



Rakennustietosäätiö RTS RTS EPD,
Building Information No.RTS_63_20
Foundation RTS DELTABEAM® Green, Galvanized

Scope of the declaration

This environmental product declaration covers the environmental impacts of galvanized DELTABEAM® Green. 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, 14.6.2018). 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

29.4.2020
Building Information Foundation
RTS
Malminkatu 16 A
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<http://epd.rts.fi>



Laura Sariola
Committee secretary



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RTS General Director



General information, declaration scope and verification (7.1)

1. Owner of the declaration, manufacturer

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Voimakatu 3, P.O.Box 104, 15101 LAHTI, FINLAND
Veikko Mattila
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2. Product name and number

DELTABEAM® Green, galvanized

3. Place of production

The EPD represents the average DELTABEAM® Green galvanized manufactured at Peikko plant in Lahti, Finland

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, 14.6.2018). 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 Oy

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 Teija Käpynen, Vahanen Environment Oy.

8. Declaration issue and validity

29.4.2020 Valid :20.4.2020-20.4.2025

European standard EN 15804: 2014 A1 serves as the core PCR	
Independent verification of the declaration and data, according to ISO14025:2010	
<input type="checkbox"/> Internal	<input checked="" type="checkbox"/> External
Third party verifier: Teija Käpynen Vahanen Environment Oy	



Product information

9. Product description

This EPD represents galvanized DELTABEAM® Green produced at Peikko facility in Lahti, Finland. The EPD calculations do not cover concrete used at the construction site.

DELTABEAM® Green 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® Green 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. The EPD calculations do not cover concrete used at the construction site.

DELTABEAM®-products are ordered by clients as custom projects. 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.

11. Product standards

DELTABEAM® Green is CE marked through harmonized standard EN 1090-1.

12. Physical properties

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

13. Raw-materials of the product

Product structure / composition / raw-material	Amount %
Steel plate	83,3 %
Rebar	9,3 %
Welding filler metal	1,0 %
Zinc	6,4 %

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® Green, galvanized

16. System boundary

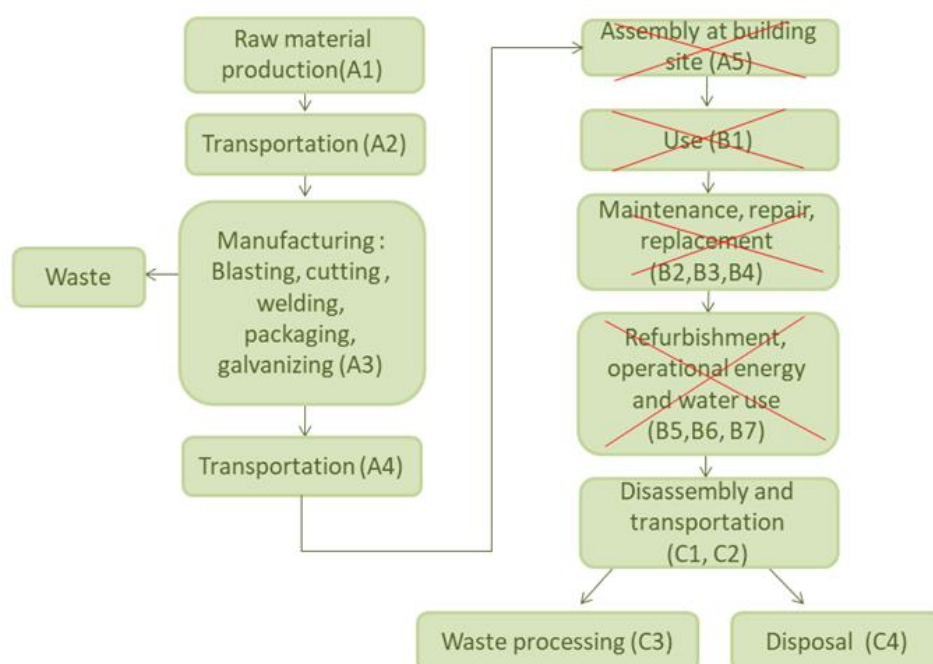
This EPD covers the following modules; A1 (Raw material supply), A2 (Transport), A3 (Manufacturing) and A4 (Transportation of the product to the building) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads 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. Consumption of auxiliary chemicals used in hot dip galvanizing process is estimated to be very small (below 1% of A3 module material flows) and so wasn't taken into account in calculations. A1-A3 results have been provided as an aggregate. DELTABEAM® Green galvanising is taking place in the capital region. Transportation distance from Peikko to galvanizing site is 110 km and from galvanizing site to construction site in Helsinki is 10 km. 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 100 km. C3 includes the treatment of the product. C4 includes the landfilling of the product which cannot be separated. 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 packaged for shipping and sent for galvanizing. 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	x	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 results of a life cycle assessment are relative. They do not predict impact on category endpoints, exceeding of limit values, safety margins, or risks. The impacts are presented per declared unit, 1 kg of product. The LCIA results indicate that most of the impact categories are dominated by the impacts of the raw materials. The scrap contents of the DELTABEAM® Green galvanized is 93,2 %

Environmental impact								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential	kg CO ₂ -eqv	1,56E+0	1,42E-3	3,34E-3	8,29E-3	8,07E-2	0E0	-1,31E-1
Depletion of stratospheric ozone layer	kg CFC11-eqv	1,91E-7	1,71E-10	5,99E-10	1,71E-9	1,45E-8	0E0	-6,65E-9
Formation of photochemical ozone	kg C ₂ H ₄ -eqv	4,94E-4	4,05E-7	6,66E-7	1,27E-6	1,61E-5	0E0	-9,17E-5
Acidification	kg SO ₂ -eqv	8,54E-3	1,97E-5	2,52E-5	2,11E-5	6,08E-4	0E0	-5,29E-4
Eutrophication	kg PO ₄ 3--eqv	1,37E-3	1,21E-5	5,41E-6	2,91E-6	1,31E-4	0E0	-5,56E-5
Abiotic depletion of non fossil resources	kg Sb-eqv	2,05E-3	2,85E-8	2,24E-9	5,38E-8	5,43E-8	0E0	-1,73E-7
Abiotic depletion of fossil resources	MJ	2,53E+1	1,75E-2	4,78E-2	1,36E-1	1,16E+0	0E0	-1,75E+0

20. Use of natural resources

Resource use								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	3,09E-1	2,09-2	0E0	2,45E-3	0E0	0E0	0E0
Renewable primary energy resources used as raw materials	MJ	3,37E+0	0E0	2,79E-4	0E0	6,75E-3	0E0	-4,78E-2
Total use of renewable primary energy resources	MJ	3,68E+0	2,09-2	2,79E-4	2,45E-3	6,75E-3	0E0	-4,78E-2
Nonrenewable primary energy resources used as energy carrier	MJ	4,71E+0	1,86E-2	0E0	1,40E-1	0E0	0E0	0E0
Nonrenewable primary energy resources used as materials	MJ	2,47E+1	0E0	4,82E-2	0E0	1,17E+0	0E0	-1,81E+0
Total use of non-renewable primary energy resources	MJ	2,94E+1	1,86E-2	4,82E-2	1,40E-1	1,17E+0	0E0	-1,81E+0
Use of secondary materials	kg	1,42E+0	2,85E-4	1,49E-5	5,86E-5	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	1,12E-6	0E0	0E0	0E0	0E0	0E0	0E0
Use of non-renewable secondary fuels	MJ	1,24E-1	9,79E-5	8,60E-5	2,21E-4	2,08E-3	0E0	-1,30E-1
Use of net fresh water	m3	2,60E-2	8,45E-5	6,76E-6	3,05E-5	1,64E-4	0E0	-8,04E-4

21. End of life - Waste

Waste								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	8,36E-4	7,81E-7	7,64E-6	3,68E-6	1,85E-4	0E0	-2,78E-5
Non-hazardous waste	kg	5,32E-1	2,27E-3	2,53E-5	1,21E-2	6,13E-4	0E0	-6,25E-3
Radioactive waste	kg	1,89E-4	7,73E-8	3,38E-7	9,94E-7	8,17E-6	0E0	-2,32E-6

22. End of life - Output flow

Output flow								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for reuse	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	2,47E-1	5,22E-8	1,46E-8	5,59E-8	1,00E+0	0E0	-1,59E-6
Materials for energy recovery	kg	2,76E-10	2,50E-11	3,45E-16	2,72E-15	8,34E-15	0E0	-1,56E-14
Exported energy	MJ	0E0	0E0	0E0	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	FI 0,24	The environmental impact of average Finnish electricity in Finland is based on the ecoinvent 3.4 database resource "Market for electricity, medium voltage", Finland, 2018

24. Transport from production place to user (7.3.2 A4)

Variable	Amount	Data quality
Fuel type and consumption in liters / 100 km	50	Data source:lipasto.vtt.fi
Transportation distance km	10	Manufacturer data
Transport capacity utilization %	100	Assumption
Bulk density of transported products kg/m³	vary	Manufacturer data
Volume capacity utilization factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	1	Assumption

25. 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	0
Recovery system specified by type	kg for re-use	0
	kg for recycling	1
	kg for energy recovery	0
Disposal specified by type	kg product or material for final deposition	0
Assumptions for scenario development, e.g. transportation	units as appropriate	Transportation distance estimation based on average recycling facility locations; 100 km

24. Additional information (7.4)

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

25. 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 14.6.2018 RTS PCR protocol: EPDs published by the Building Information Foundation RTS sr. PT 18 RT EPD Committee. (English version)