

## ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Vik Ørsta AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-2679-1379-EN
Registration number:	NEPD-2679-1379-EN
ECO Platform reference number:	-
Issue date:	09.02.2021
Valid to:	09.02.2026

### CT-Bolt® M22 [kg bolt] - K640 Vanadium CombiCoat®

Vik Ørsta AS



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



## General information

### Product:

CT-Bolt® M22 [kg bolt] - K640 Vanadium CombiCoat®

### Program operator:

The Norwegian EPD Foundation  
Pb. 5250 Majorstuen, 0303 Oslo  
Phone: +47 23 08 80 00  
e-mail: [post@epd-norge.no](mailto:post@epd-norge.no)

### Declaration number:

NEPD-2679-1379-EN

### ECO Platform reference number:

### This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A1:2013 serves as core PCR  
NPCR 013:2019 Part B for Steel and aluminium construction products

### Statement of liability:

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.

### Declared unit:

1 kg CT-Bolt® M22 [kg bolt] - K640 Vanadium CombiCoat®

### Declared unit with option:

A1,A2,A3,A4,A5,C1,C2,C3,C4,D

### Functional unit:

1 kg complete pre-assembled M22 CT-bolt system (incl. CT-plate)

### General information on verification of EPD from EPD tools:

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.

### Verification of EPD tool:

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)

### Owner of the declaration:

Vik Ørsta AS  
Contact person: Teknisk sjef - Jan Olav Hoggen  
Phone: 0047 95170854  
e-mail: [jan.olav.hoggen@vikorsta.no](mailto:jan.olav.hoggen@vikorsta.no)

### Manufacturer:

Vik Ørsta AS  
Strandgata 59, , No-6150 Ørsta, Norway  
Norway

### Place of production:

Vik Ørsta AS, Skorgeura  
Nørestranda 383 , 6152 Ørsta  
Norway

### Management system:

NS-EN ISO 9001:2015 NS-EN ISO 14001:2015

### Organisation no:

985001952

### Issue date:

09.02.2021

### Valid to:

09.02.2026

### Year of study:

2021

### Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

### Development and verification of EPD:

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

Developer of EPD:

Stig Robert Sporstøl

Reviewer of company-specific input data and EPD:

Atle Årseth

### Approved:

Sign

Håkon Hauan, CEO EPD-Norge

## Product

### Product description:

Vik Ørsta 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 where we use high quality European produced rebar steel for the M22 CT-Bolt®. 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 report based on laboratory testing in collaboration with Vik Ørsta AS. Read more about CombiCoat® on [www.vikorsta.no](http://www.vikorsta.no))

All of our rock support bolts made of K640 Vanadium is produced according to NS-EN 1090 and delivered CE-marked.

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

Materials	kg	%
Steel	0,93	92,94
Powder coating	0,00	0,42
Zinc	0,02	2,03
Plastic	0,00	0,02
Plastic recycled	0,05	4,59
<b>Total</b>	<b>1</b>	

### Technical data:

Thread size: M22 (rolled)  
Thread length: 150 mm  
Material: K640 Vanadium  
CE-marked: Yes

### Length | Total weight\*

2,4 m | 10,0 kg  
3,0 m | 11,9 kg  
4,0 m | 15,4 kg  
5,0 m | 18,9 kg  
6,0 m | 22,3 kg  
8,0 m | 29,1 kg

\*Total weight is incl. 1,2 kg CT-plate

### Market:

Worldwide

### Reference service life, product

120 years

### Reference service life, building

Not relevant

## LCA: Calculation rules

### Declared unit:

1 kg CT-Bolt® M22 [kg bolt] - K640 Vanadium 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.

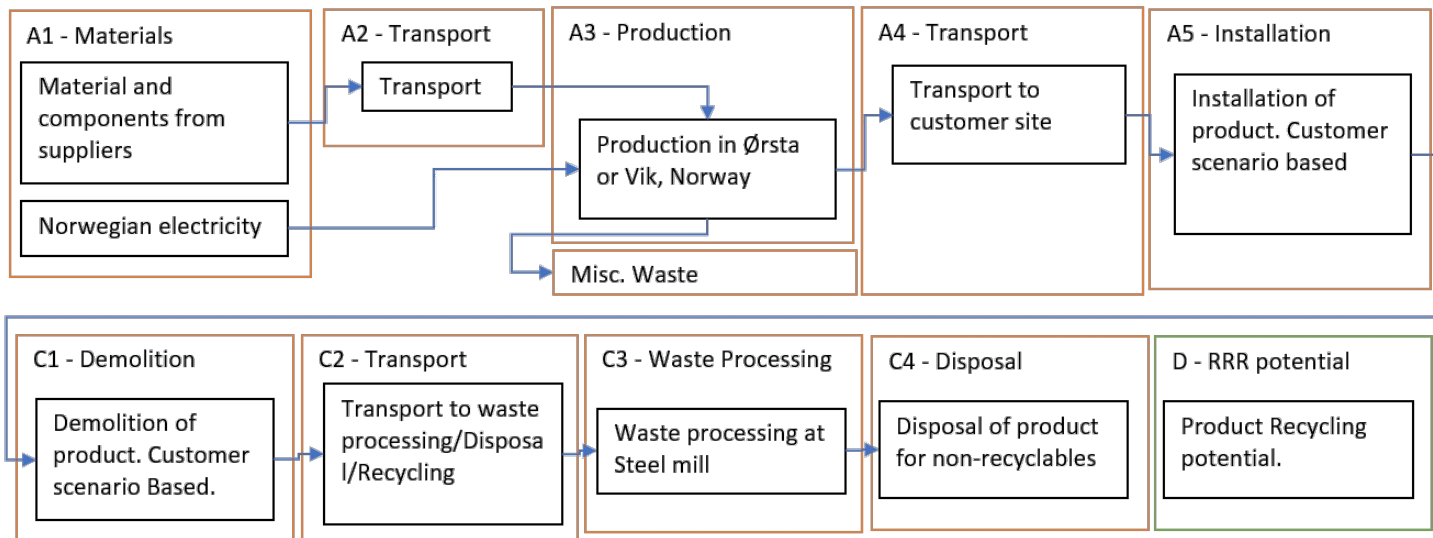
The EPD is based on average values of percent material consumption and the LCA results are within +/- 10% margin of error

Materials	Source	Data quality	Year
Steel	Owner of product declaration	EPD	2014
Steel	EPD-ARM-20160051-IBD2-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:**

Please note it is unlikely the CT-Bolt is to be removed and recycled after installation, but it is included for information in "End of life stage C1 - C4" & "Beyond the system boundaries D"

System boundaries are shown in the flowchart below.



**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	
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	0,0878
Energy recovery	kg	0,0000
To landfill	kg	0,0048

### 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	

..

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

	Unit	Value
Substitution of reinforcing steel (kg)	kg	0,08
Substitution of electricity, in Norway (MJ)	MJ	0,00
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	0,00
Substitution of primary plastics, LDPE (kg)	kg	0,00

## 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	1,81E+00	2,48E-02	2,13E+00	2,13E+00	1,28E-01	1,77E-04	2,49E-05	-1,63E-01
ODP	kg CFC11 -eq	8,14E-08	5,10E-09	3,85E-07	3,85E-07	2,40E-08	6,00E-12	8,00E-12	-9,17E-09
POCP	kg C <sub>2</sub> H <sub>4</sub> -eq	6,66E-04	3,88E-06	4,28E-04	4,28E-04	1,93E-05	1,28E-08	7,57E-09	-9,90E-05
AP	kg SO <sub>2</sub> -eq	1,03E-02	6,41E-05	1,62E-02	1,62E-02	3,00E-04	2,66E-07	1,81E-07	-6,98E-04
EP	kg PO <sub>4</sub> <sup>3-</sup> -eq	8,72E-04	8,84E-06	3,48E-03	3,48E-03	3,93E-05	4,40E-08	3,19E-08	-3,59E-04
ADPM	kg Sb -eq	2,36E-04	5,91E-08	7,17E-07	7,17E-07	3,96E-07	1,47E-10	0,00E+00	-6,83E-07
ADPE	MJ	1,13E+01	4,08E-01	3,08E+01	3,08E+01	1,93E+00	7,46E-04	6,96E-04	-1,68E+00

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	4,73E+00	7,41E-03	1,77E-01	1,77E-01	2,84E-02	1,39E-03	5,79E-06	-9,48E-02
RPEM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	4,73E+00	7,41E-03	1,77E-01	1,77E-01	2,84E-02	1,39E-03	5,79E-06	-9,48E-02
NRPE	MJ	2,02E+01	4,20E-01	3,11E+01	3,11E+01	1,97E+00	8,56E-04	7,06E-04	-1,76E+00
NRPM	MJ	1,21E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-7,59E-03
TRPE	MJ	2,14E+01	4,20E-01	3,11E+01	3,11E+01	1,97E+00	8,56E-04	7,06E-04	-1,77E+00
SM	kg	6,64E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	6,17E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,04E-07
NRSF	MJ	2,13E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
W	m <sup>3</sup>	9,62E-03	9,95E-05	3,27E-03	3,27E-03	3,73E-04	2,58E-07	7,64E-07	-1,06E-03

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	6,14E-03	2,24E-07	1,39E-05	1,39E-05	1,16E-06	1,13E-09	1,05E-09	-1,16E-05
NHW	kg	5,49E-01	3,84E-02	1,49E-01	1,49E-01	1,06E-01	5,46E-05	4,77E-03	-1,64E-01
RW	kg	INA*	INA*	INA*	INA*	INA*	INA*	INA*	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	0,00E+00	0,00E+00
MR	kg	3,40E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,80E-02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,43E-05	0,00E+00	0,00E+00
EEE	MJ	INA*	INA*	INA*	INA*	INA*	INA*	INA*	INA*
ETE	MJ	INA*	INA*	INA*	INA*	INA*	INA*	INA*	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.

ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.

ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.

Iversen et al., (2018) eEPD v3.0 - Background information for EPD generator system. LCA.no report number 04.18.

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.

NPCR 013 Part B for steel and aluminium construction products. Ver. 3.0 April 2019, EPD-Norge.

NPCR 013 Part B for steel and aluminium construction products, Version 3.0.

<p><b>epd-norge.no</b> The Norwegian EPD Foundation</p>	<p><b>Program operator and publisher</b> The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway</p>	<p>Phone: +47 23 08 80 00 e-mail: post@epd-norge.no web: www.epd-norge.no</p>
	<p><b>Owner of the declaration</b> VikØrsta AS Strandgata 59, , No-6150 Ørsta, Norway</p>	<p>Phone: 0047 95170854 e-mail: jan.olav.hoggen@vikorsta.no web: www.vikorsta.no</p>
	<p><b>Author of the Life Cycle Assessment</b> LCA.no AS Dokka 1C, 1671 Kråkerøy</p>	<p>Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no</p>
	<p><b>Developer of EPD generator</b> LCA.no AS Dokka 1C, 1671 Kråkerøy</p>	<p>Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no</p>