ENVIRONMENTAL PRODUCT DECLARATION

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

DELTABEAM® COMPOSITE BEAM, PAINTED

PEIKKO FINLAND OY

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Peikko Finland Oy
Address	Voimakatu 3, P.O.Box 104, 15101 LAHTI, FINLAND
Contact details	jaakko.yrjola@peikko.com
Website	www.peikko.com

PRODUCT IDENTIFICATION

Product name	DELTABEAM® Composite Beam, Painted
Place(s) of production	Finland

The Building Information Foundation RTS sr

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

Jessica Karhu
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 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, RTS PCR (Finnish version, 26.8.2020) is used.
EPD author	Patience Wanjala, Peikko Group Oy.
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	09.06.2021
EPD verifier	Anni Oviir, Rangi Maja OÜ, www.lcasupport.com
EPD number	RTS_131_21
ECO Platform nr.	-
Publishing date	23.6.2021
EPD valid until	9.6.2026

PRODUCT INFORMATION

PRODUCT DESCRIPTION

This EPD represents primed DELTABEAM® Composite Beam produced at Peikko facility in Lahti, Finland.
DELTABEAM® is a structural element which can be combined with all general concrete slabs and timber.

PRODUCT APPLICATION

DELTABEAM® is designed to be used as a structural element combined with all general concrete slab types: hollow-core slab, filigran slabs, composite steel decking, trapezoidal steel decking slabs, and cast-in-situ concrete slabs. It enables the usage of shallow element structures and strengthens the frame structure inside the slab.

TECHNICAL SPECIFICATIONS

DELTABEAM® consists of steel plates welded together into a delta kind of shape. It is a steel structural element which can be combined with all general concrete slabs, steel decking and wooden slabs. It is integrated into the floor and filled with concrete on-site. The infill concrete and DELTABEAM® form a composite structure after the concrete has hardened. DELTABEAM® acts as a steel beam before the infill concrete has reached the required strength.
The EPD calculations do not cover concrete used at the construction site.
DELTABEAM® products are ordered by clients as custom projects. The market area is Nordic countries and Europe. Each DELTABEAM® is designed individually. Typical linear density of the product is 50 – 800 kg/m. This EPD is valid for an average DELTABEAM® project order with an average material composition (production based). As the materials in the product are scaled based on the products geometry, there is only a low variance. Peikko declares in the quotation the total amount of CO2-emission of DELTABEAM® in the appropriate project, according to this EPD.

PRODUCT STANDARDS

DELTABEAM® Composite Beam is CE marked through harmonized standard EN 1090-1

PHYSICAL PROPERTIES OF THE PRODUCT

Detailed technical information can be found from manufacturers webpages at:
https://www.peikko.com/products/product/deltabeam-product-information/.

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.peikko.com.

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Steel plate	0.890	25	0	EU
Rebar	0.100	97	0	EU
Welding filler metal	0.006	0	0	EU
Paint	0.005	0	0	EU

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	100	EU
Minerals	0	-
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)

A1

The environmental impacts of raw material supply (A1) include emissions generated when raw materials are taken from nature, transported to industrial units for processing and processed, along with waste handling from the various production processes. All major upstream processes are taken into consideration, including infrastructure. Loss of raw material and energy transmission losses are also taken into account. This stage includes all the aforementioned for the raw materials which end up in the final product (i.e. steel, welding filler and packaging) as well as the electricity and heat production which are consumed during the manufacturing at the plant.

A2

The considered transportation impacts (A2) include exhaust emissions resulting from the transport of all raw materials from suppliers to Finland Peikko production plant as well as the environmental impacts of production of the used diesel. The manufacturing, maintenance and disposal of the vehicles as well as tire and road wear during transportation have also been included. The transportation distances and methods were provided mainly by Peikko Finland Oy.

A3

The environmental impacts considered for the production stage (A3) cover the manufacturing of the production materials (welding gases and blasting steel shots) and fuels used by machines. Also handling of waste formed in the production processes at the production plant is covered. The environmental impacts of this stage have been calculated using the most recent data in regard to what applied in the factory. The data is from the year 2020. The study considers the losses of main raw materials occurring during the manufacturing process.

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. DELTABEAM® transportation is taking place in the capital region. Since the transportation is from manufacturing site in Lahti to construction site in Helsinki, it is assumed as 110 km and the transportation method is assumed to be lorry. Transportation does not cause losses as product are packaged properly. Also, volume capacity utilisation factor is assumed to be 1 for the nested packaged products.

A5

Wood pallets used for transportation of products to client is accounted for in A5. It is assumed that the pallets are incinerated at the nearest municipal incineration plant for energy recovery. The distance is assumed as 50km and the transportation method assumed to be lorry. This is an average distance which considers the fact that according to the scenario A4 products are situated in

Finland and distance to recycling, landfill and incineration facilities is not very long.

PRODUCT USE AND MAINTENANCE (B1-B7)

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

PRODUCT END OF LIFE (C1-C4, D)

End of life stage includes deconstruction/demolition (C1), transport to waste processing (C2), waste processing for reuse, recovery and/or recycling (C3) and disposal (C4).

C1
Demolition is assumed to take 0.01 kWh/kg of element. It is assumed that 100% of waste is collected.

C2
Distance for transportation to treatment is assumed as 50 km and the transportation method is assumed to be lorry. This is an average distance which considers the fact that according to the scenario A4 products are situated in Finland and distance to recycling and landfill facilities is not very long.

C3
95% of steel is assumed to be recycled based on World Steel Association, 2020.

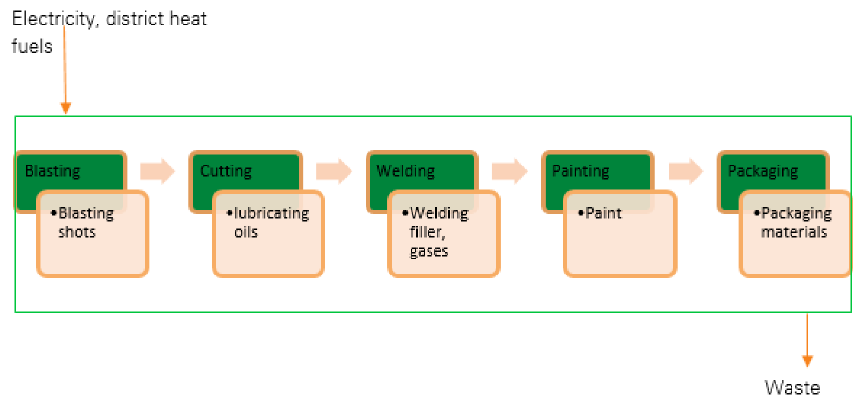
C4
It is assumed that 5% of steel is taken to landfill for final disposal.

D
Due to the recycling process the end-of-life product is converted into a recycled steel (D).

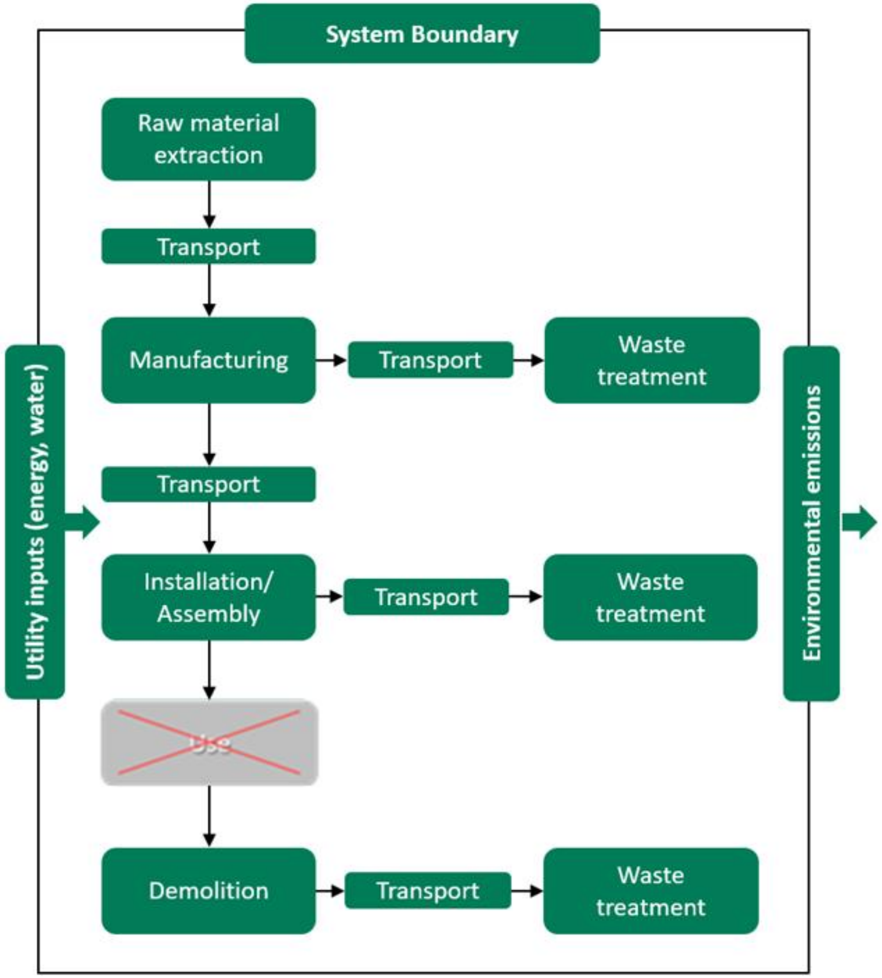
MANUFACTURING PROCESS

The steel materials are blasted to wanted surface conditions using cast iron steel shots and cut to required shapes. Hydraulic oils, cutting emulsions and other lubricants are used during the process to reduce the wear of machines and to ensure stable cutting conditions. The final products are welded from the different steel components. The welding process consumes welding fillers as well as shielding gases. The finished products are then painted and sent to the construction sites. The manufacturing process requires electricity and fuels for the different equipment as well as heating, unless district heating can be used. The steel wasted produced at the plant is directed into recycling. The material loss is considered.

Technical flow diagram:



Life cycle stages diagram:



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2020

DECLARED AND FUNCTIONAL UNIT

Declared unit	1kg of DELTABEAM®, painted
Mass per declared unit	1kg

MASS TABLE FOR PRODUCT VARIATIONS

D-TYPE PRODUCT SIZE	MASS PER UNIT LENGTH
D20-200	105.39 kg/m
D22-400	161.32 kg/m
D26-300	138.12 kg/m
D26-400	168.97 kg/m
D37-400	186.05 kg/m
D40-500	216.42 kg/m
D50-600	257.87 kg/m

*Steel plate thickness ranges up to 30mm, an average thickness of 15mm was used.

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0.0
Biogenic carbon content in packaging, kg C	0.0045

SYSTEM BOUNDARY

This EPD covers the *cradle to gate with options* scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly) 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	x	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 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. Processes excluded from the assessment and the related cut-off criteria are provided in table below:

Process excluded from study	Cut-off criteria	Quantified contribution from process
Weight loss (waste streams) of ancillary materials (oils, cut liquids etc.)	Mass	< 1.0 %
Mixed waste	Mass	< 0.9 %
Other waste streams (paper waste, energy waste etc.)	Mass	< 0.6 %
Chemicals (paints, thinners)	Mass	< 0.6 %

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.

Since the plant produces more than one product type, it is impractical to collect raw material and energy consumption data separately for each product produced, data is therefore allocated. Allocation is based on physical properties, through the annual production rate and is made with high accuracy and precision.

The values for 1 kg of the product, which is used within the study, are calculated by considering the total production output (kg) for the product per annual production output (kg) of the plant. Since the production processes of the products produced in the plant are similar, the annual production output percentages are taken into consideration for allocation. According to the ratio of the annual production output of the declared product to the total annual production output at the factory, the annual total energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 1 kg and the corresponding amount of product is used in calculations.

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.

ESTIMATIONS AND ASSUMPTIONS

This LCA study is conducted in accordance with 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 A2, A4 & C2: Vehicle capacity utilization factor is assumed to be 1, which means fully loaded lorries. It may vary in reality, but since the impact of the transportation emissions to the total results is small, variety in load is assumed to be negligible. Returns without delivered load are not taken into account as it is assumed that return trip is used by transportation company to serve needs of other clients.

• Module A4: The transportation distance is defined according to RTS PCR. It was assumed that typical construction site is situated in the district of the production plant. The transportation distance from manufacturing plant to construction site in Helsinki is assumed as 110 km and the transportation method is assumed to be lorry. According to producer, transportation doesn't cause losses as products are packaged properly. Also, volume capacity utilization factor is assumed to be 1 for the packaged products.

• Module C1: Energy consumption of demolition process is on the average 10 kWh/m2 (Bozdag, Ö. & Secer, M. 2007). Based on Level(s) project, an average mass of concrete building is about 1000 kg/m2. Thus, energy consumption of demolition is 10 kWh / 1000 kg = 0.01 kWh/kg.

• 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 50 km and the transportation method is assumed as lorry, which is the most common.

• Module C3: 95% of steel (World Steel Association. 2020) is recycled.

• Module C4: The remaining 5% of steel is assumed to be landfilled.

• Module D: Due to the recycling process, the end-of-life product is assumed to be converted into a recycled steel.

ENVIRONMENTAL IMPACT DATA

Note: ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930 are presented in annex.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Climate change – total	kg CO2e	2,22E0	2,91E−1	1,24E−1	2,63E0	9,59E−3	2,14E−2	MND	3,3E−3	4,36E−3	5,45E−2	2,64E−4	−9,04E−1
Climate change – fossil	kg CO2e	2,22E0	2,91E−1	1,41E−1	2,65E0	9,68E−3	1,45E−4	MND	3,3E−3	4,35E−3	5,45E−2	2,63E−4	−9,11E−1
Climate change – biogenic	kg CO2e	−2,98E−3	2,21E−4	−1,86E−2	−2,13E−2	7,34E−6	2,13E−2	MND	9,17E−7	3,3E−6	1,51E−5	5,22E−7	6,76E−3
Climate change – LULUC	kg CO2e	9,44E−4	9,14E−5	9,48E−4	1,98E−3	3,04E−6	2,81E−8	MND	2,79E−7	1,37E−6	4,6E−6	7,82E−8	2,52E−5
Ozone depletion	kg CFC11e	1,29E−7	7,15E−8	2,05E−8	2,21E−7	2,38E−9	1,17E−11	MND	7,12E−10	1,07E−9	1,18E−8	1,08E−10	−2,42E−8
Acidification	mol H+e	9,62E−3	9,36E−4	6,14E−4	1,12E−2	3,11E−5	1,64E−6	MND	3,45E−5	1,4E−5	5,7E−4	2,5E−6	−3,51E−3
Eutrophication, aquatic freshwater[2)]	kg Pe	1,07E−4	2,47E−6	5,98E−6	1,15E−4	8,22E−8	1,94E−9	MND	1,33E−8	3,7E−8	2,2E−7	3,18E−9	−3,66E−5
Eutrophication, aquatic marine	kg Ne	1,9E−3	2,06E−4	1,51E−4	2,25E−3	6,84E−6	7,75E−7	MND	1,52E−5	3,08E−6	2,52E−4	8,61E−7	−6,92E−4
Eutrophication, terrestrial	mol Ne	2,09E−2	2,29E−3	1,78E−3	2,49E−2	7,61E−5	8,24E−6	MND	1,67E−4	3,43E−5	2,76E−3	9,48E−6	−7,32E−3
Photochemical ozone formation	kg NMVOCe	1,08E−2	8,99E−4	4,84E−4	1,22E−2	2,99E−5	2,03E−6	MND	4,59E−5	1,34E−5	7,59E−4	2,75E−6	−4,78E−3
Abiotic depletion, minerals & metals	kg Sbe	1,22E−5	5,18E−6	4,34E−7	1,78E−5	1,72E−7	1,91E−9	MND	5,03E−9	7,75E−8	8,32E−8	2,41E−9	−9,04E−7
Abiotic depletion of fossil resources	MJ	2,44E1	4,73E0	3,52E0	3,27E1	1,57E−1	1,27E−3	MND	4,54E−2	7,07E−2	7,49E−1	7,36E−3	−6,72E0
Water use[1)]	m3e depr.	8,62E−1	1,76E−2	5,06E−2	9,3E−1	5,84E−4	−1,13E−4	MND	8,46E−5	2,63E−4	1,4E−3	3,4E−4	−1,29E−1

1) 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. 2) 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-B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,87E−7	2,55E−8	6,39E−9	2,19E−7	8,49E−10	1,7E−11	MND	9,14E−10	3,82E−10	1,51E−8	4,86E−11	−6,45E−8
Ionizing radiation, human health[3)]	kBq U235e	5,83E−2	2,07E−2	6,89E−2	1,48E−1	6,87E−4	2,09E−6	MND	1,94E−4	3,09E−4	3,21E−3	3,02E−5	1,03E−2
Eco-toxicity (freshwater)	CTUe	6,14E1	3,61E0	2,04E0	6,71E1	1,2E−1	2,26E−3	MND	2,66E−2	5,4E−2	4,4E−1	4,65E−3	−2,98E1
Human toxicity, cancer effects	CTUh	1,32E−8	9,1E−11	4,52E−11	1,33E−8	3,02E−12	4,02E−13	MND	9,53E−13	1,36E−12	1,58E−11	1,1E−13	−1,98E−10
Human toxicity, non-cancer effects	CTUh	1,62E−7	4,12E−9	1,13E−9	1,68E−7	1,37E−10	2,19E−11	MND	2,35E−11	6,17E−11	3,88E−10	3,39E−12	1,54E−7
Land use related impacts/soil quality	-	4,34E0	7,13E0	1,35E−1	1,16E1	2,37E−1	3,3E−4	MND	1,16E−3	1,07E−1	1,92E−2	1,25E−2	−1,62E0

3) 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

ENVIRONMENTAL IMPACTS – TRACI 2.1. / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential	kg CO2e	2,08E0	2,88E−1	1,39E−1	2,51E0	9,58E−3	1,42E−4	MND	3,26E−3	4,31E−3	5,38E−2	2,57E−4	−8,4E−1
Ozone depletion	kg CFC11e	1,58E−7	7,57E−8	2,93E−8	2,63E−7	2,52E−9	1,24E−11	MND	7,51E−10	1,13E−9	1,24E−8	1,15E−10	−3,11E−8
Acidification	kg SO2e	8,06E−3	7,9E−4	5,23E−4	9,37E−3	2,63E−5	1,52E−6	MND	3,16E−5	1,18E−5	5,22E−4	2,22E−6	−2,93E−3
Eutrophication	kg Ne	1,22E−3	1,36E−4	6,7E−5	1,42E−3	4,52E−6	6,08E−7	MND	2,79E−6	2,03E−6	4,6E−5	2,65E−7	−4,38E−4
Photochemical Smog Formation	kg O3e	1,12E−1	1,3E−2	9,5E−3	1,35E−1	4,32E−4	4,73E−5	MND	9,69E−4	1,94E−4	1,6E−2	5,47E−5	−3,96E−2
Depletion of non-renewable energy	MJ	1,3E0	6,77E−1	1,55E−1	2,13E0	2,25E−2	1,69E−4	MND	6,71E−3	1,01E−2	1,11E−1	1,07E−3	−1,06E−1

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Renewable PER used as energy4)	MJ	1,29E0	5,95E−2	9,08E−1	2,26E0	1,98E−3	2,91E−5	MND	2,45E−4	8,9E−4	4,05E−3	5,95E−5	8,93E−2
Renewable PER used as materials	MJ	0E0	0E0	1,97E−1	1,97E−1	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Total use of renewable PER	MJ	1,29E0	5,95E−2	1,11E0	2,46E0	1,98E−3	2,91E−5	MND	2,45E−4	8,9E−4	4,05E−3	5,95E−5	8,93E−2
Non-renew. PER used as energy	MJ	2,44E1	4,73E0	3,52E0	3,27E1	1,57E−1	1,27E−3	MND	4,54E−2	7,07E−2	7,49E−1	7,36E−3	−6,72E0
Non-renew. PER used as materials	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-renewable PER	MJ	2,44E1	4,73E0	3,52E0	3,27E1	1,57E−1	1,27E−3	MND	4,54E−2	7,07E−2	7,49E−1	7,36E−3	−6,72E0
Use of secondary materials	kg	4,95E−1	0E0	1,49E−4	4,95E−1	0E0	0E0	MND	0E0	0E0	0E0	0E0	4,26E−1
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Use of non-renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	1,75E−2	9,84E−4	9,26E−4	1,94E−2	3,27E−5	2,55E−6	MND	4,01E−6	1,47E−5	6,62E−5	8,05E−6	−6,04E−3

4) PER abbreviation stands for primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Hazardous waste	Kg	4,11E−1	4,59E−3	8,19E−3	4,23E−1	1,53E−4	5,43E−5	MND	4,88E−5	6,87E−5	0E0	6,87E−6	−1,09E−1
Non-hazardous waste	Kg	4,22E0	5,08E−1	2,18E−1	4,94E0	1,69E−2	9,95E−3	MND	5,22E−4	7,6E−3	0E0	5E−2	−1,23E0
Radioactive waste	Kg	5,58E−5	3,25E−5	3,18E−5	1,2E−4	1,08E−6	2,8E−9	MND	3,18E−7	4,86E−7	0E0	4,87E−8	4,93E−6

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Components for reuse	Kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	0E0	0E0	2,64E−1	2,64E−1	0E0	0E0	MND	0E0	0E0	9,5E−1	0E0	0E0
Materials for energy recovery	Kg	0E0	0E0	0E0	0E0	0E0	1E−2	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	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-B7	C1	C2	C3	C4	D
Climate change – total	kg CO2e	2,22E0	2,91E−1	1,24E−1	2,63E0	9,69E−3	2,14E−2	MND	3,3E−3	4,36E−3	5,45E−2	2,64E−4	−9,04E−1
Abiotic depletion, minerals & metals	kg Sbe	1,22E−5	5,18E−6	4,34E−7	1,78E−5	1,72E−7	1,91E−9	MND	5,03E−9	7,75E−8	8,32E−8	2,41E−9	−9,04E−7
Abiotic depletion of fossil resources	MJ	2,44E1	4,73E0	3,52E0	3,27E1	1,57E−1	1,27E−3	MND	4,54E−2	7,07E−2	7,49E−1	7,36E−3	−6,72E0
Water use	m3e depr.	8,62E−1	1,76E−2	5,06E−2	9,3E−1	5,84E−4	−1,13E−4	MND	8,46E−5	2,63E−4	1,4E−3	3,4E−4	−1,29E−1
Use of secondary materials	kg	4,95E−1	0E0	1,49E−4	4,95E−1	0E0	0E0	MND	0E0	0E0	0E0	0E0	4,26E−1
Biogenic carbon content 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
Biogenic carbon content in packaging	kg C	N/A	N/A	4,5E−3	4,5E−3	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	Electricity, high voltage, production mix (Reference product: electricity, high voltage), Finland, Ecoinvent 3,6, year: 2019
Electricity CO2e / kWh	0.23 kg CO2 eq. /kWh
District heating data source and quality	Heat and power co-generation, natural gas, conventional power plant, 100mw electrical (Reference product: heat, district, or industrial, natural gas), Finland, Ecoinvent 3,6, year: 2019
District heating CO2e / kWh	0.11 kg CO2 eq. /kWh

Transport scenario documentation (A4)

Scenario parameter	Value
Specific transport CO2e emissions, kg CO2e / tkm	0.0863
Average transport distance, km	110
Capacity utilization (including empty return) %	100
Bulk density of transported products kg/m3	7000
Volume capacity utilization factor %	100

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1
Collection process – kg collected with mixed waste	-
Recovery process – kg for re-use	-
Recovery process – kg for recycling	0.95
Recovery process – kg for energy recovery	-
Disposal (total) – kg for final deposition	0.05
Scenario assumptions e.g. transportation	End-of-life product is transported 50 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, RTS PCR (Finnish version, 26.8.2020) is used.

DELTABEAM® Composite Beam, Painted LCA background report 24.05.2021

DATA REFERENCES

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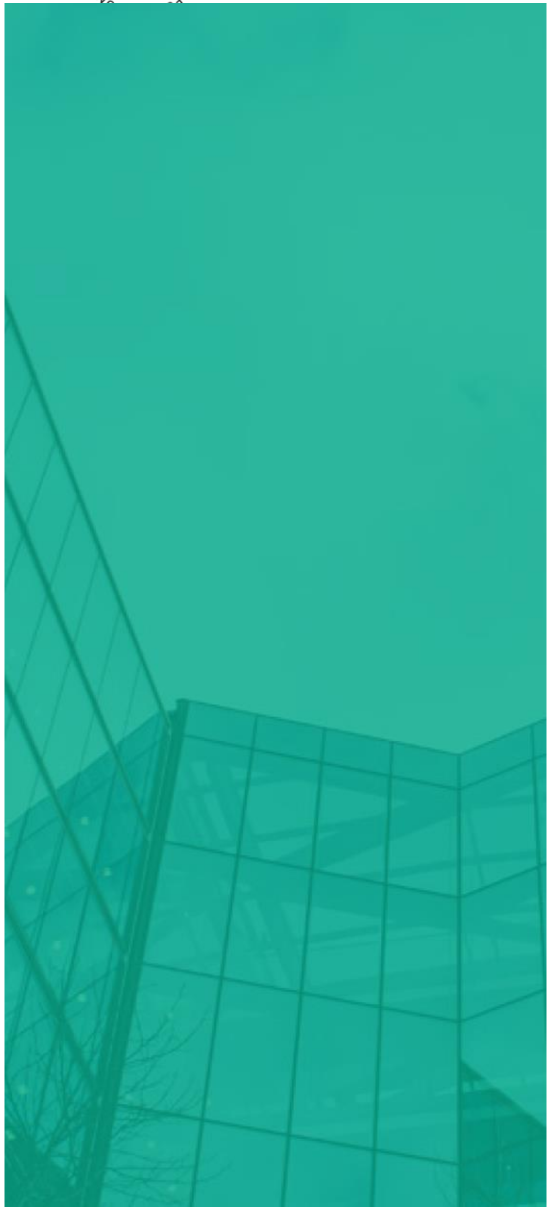

ABOUT THE MANUFACTURER

www.peikko.com.
Peikko manufactures and supplies a large selection of concrete connections and composite beams for both precast and cast-in-situ solutions in a wide variety of applications.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Peikko Finland Oy
EPD author	Patience Wanjala, Peikko Group Oy.
EPD verifier	Anni Oviir, Rangi Maja OÜ, www.lcasupport.com
EPD program operator	The Building Information Foundation RTS sr 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 Primary Steel and Aluminium and all Metal-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	Anni Oviir, Rangi Maja OÜ
EPD verification started on	6.6.2021
EPD verification completed	9.6.2021
Approver of the EPD verifier	The Building Information Foundation RTS sr

Author & tool verification	Answer
EPD author	Patience Wanjala, Peikko Group Oy.
EPD author training completion	21.5.2021
EPD Generator module	Primary Steel and Aluminium and all Metal-Based Products
Independent software verifier	Anni Oviir, Rangi Maja OÜ
Software verification date	25.9.2020

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.

Signature

Anni Oviir, Rangi Maja OÜ, www.lcasupport.com

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

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential	kg CO2e	2,13E0	2,88E−1	1,39E−1	2,56E0	9,59E−3	1,42E−4	MND	3,27E−3	4,32E−3	5,41E−2	2,58E−4	−8,67E−1
Depletion of stratospheric ozone	kg CFC11e	1,17E−7	5,68E−8	2,34E−8	1,97E−7	1,89E−9	9,81E−12	MND	5,63E−10	8,5E−10	9,31E−9	8,59E−11	−2,14E−8
Acidification	kg SO2e	7,32E−3	6,18E−4	3,95E−4	8,33E−3	2,06E−5	1,14E−6	MND	4,87E−6	9,25E−6	8,04E−5	1,04E−6	−2,76E−3
Eutrophication	kg PO4 3e	4,27E−3	1,25E−4	1,76E−4	4,57E−3	4,15E−6	1,28E−6	MND	8,57E−7	1,87E−6	1,42E−5	2,02E−7	−1,53E−3
Photochemical ozone formation	kg C2H4e	1,37E−3	3,56E−5	1,92E−5	1,43E−3	1,18E−6	2,36E−8	MND	5,01E−7	5,32E−7	8,28E−6	7,64E−8	−7,13E−4
Abiotic depletion of non-fossil res.	kg Sbe	1,22E−5	5,18E−6	4,34E−7	1,78E−5	1,72E−7	1,91E−9	MND	5,03E−9	7,75E−8	8,32E−8	2,41E−9	−9,04E−7
Abiotic depletion of fossil resources	MJ	2,44E1	4,73E0	3,52E0	3,27E1	1,57E−1	1,27E−3	MND	4,54E−2	7,07E−2	7,49E−1	7,36E−3	−6,72E0