



Rakennustietosäätiö RTS sr -
The Building Information
Foundation RTS

RTS EPD,
No. RTS_23_19
DELTABEAM

Scope of the declaration

This environmental product declaration covers the environmental impacts of DELTABEAM. The declaration has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 2.6.2016). This declaration covers the life cycle stages from cradle-to-gate as well as deconstruction, transportation, treatment and recovery of the product at its end-of-life.

RAKENNUSTIETO

25.2.2019
The Building Information
Foundation RTS
Malminkatu 16 A
00100 Helsinki

<http://epd.rts.fi>



Committee secretary



RTS Director General





General information, declaration scope and verification (7.1)

1. Owner of the declaration, manufacturer

Peikko Group Corporation
R. Kalantos g. 49, Kaunas 52303, Lithuania
+370 606 65415
Zygimantas.Kacinskas@peikko.com

2. Product name and number

DELTABEAM

3. Place of production

The EPD represents the average DELTABEAM manufactured at Peikko Group plant in Lithuania (Kaunas)

4. Additional information

peikko@peikko.com

5. Product Category Rules and the scope of the declaration

This EPD has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards together with the RTS PCR (English version, 2.6.2016). Product specific category rules have not been applied in this EPD. EPD of construction materials may not be comparable if they do not comply with EN 15804 and seen in a building context.

6. Author of the life-cycle assessment and declaration

Anastasia Sipari
Bionova Engineering, Hämeentie 31, 00500 Helsinki,
Finland

7. Verification

This EPD has been verified according to the requirements of ISO 14025:2010, EN 15804:2012+A1:2013 and RTS PCR by a third party. The verification has been carried out by verifier MSc Anni Oviir according to the above mentioned standard. One Click LCA Services OÜ, Mustamäe tee 44, 10621, Tallin Harjumaa Estonia +358 40 6475628

8. Declaration issue and validity

18.2.2019 - 18.2.2024

European standard EN 15804: 2014 A1 serves as the core PCR

Independent verification of the declaration and data, according to ISO14025:2010

Internal

External

Third party verifier:

Anni Ovir (MSc), One Click LCA Services OÜ



Product information

9. Product description

This EPD represents DELTABEAM produced in Peikko Group facility in Lithuania, Kaunas. DELTABEAM is a structural element which can be combined with all general concrete slabs. The market area is Nordic countries and Europe.

10. Technical specifications

DELTABEAM is a slim-floor composite beam which is integrated into the floor. The beam is completely 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. DELTABEAMS are ordered by clients as custom projects. This EPD is valid for an average DELTABEAM project order with the an average material composition (production based). As the materials in DELTABEAM are scaled based on the products geometry, there is only a low variance

11. Product standards

DELTABEAMS are CE marked through harmonized standard EN 1090-1.

12. Physical properties

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

13. Raw-materials of the product

Product structure / composition / raw-material	Amount %
Rebar, non-renewable, contain scrap, EU	2%
Steel plate, non-renewable, contain scrap, EU	97%
Steel profiles and welding filler metal, non-renewable, contain scrap, EU	1,4%
Paint, non-renewable, EU	<1%

14. Substances under European Chemicals Agency's REACH, SVHC restrictions

Name	EC Number	CAS Number
The product does not contain REACH SVHC substances.		

15. Functional / declared unit

1 kg of DELTABEAM

16. System boundary

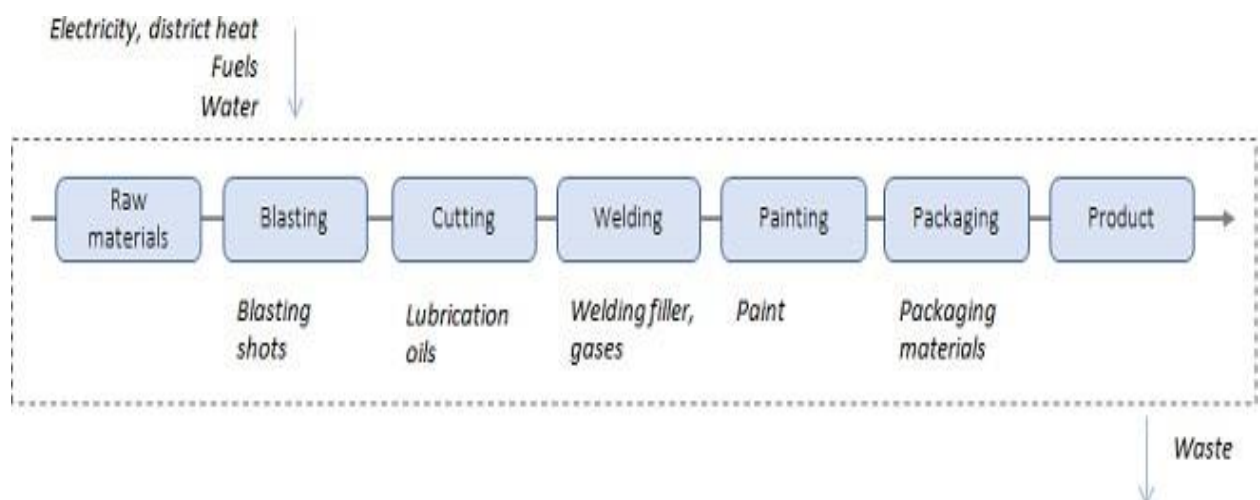
This EPD covers the following modules; A1 (Raw material supply), A2 (Transport), A3 (Manufacturing) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary - have been included.

17. Cut-off criteria

All used materials, energy, packing and transportation until the end-of-waste state have been included. A1-A3 results have been provided as an aggregate. Information for modules A4, A5 and B has not been presented or included in the LCA calculation. Of module C all impacts have been calculated (C1-C4). C1 includes the deconstruction using a hydraulic digger. The distance for C2 has been estimated to be 20 km. C3 includes the treatment of the product (90%). C4 includes the landfilling of the product which cannot be separated (10%). Module D considers the benefits of recycled scrap which replaces virgin steel in steel profiles production.

18. Production 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 lubrication oils 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 gases used as shielding. The ready products are then painted and packaged for shipping. The manufacturing process requires electricity and fuels for the different equipment as well as heating, unless district heating is used. The steel waste produced at the plant is directed into recycling. The loss of material is considered.



Scope of the Life-Cycle Assessment (7.2.1-2)

Mark all the covered modules of the EPD with X. Mandatory modules are marked with blue in the table below. This declaration covers "cradle-to-gate with options". For other fields mark MND (module not declared) or MNR (module not relevant)

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	MNR	MNR	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

	Mandatory modules
	Mandatory as per the RTS PCR section 6.2.1 rules and terms
	Optional modules based on scenarios

Environmental impacts and raw-material use (7.2.3-7.2.4)

19. Environmental impacts

The LCIA results indicate that most of the impact categories are dominated by the impacts of the raw materials. These results are supported by the fact that over 95 w% of the raw materials are different steel products; the manufacturing of steel products consume large amounts of energy, their impact on the environment can be significant depending on the use of scrap materials. The scrap contents of the used steel materials are the following (World Steel Association, 2015); plate 11.3 w%, profiles 85 w%

Environmental impact										
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Global warming potential	kg CO2 -eqv	2,84E0	7,32E-2	1,21E-1	3,04E0	MND	MND	MND	MND	MND
Depletion of stratospheric ozone layer	kg CFC11-eqv	1,73E-7	1,65E-8	9,28E-9	1,99E-7	MND	MND	MND	MND	MND
Formation of photochemical ozone	kg C2H4 -eqv	1,68E-3	1,19E-5	3,54E-5	1,72E-3	MND	MND	MND	MND	MND
Acidification	kg SO2 -eqv	2,26E-2	3,76E-4	4,16E-4	2,34E-2	MND	MND	MND	MND	MND
Eutrophication	kg PO4 3--eqv	9,89E-3	8,74E-5	9,06E-5	1,01E-2	MND	MND	MND	MND	MND
Abiotic depletion of non fossil resources	kg Sb-eqv	3,82E-5	3,07E-7	1,65E-7	3,87E-5	MND	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	2,89E1	1,97E0	1,61E0	3,25E1	MND	MND	MND	MND	MND

Environmental impact										
Parameter	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential	kg CO ₂ -eqv	MND	MND	MND	MND	5,77E-2	1,54E-2	1,3E-2	1,06E-3	-9,62E-1
Depletion of stratospheric ozone layer	kg CFC11-eqv	MND	MND	MND	MND	1,06E-8	3,4E-9	2,19E-9	2,72E-10	-7,61E-8
Formation of photochemical ozone	kg C ₂ H ₄ -eqv	MND	MND	MND	MND	1,17E-5	2,34E-6	1,96E-6	3,4E-7	-5,11E-4
Acidification	kg SO ₂ -eqv	MND	MND	MND	MND	4,38E-4	7,85E-5	1,9E-5	7,3E-6	-1,09E-2
Eutrophication	kg PO ₄ 3--eqv	MND	MND	MND	MND	1E-4	1,8E-5	3,9E-6	2,2E-6	-3,06E-3
Abiotic depletion of non fossil resources	kg Sb-eqv	MND	MND	MND	MND	1,79E-8	4,06E-8	1,75E-9	1,4E-9	-9,46E-6
Abiotic depletion of fossil resources	MJ	MND	MND	MND	MND	8,43E-1	4,17E-1	1,71E-1	2,5E-2	-1,06E1

20. Use of natural resources

Resource use										
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Renewable primary energy resources used as energy carrier	MJ	3,22E0	2,76E-2	5,37E-2	3,31E0	MND	MND	MND	MND	MND
Renewable primary energy resources used as raw materials	MJ	0E0	0E0	2,32E-3	2,32E-3	MND	MND	MND	MND	MND
Total use of renewable primary energy resources	MJ	3,22E0	2,76E-2	5,6E-2	3,31E0	MND	MND	MND	MND	MND
Nonrenewable primary energy resources used as energy carrier	MJ	3,31E1	2,11E0	1,49E0	3,67E1	MND	MND	MND	MND	MND
Nonrenewable primary energy resources used as materials	MJ	1,87E-2	0E0	1,11E-2	2,98E-2	MND	MND	MND	MND	MND
Total use of nonrenewable primary energy resources	MJ	3,31E1	2,11E0	1,5E0	3,68E1	MND	MND	MND	MND	MND
Use of secondary materials	kg	1,66E-1	0E0	4,6E-4	1,66E-1	MND	MND	MND	MND	MND
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND
Use of nonrenewable secondary fuels	MJ	0E0	0E0	7,51E-5	7,51E-5	MND	MND	MND	MND	MND
Use of net fresh water	m ³	5,25E-3	6,7E-5	2,92E-3	8,23E-3	MND	MND	MND	MND	MND

Resource use										
Parameter	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	MND	MND	MND	MND	4,94E-3	4,93E-3	1,3E-2	7,88E-4	-1,2E0
Renewable primary energy resources used as raw materials	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renewable primary energy resources	MJ	MND	MND	MND	MND	4,94E-3	4,93E-3	1,3E-2	7,88E-4	-1,2E0
Nonrenewable primary energy resources used as energy carrier	MJ	MND	MND	MND	MND	8,97E-1	4,44E-1	1,85E-1	2,72E-2	-1,33E1
Nonrenewable primary energy resources used as materials	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of nonrenewable primary energy resources	MJ	MND	MND	MND	MND	8,97E-1	4,44E-1	1,85E-1	2,72E-2	-1,33E1
Use of secondary materials	kg	MND	MND	MND	MND	5,95E-6	0E0	0E0	0E0	-5,46E-1
Use of renewable secondary fuels	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of nonrenewable secondary fuels	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m ³	MND	MND	MND	MND	2,61E-5	1,27E-5	8E-6	2,69E-6	-2,06E-3

21. End of life - Waste

Waste										
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Hazardous waste	kg	7,8E-4	7,37E-7	2,32E-3	3,1E-3	MND	MND	MND	MND	MND
Non-hazardous waste	kg	1,06E0	1,74E-1	1,39E-2	1,24E0	MND	MND	MND	MND	MND
Radioactive waste	kg	7,33E-5	9,82E-6	3,4E-6	8,65E-5	MND	MND	MND	MND	MND

Waste										
Parameter	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	MND	MND	MND	MND	3,61E-7	1,39E-7	4,6E-8	2,01E-8	-5,18E-5
Non-hazardous waste	kg	MND	MND	MND	MND	9,01E-4	3,03E-2	7,52E-5	1E-1	-3,56E-1
Radioactive waste	kg	MND	MND	MND	MND	5,95E-6	2E-6	1,23E-6	1,55E-7	-4,48E-5

22. End of life - Output flow

Output flow										
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Components for reuse	kg	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND
Materials for recycling	kg	7,9E-8	0E0	1,36E-1	1,36E-1	MND	MND	MND	MND	MND
Materials for energy recovery	kg	0E0	0E0	1,53E-5	1,53E-5	MND	MND	MND	MND	MND
Exported energy	MJ	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND

Output flow										
Parameter	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for reuse	kg	MND	MND	MND	MND	0E0	0E0	0E0	0E0	
Materials for recycling	kg	MND	MND	MND	MND	0E0	0E0	9E-1	0E0	
Materials for energy recovery	kg	MND	MND	MND	MND	0E0	0E0	0E0	0E0	
Exported energy	MJ	MND	MND	MND	MND	0E0	0E0	0E0	0E0	

Scenarios and additional technical information (7.3)

23. Energy in the manufacturing phase (7.3. A3)

manufacturing plant does not use district heating

Object	Value	Data quality
A3 data quality of electricity and CO2 emission kg CO2 eq. / kWh	Lithuania: 0,51	Based on country specific fuel mixes for the production year 2016 from IEA (2016). Imported electricity has been considered. The environmental impacts of the fuels are based on ecoinvent 3.3 database. The impacts include all upstream processes as well as transmission losses.

Manufacturing plant does not use district heating.

24. End-of-life process description (7.3.4)

Processes	Unit (expressed per functional unit or per declared unit of components products or materials and by type of material)	Amount kg/kg Data quality
Collection process specified by type	kg collected separately	1
	kg collected with mixed construction waste	-
Recovery system specified by type	kg for re-use	-
	kg for recycling	0,9*
	kg for energy recovery	-
Disposal specified by type	kg product or material for final deposition	0,1*
Assumptions for scenario development, transportation e.g.	units as appropriate	Transportation distance estimation based on average recycling facility locations; 250 km

*Deltabeam is a rather new product due to which no known demolition cases exist at this point. The following realistic scenario based on existing waste handling technologies has been provided by the manufacturer for the end-of-life; Deltabeam is collected from the demolition site and the bottom steel sheet is cut off. The concrete beam (incl. rebar) is removed from inside the steel sheets. The concrete is crushed in order to remove the rebar inside. Conservative estimation is that 90% of the steel is recovered while 10% is landfilled (estimation based on Stålbyggnadsinstitutet (n.d.)).

25. Additional information (7.4)

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

26. 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. EN 15804:2012+A1 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products. RTS PCR 2.6.2016 RTS PCR protocol: EPDs published by the Building Information Foundation RTS sr. PT 18 RT EPD Committee. (English version)