ENVIRONMENTAL PRODUCT DECLARATION

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

SOLID WALL

CONSOLIS PARMA

GENERAL INFORMATION

MANUFACTURER INFORMATION

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

PRODUCT IDENTIFICATION

Product name	Solid wall
Additional label(s)	SFS –EN 14992, FI TR15
Product number / reference	V
Place(s) of production	Nurmijärvi, Kotka, Iisalmi, Haapavesi, Nastola, Haukipudas, Finland

The Building Information Foundation RTS sr
EPDs within the same product category but from different programmes may not be comparable.

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	Building Information Foundation RTS sr / Building Information Ltd Malminkatu 16 A, 00100 Helsinki, Finland
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN15904 serves as the core PCR. In addition, the RTS PCR (Finnish version, 26.8.2020) 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	27.9.2021
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD number	RTS_151_21
Publishing date	6.10.2021
EPD valid until	30.9.2021

Jessica Karhu
RTS EPD Committee secretary

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Managing Director

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The product is precast concrete solid wall element with thickness of 200 mm and weight 500 kg/m². LCA results are applied to solid wall elements of different thicknesses (150mm, 160mm, 180mm, 220mm, 240mm and 260mm) by using the scaling factor table Annex 2.

PRODUCT APPLICATION

Concrete solid wall elements are mainly used as load bearing members of multi storey buildings.

TECHNICAL SPECIFICATIONS

The service life is 100 years.

PRODUCT STANDARDS

SFS -EN 14992+A1 Precast concrete products. Wall elements

PHYSICAL PROPERTIES OF THE PRODUCT

Typical physical properties: Material density 2500 kg/m3
Dimensions: according to the project based design, thickness 200 mm.

ADDITIONAL TECHNICAL INFORMATION

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

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Aggregate	391			Finland
Cementitious and non-cementitious binders	72	3		EU
Water	30			Finland
Reinforcement	6	98		Finland
Admixtures	1			Finland

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 concrete wall elements begins with the preparation of the casting mould, which includes cleaning the casting surface. At the next phase, the reinforcement bars and (meshes) are put into place. When the reinforcement and other inserts are in place, fresh concrete is poured to the mould. After casting and (surface finishing), the element is left to cure. When the element is cured the element is demoulded. The final stage is finishing the product and transporting to the storage.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts from final product delivery to construction site (A4) cover direct fuel exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. Optional A5 module is not declared.

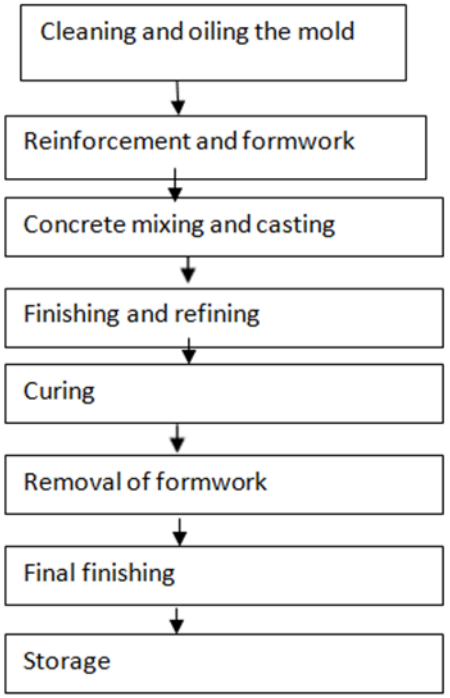
PRODUCT USE AND MAINTENANCE (B1-B7)

Use phase is not declared. 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 demolished solid wall element 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 2020

DECLARED UNIT

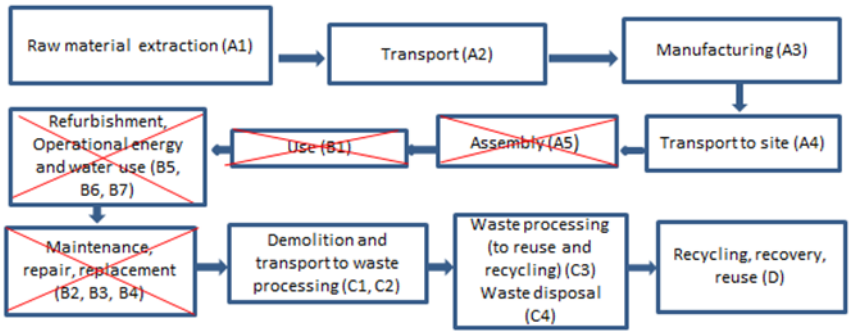
Declared unit	1 m²
Mass per declared unit	500 kg/m²

BIOGENIC CARBON CONTENT

The product does not contain biogenic carbon at the factory gate

SYSTEM BOUNDARY

This EPD covers cradle to gate with module A4, 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 1% of product mass are excluded. These include for example lifting loops 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

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.

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 solid wall 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 factories, 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 and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 500 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 87 km. Transportation method is assumed to be lorry. The transportation doesn't cause losses as products are fixed properly. Also, volume capacity utilisation factor is assumed to be 1

for the product.

• Module C1: Energy consumption of a demolition process is on the average 1 l of diesel/ ton (Kivikolmio 2020). Therefore, energy consumption demolition is 5 kWh/ 500 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 solid wall 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.

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.

AVERAGES AND VARIABILITY

This EPD has average data for six sites of production which differs less than 10% between factories/plants covered in this EPD. The averaging of the data between each of the factories for similar products for modules A1-A3 is done by doing all of the calculations and data gathering for each factory separately and then averaging the obtained data. Weighted average has been made based on production tons of each factory.

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	6,58E1	4,89E0	3,86E0	7,45E1	5,49E0	MND	MND	MND	MND	MND	MND	MND	MND	1,65E0	2,55E0	2,1E0	2,64E-2	-4,26E0
GWP – fossil	kg CO2e	6,48E1	4,89E0	3,69E0	7,33E1	5,54E0	MND	MND	MND	MND	MND	MND	MND	MND	1,65E0	2,55E0	2,1E0	2,63E-2	-4,21E0
GWP – biogenic	kg CO2e	9,83E-1	2,97E-3	1,49E-1	1,14E0	3,4E-3	MND	MND	MND	MND	MND	MND	MND	MND	4,58E-4	1,56E-3	-7,86E-3	5,22E-5	-4,91E-2
GWP – LULUC	kg CO2e	1,78E-2	1,73E-3	1,4E-2	3,36E-2	1,96E-3	MND	MND	MND	MND	MND	MND	MND	MND	1,39E-4	9E-4	3,32E-4	7,82E-6	-5,26E-3
Ozone depletion pot.	kg CFC11e	2,86E-6	1,12E-6	5,89E-7	4,57E-6	1,27E-6	MND	MND	MND	MND	MND	MND	MND	MND	3,56E-7	5,84E-7	4,44E-7	1,08E-8	-3,71E-7
Acidification potential	mol H+e	1,85E-1	2,07E-2	9,73E-3	2,16E-1	2,28E-2	MND	MND	MND	MND	MND	MND	MND	MND	1,72E-2	1,05E-2	2,22E-2	2,5E-4	-2,72E-2
EP-freshwater[2)]	kg Pe	1,09E-3	4,22E-5	6,83E-5	1,2E-3	4,79E-5	MND	MND	MND	MND	MND	MND	MND	MND	6,66E-6	2,2E-5	1,8E-5	3,18E-7	-2,69E-4
EP-marine	kg Ne	4,63E-2	6,09E-3	2,46E-3	5,49E-2	6,76E-3	MND	MND	MND	MND	MND	MND	MND	MND	7,61E-3	3,11E-3	9,43E-3	8,61E-5	-5,72E-3
EP-terrestrial	mol Ne	5,45E-1	6,73E-2	2,91E-2	6,41E-1	7,47E-2	MND	MND	MND	MND	MND	MND	MND	MND	8,35E-2	3,43E-2	1,04E-1	9,48E-4	-7,51E-2
POCP (“smog”)	kg NMVOCe	1,45E-1	2,1E-2	1,01E-2	1,77E-1	2,35E-2	MND	MND	MND	MND	MND	MND	MND	MND	2,3E-2	1,08E-2	2,85E-2	2,75E-4	-1,94E-2
ADP-minerals & metals	kg Sbe	5,71E-4	1,22E-4	1,41E-5	7,07E-4	1,38E-4	MND	MND	MND	MND	MND	MND	MND	MND	2,52E-6	6,36E-5	1,11E-5	2,41E-7	-4,47E-4
ADP-fossil resources	MJ	3,59E2	7,45E1	8,13E1	5,14E2	8,46E1	MND	MND	MND	MND	MND	MND	MND	MND	2,27E1	3,89E1	2,9E1	7,36E-1	-5,92E1
Water use[1)]	m3e depr.	1,24E1	2,65E-1	4E-1	1,31E1	3E-1	MND	MND	MND	MND	MND	MND	MND	MND	4,23E-2	1,38E-1	7,91E-2	3,4E-2	-7,28E0

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	1,53E-6	3,76E-7	8,56E-8	1,99E-6	4,28E-7	MND	MND	MND	MND	MND	MND	MND	MND	4,57E-7	1,97E-7	2,51E-6	4,86E-9	-3,21E-7
Ionizing radiation[3)]	kBq U235e	1,62E0	3,26E-1	1,03E0	2,98E0	3,7E-1	MND	MND	MND	MND	MND	MND	MND	MND	9,72E-2	1,7E-1	1,26E-1	3,02E-3	-3,66E-1
Ecotoxicity (freshwater)	CTUe	5,2E2	5,82E1	3,36E1	6,12E2	6,6E1	MND	MND	MND	MND	MND	MND	MND	MND	1,33E1	3,04E1	2,44E1	4,65E-1	-8,08E1
Human toxicity, cancer	CTUh	7,19E-8	1,65E-9	9,71E-10	7,45E-8	1,87E-9	MND	MND	MND	MND	MND	MND	MND	MND	4,77E-10	8,6E-10	7,79E-10	1,1E-11	-4,6E-9
Human tox. non-cancer	CTUh	2,31E-6	6,67E-8	1,95E-8	2,4E-6	7,58E-8	MND	MND	MND	MND	MND	MND	MND	MND	1,17E-8	3,48E-8	2,41E-8	3,39E-10	-6,27E-8
SQP	-	7,71E2	8,28E1	1,91E0	8,56E2	9,42E1	MND	MND	MND	MND	MND	MND	MND	MND	5,82E-1	4,33E1	1,2E0	1,25E0	-4,04E1

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	2,45E1	1,05E0	1,46E1	4,02E1	1,2E0	MND	MND	MND	MND	MND	MND	MND	MND	1,23E-1	5,52E-1	4,64E-1	5,95E-3	-5,07E0
Renew. PER as material	MJ	0E0	0E0	1,21E0	1,21E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	2,45E1	1,05E0	1,58E1	4,14E1	1,2E0	MND	MND	MND	MND	MND	MND	MND	MND	1,23E-1	5,52E-1	4,64E-1	5,95E-3	-5,07E0
Non-re. PER as energy	MJ	3,48E2	7,45E1	8,13E1	5,04E2	8,46E1	MND	MND	MND	MND	MND	MND	MND	MND	2,27E1	3,89E1	2,9E1	7,36E-1	-5,92E1
Non-re. PER as material	MJ	1,08E1	0E0	0E0	1,08E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	3,59E2	7,45E1	8,13E1	5,14E2	8,46E1	MND	MND	MND	MND	MND	MND	MND	MND	2,27E1	3,89E1	2,9E1	7,36E-1	-5,92E1
Secondary materials	kg	5,42E0	0E0	1,28E-3	5,42E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	7,45E-2
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. 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	2,43E0	1,41E-2	1,33E-2	2,46E0	1,6E-2	MND	MND	MND	MND	MND	MND	MND	MND	2E-3	7,37E-3	3,21E-3	8,05E-4	-5,76E-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	2,24E0	7,78E-2	1,13E-1	2,44E0	8,8E-2	MND	MND	MND	MND	MND	MND	MND	MND	2,44E-2	4,05E-2	0E0	6,87E-4	-3,73E-1
Non-hazardous waste	Kg	4,82E1	6,43E0	2,36E0	5,69E1	7,31E0	MND	MND	MND	MND	MND	MND	MND	MND	2,61E-1	3,36E0	0E0	5E0	-1,29E1
Radioactive waste	Kg	1,68E-3	5,1E-4	4,9E-4	2,68E-3	5,78E-4	MND	MND	MND	MND	MND	MND	MND	MND	1,59E-4	2,66E-4	0E0	4,87E-6	-2,66E-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 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	0E0	0E0	5,52E0	5,52E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	4,95E2	0E0	0E0
Materials for energy rec	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
GWP – total	kg CO2e	1,32E-1	9,79E-3	7,71E-3	1,49E-1	1,11E-2	MND	MND	MND	MND	MND	MND	MND	MND	3,3E-3	5,1E-3	4,19E-3	5,28E-5	-8,52E-3
ADP-minerals & metals	kg Sbe	1,14E-6	2,43E-7	2,82E-8	1,41E-6	2,77E-7	MND	MND	MND	MND	MND	MND	MND	MND	5,03E-9	1,27E-7	2,22E-8	4,81E-10	-8,95E-7
ADP-fossil	MJ	7,17E-1	1,49E-1	1,63E-1	1,03E0	1,69E-1	MND	MND	MND	MND	MND	MND	MND	MND	4,54E-2	7,78E-2	5,79E-2	1,47E-3	-1,18E-1
Water use	m3e depr.	2,48E-2	5,3E-4	8E-4	2,62E-2	6,01E-4	MND	MND	MND	MND	MND	MND	MND	MND	8,46E-5	2,76E-4	1,58E-4	6,81E-5	-1,46E-2
Secondary materials	kg	1,08E-2	0E0	2,56E-6	1,08E-2	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	1,49E-4
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	2,72E-3	2,72E-3	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	Electricity, high voltage, production mix (Reference product: electricity, high voltage), Finland, Ecoinvent 3.6, year: 2019
Electricity CO2e / kWh	0.23
District heating data source and quality	Market for heat, district or industrial, natural gas (Reference product: heat, district or industrial, natural gas) Finland, Ecoinvent 3.6, year: 2019
District heating CO2e / kWh	0.11
Diesel data source and quality	Diesel, burned in diesel-electric generating set, 10mw (Reference product: diesel, burned in diesel-electric generating set, 10mw) Finland, Ecoinvent 3.6, Global, year: 2019
Diesel CO2e/kWh	0.09
Natural gas data source and quality	Heat production, natural gas, at boiler condensing modulating >100kw (Reference product: heat, district or industrial, natural gas) Finland,
	Ecoinvent 3.6, year: 2019
Natural gas CO2 / kWh	0.0641 kg CO2e / MJ
Fuel oil data source and quality	Heat production, light fuel oil, at boiler 100kw condensing, non-modulating (Reference product: heat, central or small-scale, other than natural gas) Finland, Ecoinent 3.6, year: 2019
Fuel oil CO2 / kWh	0.0862 kg CO2e / MJ

Transport scenario documentation (A4)

Scenario parameter	Value
Specific transport CO2e emissions, kg CO2e / tkm	0,132
Average transport distance, km	87
Capacity utilization (including empty return) %	100
Bulk density of transported products	2500 kg/m3
Volume capacity utilization factor	100

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	500
Collection process – kg collected with mixed waste	-
Recovery process – kg for re-use	-
Recovery process – kg for recycling	495
Recovery process – kg for energy recovery	-

Scenario parameter	Value
Disposal (total) – kg for final deposition	5
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 (2019) and One Click LCA database.

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

The CEN standard EN 15804+A2 serves as the core PCR. In addition, the RTS PCR (Finnish version, 26.8.2020) is used.

Solid wall LCA background report 23.07.2021

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	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 Cementitious 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	22.9.2021
EPD verification completed on	27.9.2021
Approver of the EPD verifier	The Building Information Foundation RTS

Author & tool verification	Answer
EPD author	Heini Saloinen, Consolis Parma
EPD author training completion	30.9.2020
EPD Generator module	Cementitious Products
Independent software verifier	Anni Oviir, Rangi Maja OÜ
Software verification date	27.6.2020

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.

Silvia Vilčeková, Silcert, s.r.o.

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	6,42E1	4,85E0	3,62E0	7,26E1	5,49E0	MND	MND	MND	MND	MND	MND	MND	MND	1,64E0	2,53E0	2,09E0	2,58E-2	-4,11E0
Ozone depletion Pot.	kg CFC11e	2,56E-6	8,91E-7	5,56E-7	4E-6	1,01E-6	MND	MND	MND	MND	MND	MND	MND	MND	2,82E-7	4,65E-7	3,52E-7	8,59E-9	-3,38E-7
Acidification	kg SO2e	1,35E-1	1,04E-2	7,45E-3	1,53E-1	1,13E-2	MND	MND	MND	MND	MND	MND	MND	MND	2,43E-3	5,19E-3	3,99E-3	1,04E-4	-1,69E-2
Eutrophication	kg PO4 3e	4,6E-2	2,13E-3	2,38E-3	5,05E-2	2,35E-3	MND	MND	MND	MND	MND	MND	MND	MND	4,29E-4	1,08E-3	9,6E-4	2,02E-5	-9,22E-3
POCP (“smog”)	kg C2H4e	6,41E-3	6,54E-4	3,81E-4	7,44E-3	7,3E-4	MND	MND	MND	MND	MND	MND	MND	MND	2,51E-4	3,36E-4	3,49E-4	7,64E-6	-1,44E-3
ADP-elements	kg Sbe	5,71E-4	1,22E-4	1,41E-5	7,07E-4	1,38E-4	MND	MND	MND	MND	MND	MND	MND	MND	2,52E-6	6,36E-5	1,11E-5	2,41E-7	-4,47E-4
ADP-fossil	MJ	3,59E2	7,45E1	8,13E1	5,14E2	8,46E1	MND	MND	MND	MND	MND	MND	MND	MND	2,27E1	3,89E1	2,9E1	7,36E-1	-5,92E1

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 wall's own weight is different than 500 kg/m².

Wall's thickness m	Weight kg/m²	Scaling factor
0,15	375	0,75
0,16	400	0,8
0,18	450	0,9
0,20	500	1
0,22	550	1,1
0,24	600	1,2
0,26	650	1,3

ANNEX 3 : ENVIRONMENTAL IMPACTS – TRACI 2.1. / 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	6,41E1	4,84E0	3,63E0	7,26E1	5,48E0	MND	MND	MND	MND	MND	MND	MND	MND	1,63E0	2,52E0	2,08E0	2,57E-2	-4,08E0
Ozone Depletion	kg CFC11e	3,23E-6	1,19E-6	7,25E-7	5,14E-6	1,35E-6	MND	MND	MND	MND	MND	MND	MND	MND	3,76E-7	6,19E-7	4,7E-7	1,15E-8	-4,48E-7
Acidification	kg SO2e	1,59E-1	1,8E-2	8,32E-3	1,85E-1	1,99E-2	MND	MND	MND	MND	MND	MND	MND	MND	1,58E-2	9,13E-3	2,03E-2	2,22E-4	-2,3E-2
Eutrophication	kg Ne	1,66E-2	2,49E-3	9,45E-4	2,01E-2	2,8E-3	MND	MND	MND	MND	MND	MND	MND	MND	1,39E-3	1,29E-3	1,8E-3	2,65E-5	-3,08E-3
POCP (“smog”)	kg O3e	2,92E0	3,86E-1	1,53E-1	3,46E0	4,28E-1	MND	MND	MND	MND	MND	MND	MND	MND	4,85E-1	1,97E-1	6E-1	5,47E-3	-3,54E-1
ADP-fossil	MJ	3,1E1	1,06E1	7,57E0	4,92E1	1,21E1	MND	MND	MND	MND	MND	MND	MND	MND	3,35E0	5,55E0	4,19E0	1,07E-1	-4,42E0