waste is assumed to be collected as separate construction waste. The demolition process consumes energy in the form of diesel fuel used by building machines (C1). The dismantled hollow-core slab is delivered to the nearest construction waste treatment plant (C2). At the waste treatment plant, waste that can be reused, recycled or recovered for energy is separated and diverted for further use (C3). Unusable materials are disposed of in a landfill (C4). Due to the recycling potential of reinforcement steel and concrete, they can be used as secondary raw material. This avoids the use of virgin raw materials (D).

MANUFACTURING PROCESS





LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	Calendar year 2019

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 square meter
Mass per declared unit	485 kg

BIOGENIC CARBON CONTENT

The product does not contain biogenic carbon

SYSTEM BOUNDARY

This EPD covers cradle to gate with modules C1–C4 and module D; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	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 RTS PCR. The modules A5, B1-B7 have not been calculated nor included in the LCA calculations. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes which data are available for are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows do also not exceed 5% of energy usage or mass. The life cycle analysis includes all industrial processes from raw material acquisition to production, distribution and end-of-life stages.

For easier modelling and because of lack of accuracy in available modelling resources many constituents under 0,1% of product mass are excluded. These include for example cavity plugs which are all present in the product only in very small amounts and have no serious impact on the emissions of the product.

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

ALLOCATION, ESTIMATES AND ASSUMPTIONS

As it is impossible to collect raw material, ancillary material, energy consumption and waste production data separately for each product produced the in the plant, data is allocated. Allocation is based on annual production rate of P37 hollow core slab and made with high accuracy and precision.
The values for 1 square meter of element are calculated by considering the total product weight per annual production. In the factory, several kinds of concrete elements are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total raw materials, energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 485 kg and the corresponding amount of product is used in the calculations.
This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs. All estimations and assumptions are given below:

• Module A4: The transportation distance is defined according to RTS PCR. It was assumed that typical installation place is situated in the region of the production plant. Average distance of transportation from production plant to building site is equal to 53 km. Transportation method is assumed to be lorry. The transportation doesn't cause losses as products are packaged properly. Also, volume capacity utilisation factor is assumed to be 1 for the nested packaged products.

• Module C1: Energy consumption of a demolition process is on the average 1 l of diesel/ ton (Kivikolmio 2020). Therefore, energy consumption demolition is 4,9 kWh/ 485 kg. The source of energy is diesel fuel used by work machines.

• Module C2: It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed that it has the same weight with the declared product. All of the end-of-life product is assumed to be sent to the closest facilities such as recycling and landfill. Transportation distance to the closest disposal area is estimated as 40 km and the transportation method is lorry which is the most common.

• Module A2, A4 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emission in total results is small, the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients.

• Module C3: At the beginning of 2020 waste restrictions in Finland were tightened and the amount of waste going to landfill is restricted compared to the last years, so it can be assumed that 100% of low carbon hollow core slabs are transported to a waste treatment plant, where the slabs are crushed and steel is separated. About 99% of steel and concrete (Kivikolmio 2020) are recycled. The process losses of the waste treatment plant are assumed to be negligible. Share of losses in sorting process are assumed to be very small, about 1 %.

• Module C4: The remaining 1% of concrete and 1% of steel are assumed to be send to the landfill. Loss is minimal because products consist only of concrete and steel.

• Module D: The recycled 99% of concrete and 99% of steel are converted into a raw materials after recycling.

ENVIRONMENTAL IMPACT DATA

NOTE: ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930 ARE PRESENTED IN ANNEX.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEFImpact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change – total	kg CO2e	3,93E1	1,95E0	4,01E−1	4,17E1	3,33E0	MND	MND	MND	MND	MND	MND	MND	MND	1,62E0	2,54E0	1,98E0	2,56E−2	−4,77E0
Climate change – fossil	kg CO2e	3,89E1	1,95E0	3,96E−1	4,12E1	3,36E0	MND	MND	MND	MND	MND	MND	MND	MND	1,62E0	2,54E0	1,98E0	2,55E−2	−4,76E0
Climate change – biogenic	kg CO2e	4,01E−1	5,15E−5	2,75E−3	4,04E−1	−6,18E−4	MND	MND	MND	MND	MND	MND	MND	MND	1,19E−4	−4,67E−4	−4,3E−3	3,5E−5	−6,41E−3
Climate change – LULUC	kg CO2e	2,31E−2	6,17E−4	2,96E−3	2,67E−2	1,26E−3	MND	MND	MND	MND	MND	MND	MND	MND	1,36E−4	9,47E−4	2,42E−4	7,58E−6	−4,32E−3
Ozone depletion	kg CFC11e	2,35E−6	4,78E−7	7,17E−8	2,9E−6	7,82E−7	MND	MND	MND	MND	MND	MND	MND	MND	3,49E−7	5,9E−7	4,23E−7	1,05E−8	−3,43E−7
Acidification	mol H+e	1,23E−1	5E−3	1,96E−3	1,3E−1	8,07E−3	MND	MND	MND	MND	MND	MND	MND	MND	2,76E−3	6,09E−3	3,84E−3	1,2E−4	−2,05E−2
Eutrophication, aquatic freshwater	kg PO4e	8,15E−3	1,45E−4	1,13E−4	8,41E−3	2,68E−4	MND	MND	MND	MND	MND	MND	MND	MND	5,86E−5	2,02E−4	1,3E−4	2,64E−6	−2,61E−3
Eutrophication, aquatic marine	kg Ne	2,39E−2	7,36E−4	4,25E−4	2,5E−2	1,13E−3	MND	MND	MND	MND	MND	MND	MND	MND	3,71E−4	8,51E−4	5,02E−4	2,36E−5	−3,35E−3
Eutrophication, terrestrial	mol Ne	2,63E−1	7,88E−3	5,75E−3	2,76E−1	1,2E−2	MND	MND	MND	MND	MND	MND	MND	MND	3,97E−3	9,04E−3	5,41E−3	2,56E−4	−3,79E−2
Photochemical ozone formation	kg NMVOCe	7,84E−2	4,17E−3	1,53E−3	8,41E−2	6,16E−3	MND	MND	MND	MND	MND	MND	MND	MND	3,95E−3	4,65E−3	4,92E−3	1,05E−4	−1,31E−2
Abiotic depletion, minerals & metals	kg Sbe	5,49E−4	3,46E−5	1,98E−6	5,86E−4	9,1E−5	MND	MND	MND	MND	MND	MND	MND	MND	2,47E−6	6,86E−5	6,84E−6	2,33E−7	−3,72E−4
Abiotic depletion of fossil resources	MJ	3,07E2	3,13E1	5,3E0	3,43E2	5,16E1	MND	MND	MND	MND	MND	MND	MND	MND	2,2E1	3,89E1	2,69E1	7,11E−1	−6,47E1
Water use	m3e depr.	1,23E3	2,42E1	4,12E2	1,67E3	5,06E1	MND	MND	MND	MND	MND	MND	MND	MND	4,72E0	3,82E1	1,07E1	2,2E−1	−1,6E2

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

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

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,42E−6	1,67E−7	1,29E−7	1,72E−6	2,32E−7	MND	MND	MND	MND	MND	MND	MND	MND	4,14E−7	1,75E−7	2,39E−6	4,41E−9	−3,36E−7
Ionizing radiation, human health	kBq U235e	2,77E0	1,61E−1	3,94E−1	3,32E0	2,71E−1	MND	MND	MND	MND	MND	MND	MND	MND	1,01E−1	2,04E−1	1,29E−1	3,19E−3	−6,51E−1
Eco-toxicity (freshwater)	CTUe	3,48E0	1,33E0	6,34E−2	4,87E0	1,85E0	MND	MND	MND	MND	MND	MND	MND	MND	1,22E−1	1,4E0	2,13E−1	4,43E−3	−3,65E−1
Human toxicity, cancer effects	CTUh	3,44E−8	5,66E−10	2,05E−10	3,52E−8	1,07E−9	MND	MND	MND	MND	MND	MND	MND	MND	4,3E−10	8,09E−10	6,01E−10	9,88E−12	−5,44E−9
Human toxicity, non-cancer effects	CTUh	1,53E−6	3,8E−8	1,45E−8	1,59E−6	6,83E−8	MND	MND	MND	MND	MND	MND	MND	MND	9,05E−9	5,15E−8	2,31E−8	3,75E−10	1,95E−7
Land use related impacts/soil quality	-	6,36E2	4,7E1	4,65E−1	6,84E2	5,54E1	MND	MND	MND	MND	MND	MND	MND	MND	4,91E−1	4,18E1	8,35E−1	1,21E0	−3,57E1

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
Renewable PER used as energy	MJ	2,01E1	3,97E−1	8,23E0	2,87E1	7,64E−1	MND	MND	MND	MND	MND	MND	MND	MND	1,2E−1	5,77E−1	2,96E−1	5,77E−3	−3,98E0
Renewable PER used as materials	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renewable PER	MJ	2,01E1	3,97E−1	8,23E0	2,87E1	7,64E−1	MND	MND	MND	MND	MND	MND	MND	MND	1,2E−1	5,77E−1	2,96E−1	5,77E−3	−3,98E0
Non-renew. PER used as energy	MJ	3,47E2	3,19E1	1,05E1	3,89E2	5,27E1	MND	MND	MND	MND	MND	MND	MND	MND	2,21E1	3,98E1	2,72E1	7,18E−1	−7,41E1
Non-renew. PER used as materials	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-renewable PER	MJ	3,47E2	3,19E1	1,05E1	3,89E2	5,27E1	MND	MND	MND	MND	MND	MND	MND	MND	2,21E1	3,98E1	2,72E1	7,18E−1	−7,41E1
Use of secondary materials	kg	2,55E0	1,09E−2	3,19E−1	2,88E0	2,16E−2	MND	MND	MND	MND	MND	MND	MND	MND	1,09E−2	1,63E−2	2,88E0	1,94E−4	7,88E−1
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of non-renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	1,96E0	6,57E−3	2,38E−3	1,97E0	9,86E−3	MND	MND	MND	MND	MND	MND	MND	MND	1,96E−3	7,44E−3	2,72E−3	7,81E−4	−4,89E−1

PER abbreviation stands for 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	1,61E0	3,08E−2	1,98E−2	1,66E0	5,56E−2	MND	MND	MND	MND	MND	MND	MND	MND	2,39E−2	4,19E−2	3,34E−2	6,68E−4	−4,19E−1
Non-hazardous waste	Kg	3,92E1	3,39E0	5E−1	4,31E1	4,43E0	MND	MND	MND	MND	MND	MND	MND	MND	2,56E−1	3,34E0	6,09E−1	4,86E0	−1,22E1
Radioactive waste	Kg	1,23E−3	2,17E−4	9,32E−5	1,54E−3	3,56E−4	MND	MND	MND	MND	MND	MND	MND	MND	1,56E−4	2,69E−4	1,9E−4	4,72E−6	−2,14E−4

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 reuse	Kg	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	2,94E1	0E0	2,15E1	5,09E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	4,8E2	0E0	0E0
Materials for energy recovery	Kg	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	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
Climate change – total	kg CO2e	8,11E−2	4,02E−3	8,28E−4	8,59E−2	6,93E−3	MND	MND	MND	MND	MND	MND	MND	MND	3,33E−3	5,23E−3	4,08E−3	5,27E−5	−9,84E−3
Abiotic depletion, minerals & metals	kg Sbe	1,13E−6	7,14E−8	4,09E−9	1,21E−6	1,88E−7	MND	MND	MND	MND	MND	MND	MND	MND	5,09E−9	1,42E−7	1,41E−8	4,81E−10	−7,68E−7
Abiotic depletion of fossil resources	MJ	6,33E−1	6,45E−2	1,09E−2	7,08E−1	1,06E−1	MND	MND	MND	MND	MND	MND	MND	MND	4,53E−2	8,03E−2	5,55E−2	1,47E−3	−1,33E−1
Water use	m3e	4,05E−3	1,35E−5	4,9E−6	4,06E−3	2,03E−5	MND	MND	MND	MND	MND	MND	MND	MND	4,05E−6	1,53E−5	5,61E−6	1,61E−6	−1,01E−3
Use of secondary materials	kg	5,27E−3	2,25E−5	6,59E−4	5,95E−3	4,46E−5	MND	MND	MND	MND	MND	MND	MND	MND	2,25E−5	3,37E−5	5,95E−3	3,99E−7	1,62E−3
Biogenic carbon content in product	kg C	N/A	N/A	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	N/A
Biogenic carbon content in packaging	kg C	N/A	N/A	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	N/A

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Market for electricity, high voltage (Reference product: electricity, high voltage) Ecoinvent 3.6 Finland, year: 2019
Electricity CO2e / kWh	0.24
District heating data source and quality	Heat and power co-generation, wood chips, 6667 kw, state-of-the-art 2014 (Reference product: heat, district or industrial, other than natural gas) Ecoinvent 3.6 Finland year: 2019
District heating CO2e / kWh	0.0031
Natural gas data source and quality	Heat and power co-generation, natural gas, conventional power plant, 100mw electrical (Reference product: heat, district or industrial, natural gas) Ecoinvent 3.6, Finland, year: 2019
Natural gas CO2e / kWh	0,0279
Diesel data source and quality	Diesel, burned in diesel-electric generating set, 10mw (Reference product: diesel, burned in diesel-electric generating set, 10mw) Ecoinvent 3.6, Global, year: 2019
Diesel CO2e/kWh	0,09

Transport scenario documentation

Scenario parameter	Value
A4 specific transport CO2e emissions, kg CO2e / tkm	0,132
A4 average transport distance, km	53
A4 Capacity utilization (including empty return) %	100
A4 Bulk density of transported products kg/m3	970
A4 Volume capacity utilization factor %	100

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	485
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	480,15
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	4,85
Scenario assumptions e.g. transportation	End-of-life product is transported 40 km with an average lorry.

BIBLIOGRAPHY

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

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

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

Ecoinvent database v3.6

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

RTS PCR EN 15804:2019 RTS PCR in line with EN 15804+A2. Published by the Building Information Foundation RTS 26.8.2020.

ABOUT THE MANUFACTURER

Consolis Parma is leading precast concrete producer in Finland belonging to CONSOLIS group. The company operates in 16 locations with around 900 employees. www.parma.fi

CONSOLIS is a European leader in construction, public works and rail infrastructure, specialized in designing and manufacturing high-performance concrete solutions. www.consolis.com

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Consolis Parma
EPD author	Heini Saloinen
EPD verifier	Anni Oviir, Rangi Maja OÜ, www.lcasupport.com
EPD program operator	Building Information Foundation RTS sr / Building Information Ltd Malminkatu 16 A, 00100 Helsinki, Finland http://cer.rts.fi
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 Cementitious Products

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 potential	kg CO2e	3,84E1	1,93E0	3,91E−1	4,07E1	3,33E0	MND	MND	MND	MND	MND	MND	MND	MND	1,6E0	2,52E0	1,97E0	2,51E−2	−4,62E0
Depletion of stratospheric ozone	kg CFC11e	2,12E−6	3,8E−7	7,65E−8	2,58E−6	6,23E−7	MND	MND	MND	MND	MND	MND	MND	MND	2,76E−7	4,7E−7	3,35E−7	8,33E−9	−3,11E−7
Acidification	kg SO2e	1,24E−1	4,32E−3	1,52E−3	1,3E−1	7,02E−3	MND	MND	MND	MND	MND	MND	MND	MND	2,38E−3	5,3E−3	3,35E−3	1,01E−4	−1,78E−2
Eutrophication	kg PO4 3e	3,45E−2	8,53E−4	5,51E−4	3,59E−2	1,47E−3	MND	MND	MND	MND	MND	MND	MND	MND	4,2E−4	1,11E−3	7,14E−4	1,96E−5	−9,62E−3
Photochemical ozone formation	kg C2H4e	6,33E−3	2,43E−4	7,25E−5	6,65E−3	4,13E−4	MND	MND	MND	MND	MND	MND	MND	MND	2,46E−4	3,12E−4	3,15E−4	7,41E−6	−2,2E−3
Abiotic depletion of non-fossil res.	kg Sbe	5,49E−4	3,46E−5	1,98E−6	5,86E−4	9,1E−5	MND	MND	MND	MND	MND	MND	MND	MND	2,47E−6	6,86E−5	6,84E−6	2,33E−7	−3,72E−4
Abiotic depletion of fossil resources	MJ	3,07E2	3,13E1	5,3E0	3,43E2	5,16E1	MND	MND	MND	MND	MND	MND	MND	MND	2,2E1	3,89E1	2,69E1	7,11E−1	−6,47E1

ANNEX 2: A SCALING FACTOR TABLE.

A scaling factor in the table can be used to calculate results of the life cycle assessment in a situation where slab's own weight is different than 485 kg/m².

Hollow core slab	Design bearing area mm	Slab's own weight kg/m2	Scaling factor	Slab's weight with pointed joint kg/m2
GP18M	60	225	0,46	240
GP20	60	245	0,51	260
GP27	60	360	0,74	380
GP32	60	380	0,78	400
GP37	60	485	1	510
GP40	100	435	0,90	465
GP40R	100	475	0,98	505
GP50	100	560	1,15	600
GP50R	100	600	1,24	640