

# ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	VikØrsta AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
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## CT-Bolt® M20 x 3000 mm - B500NC CombiCoat®

VikØrsta AS



[www.epd-norge.no](http://www.epd-norge.no)



## General information

<b>Product:</b> CT-Bolt® M20 x 3000 mm - B500NC CombiCoat®	<b>Owner of the declaration:</b> Vikørsta AS Contact person: Teknisk sjef - Jan Olav Hoggen Phone: 0047 95170854 e-mail: jan.olav.hoggen@vikorsta.no
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<b>Declaration number:</b> NEPD-2619-1330-EN	<b>Place of production:</b> Vik Ørsta AS, Skorgeura Nørestranda 383 , 6152 Ørsta Norway
<b>ECO Platform reference number:</b>	<b>Management system:</b> NS-EN ISO 9001:2015 NS-EN ISO 14001:2015
<b>This declaration is based on Product Category Rules:</b> CEN Standard EN 15804:2012+A1:2013 serves as core PCR NPCR 013:2019 Part B for Steel and aluminium construction products	<b>Organisation no:</b> 985001952
<b>Statement of liability:</b> The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.	<b>Issue date:</b> 06.01.2021 <b>Valid to:</b> 06.01.2026
<b>Declared unit:</b> 1 Pcs CT-Bolt® M20 x 3000 mm - B500NC CombiCoat®	<b>Year of study:</b> 2020
<b>Declared unit with option:</b> A1,A2,A3,A4,A5,C1,C2,C3,C4,D	<b>Comparability:</b> EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.
<b>Functional unit:</b> Complete 3m pre-assembled CT-bolt system	<b>Development and verification of EPD:</b> The declaration has been developed and verified using EPD tool lca.tools ver EPD2020.11, developed by LCA.no AS. The EPD tool is integrated into the company's environmental management system, and has been approved by EPD-Norway
<b>General information on verification of EPD from EPD tools:</b> Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Individual third party verification of each EPD is not required when the EPD tool is i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPDNorway, and iii) the process is reviewed annually. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools.	Developer of EPD: Stig Robert Sporstøl Reviewer of company-specific input data and EPD: Atle Årseth
<b>Verification of EPD tool:</b> Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools. Ellen Soldal, Norsus AS (no signature required)	<b>Approved:</b> Sign  Håkon Hauan, CEO EPD-Norge

## Product

### Product description:

VikØrsta CT-Bolt® is specially developed for long life and corrosive environment such as underwater tunnels. The plastic tube that encloses the bolt provides a total seal against corrosion.

The bolt takes immediate load and can be pre-tensioned before it is cast in and it has been specially developed with a view to being rapid to install in addition to being easy and safe to cast in.

### Product specification

Our bolts are manufactured in Norway with the environment in mind where we use high quality Norwegian recycled rebar steel and our green sleeve (injection tube) are made locally of recycled ocean plastics.

The steel is hot-dip galvanized and powder coated (CombiCoat®) to achieve 120 years of corrosion protection (ref.: SINTEF research report based on laboratory testing in collaboration with Vik Ørsta AS)

All of our rock support bolts is produced according to NS-EN 1090, delivered CE-approved and follows the requirements of Norwegian Public Road Administration (Statens Vegvesen) handbook 761.

EPD values are based on the finished assembled CT-bolt with injection tube, hemispherical dome, expansion shell, CT-plate and nut

### Technical data:

Thread size: M20 (rolled)  
Thread length: 200 mm  
Total length: 3000 mm  
Material: B500NC (NS 3576)  
CE-approved: Yes  
Total weight: 10 kg

### Market:

Worldwide

### Reference service life, product

120 years

### Reference service life, building

Not relevant

Materials	kg	%
Steel	2,61	24,11
Powder coating	0,05	0,43
Zinc	0,23	2,09
Plastic	0,02	0,15
Rebar of recycled steel	7,38	68,23
Plastic recycled	0,54	4,99
<b>Total</b>	<b>10,83</b>	

## LCA: Calculation rules

### Declared unit:

1 Pcs CT-Bolt® M20 x 3000 mm - B500NC CombiCoat®

### Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

### Data quality:

Specific data for the product composition are provided by the manufacturer. They represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on registered EPDs according to EN 15804, Ostfold Research databases, ecoinvent and other LCA databases. The data quality of the raw materials in A1 is presented in the table below.

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

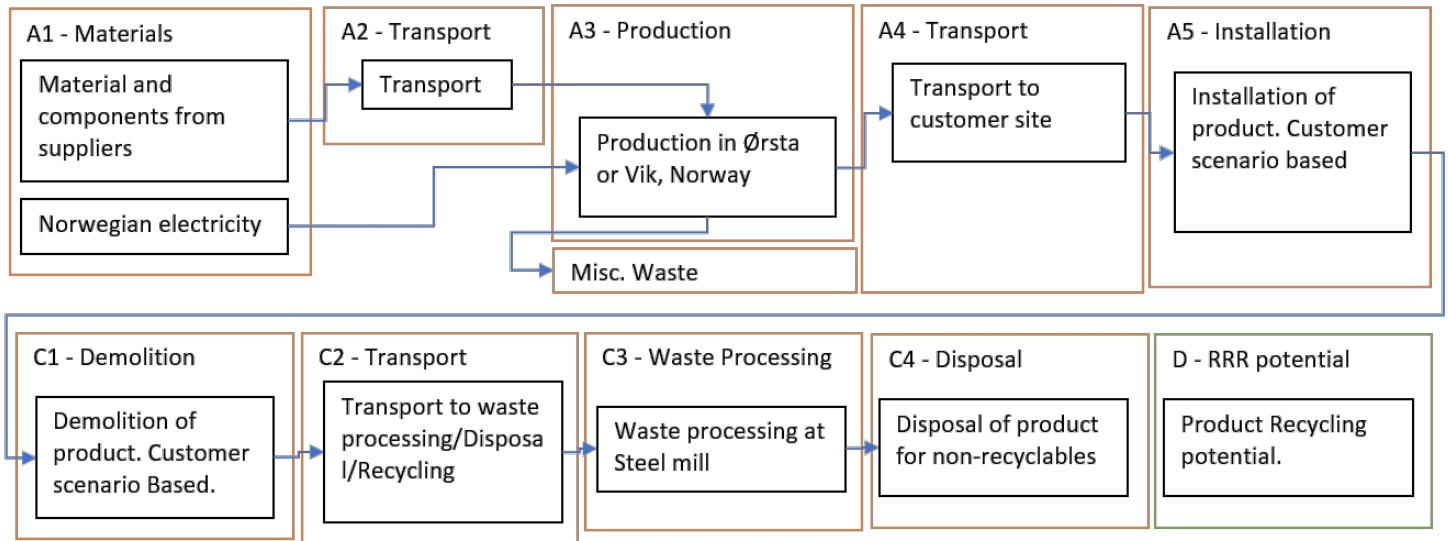
Materials	Source	Data quality	Year
Steel	Owner of product declaration	EPD	2014
Rebar of recycled steel	NEPD-434.305-EN	EPD	2016
Steel	NEPD-475-331-EN	EPD	2016
Plastic	ecoinvent 3.5	Database	2018
Powder coating	ecoinvent 3.5	Database	2018
Steel	ecoinvent 3.5	Database	2018
Zinc	ecoinvent 3.5	Database	2018
Plastic recycled	ecoinvent 3.6	Database	2019

**System boundary:**

System boundaries are illustrated in the flowchart below.

CT-plate, hemispherical dome and nut are included in "End of life stage C1 - C4" & "Beyond the system boundaries D".

The rebar is assumed to be installed permanently and are not included in C & D.



**Additional technical information:**

## LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

### Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Unit	Value (l/t)
Truck	55,0 %	Truck, lorry over 32 tonnes, EURO 6	300	0,022606	l/tkm	6,78
Railway					l/tkm	
Boat					l/tkm	
Other Transportation					l/tkm	

### Assembly (A5)

	Unit	Value
Auxiliary	kg	
Water consumption	m <sup>3</sup>	
Electricity consumption	kWh	0,0140
Other energy carriers	MJ	
Material loss	kg	
Output materials from waste treatment	kg	
Dust in the air	kg	
VOC emissions	kg	

### End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	
Collected as mixed construction waste	kg	
Reuse	kg	
Recycling	kg	1,3700
Energy recovery	kg	
To landfill	kg	

### Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Unit	Value (l/t)
Truck	38,8 %	Truck, lorry 16-32 tonnes, EURO 6	800	0,043626	l/tkm	34,90
Railway					l/tkm	
Boat					l/tkm	
Other Transportation					l/tkm	

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### Benefits and loads beyond the system boundaries (D)

	Unit	Value
Substitution of construction steel (kg)	kg/DU	1,05

## LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

### System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		User stage							End of life stage				Beyond the system boundaries
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-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MNR	MNR	MNR	MND	MNR	MNR	MNR	X	X	X	X	X

### Environmental impact

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO <sub>2</sub> -eq	1,16E+01	2,48E-01	2,67E+01	4,35E-04	1,28E+00	0,00E+00	0	-2,39E+00
ODP	kg CFC11 -eq	4,14E-07	5,10E-08	4,81E-06	4,10E-11	2,40E-07	0,00E+00	0	-9,57E-09
POCP	kg C <sub>2</sub> H <sub>4</sub> -eq	3,08E-03	3,88E-05	5,34E-03	9,74E-08	1,93E-04	0,00E+00	0	-3,71E-04
AP	kg SO <sub>2</sub> -eq	4,83E-02	6,41E-04	2,02E-01	2,03E-06	3,00E-03	0,00E+00	0	-4,50E-03
EP	kg PO <sub>4</sub> <sup>3-</sup> -eq	7,49E-03	8,84E-05	4,35E-02	4,89E-07	3,93E-04	0,00E+00	0	-4,90E-04
ADPM	kg Sb -eq	2,51E-03	5,91E-07	8,97E-06	7,12E-09	3,96E-06	0,00E+00	0	-1,24E-05
ADPE	MJ	1,11E+02	4,08E+00	3,85E+02	4,41E-03	1,93E+01	0,00E+00	0	-2,38E+01

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

## Resource use

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	7,09E+01	7,41E-02	2,27E+00	5,72E-02	2,84E-01	0,00E+00	0	-4,31E-01
RPEM	MJ	2,29E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00
TPE	MJ	7,09E+01	7,41E-02	2,27E+00	5,72E-02	2,84E-01	0,00E+00	0	-4,31E-01
NRPE	MJ	9,64E+01	4,20E+00	3,89E+02	7,58E-03	1,97E+01	0,00E+00	0	-1,26E+01
NRPM	MJ	2,23E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	-1,19E+01
TRPE	MJ	1,19E+02	4,20E+00	3,89E+02	7,58E-03	1,97E+01	0,00E+00	0	-2,45E+01
SM	kg	8,44E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00
RSF	MJ	8,60E-03	0,00E+00	9,93E-06	9,93E-06	0,00E+00	0,00E+00	0	0,00E+00
NRSF	MJ	3,26E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00
W	m <sup>3</sup>	3,83E-01	9,95E-04	4,09E-02	3,16E-06	3,73E-03	0,00E+00	0	-2,10E-02

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

## End of life - Waste

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HW	kg	1,10E-01	2,24E-06	1,73E-04	9,74E-09	1,16E-05	0,00E+00	0	-5,25E-02
NHW	kg	5,78E+00	3,84E-01	1,86E+00	5,74E-04	1,06E+00	0,00E+00	0	-4,04E-04
RW	kg	INA*	INA*	INA*	INA*	INA*	INA*	0	INA*

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

## End of life - Output flow

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00
MR	kg	4,58E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,17E+00	0	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00
EEE	MJ	INA*	INA*	INA*	INA*	INA*	INA*	0	INA*
ETE	MJ	INA*	INA*	INA*	INA*	INA*	INA*	0	INA*

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed



## Additional Norwegian requirements

### Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Data source	Amount	Unit
El-mix, Norway (kWh)	ecoinvent 3.4	31,04	g CO <sub>2</sub> -ekv/kWh

### Dangerous substances

The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

### Indoor environment

## Bibliography

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

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

EN 15804:2012+A1:2013 Environmental product declaration - Core rules for the product category of construction products.

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Vold et al., (2019) EPD generator for VikØrsta - Background information and LCA data, LCA.no report number 02.19.

NPCR Part A: Construction products and services. Ver. 1.0. April 2017, EPD-Norge.

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