

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 |
| Declaration number: | NEPD-2620-1330-EN |
| Registration number: | NEPD-2620-1330-EN |
| ECO Platform reference number: | - |
| Issue date: | 06.01.2021 |
| Valid to: | 06.01.2026 |

CT-Bolt® M20 x 5000 mm - B500NC CombiCoat®

VikØrsta AS



www.epd-norge.no



General information

Product:

CT-Bolt® M20 x 5000 mm - B500NC CombiCoat®

Program operator:

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

Declaration number:

NEPD-2620-1330-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 Pcs CT-Bolt® M20 x 5000 mm - B500NC CombiCoat®

Declared unit with option:

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

Functional unit:

Complete 5m pre-assembled CT-bolt system

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:

VikØrsta AS
Contact person: Teknisk sjef - Jan Olav Hoggen
Phone: 0047 95170854
e-mail: jan.olav.hoggen@vikorsta.no

Manufacturer:

VikØrsta 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:

06.01.2021

Valid to:

06.01.2026

Year of study:

2020

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:

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: 5000 mm
Material: B500NC (NS 3576)
CE-approved: Yes
Total weight: 15,6 kg

Market:

Worldwide

Reference service life, product

120 years

Reference service life, building

Not relevant

| Materials | kg | % |
|-------------------------|--------------|-------|
| Steel | 2,61 | 13,93 |
| Powder coating | 0,07 | 0,36 |
| Zinc | 0,33 | 1,75 |
| Plastic | 0,02 | 0,09 |
| Rebar of recycled steel | 14,75 | 78,79 |
| Plastic recycled | 0,95 | 5,07 |
| Total | 18,73 | |

LCA: Calculation rules

Declared unit:

1 Pcs CT-Bolt® M20 x 5000 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.

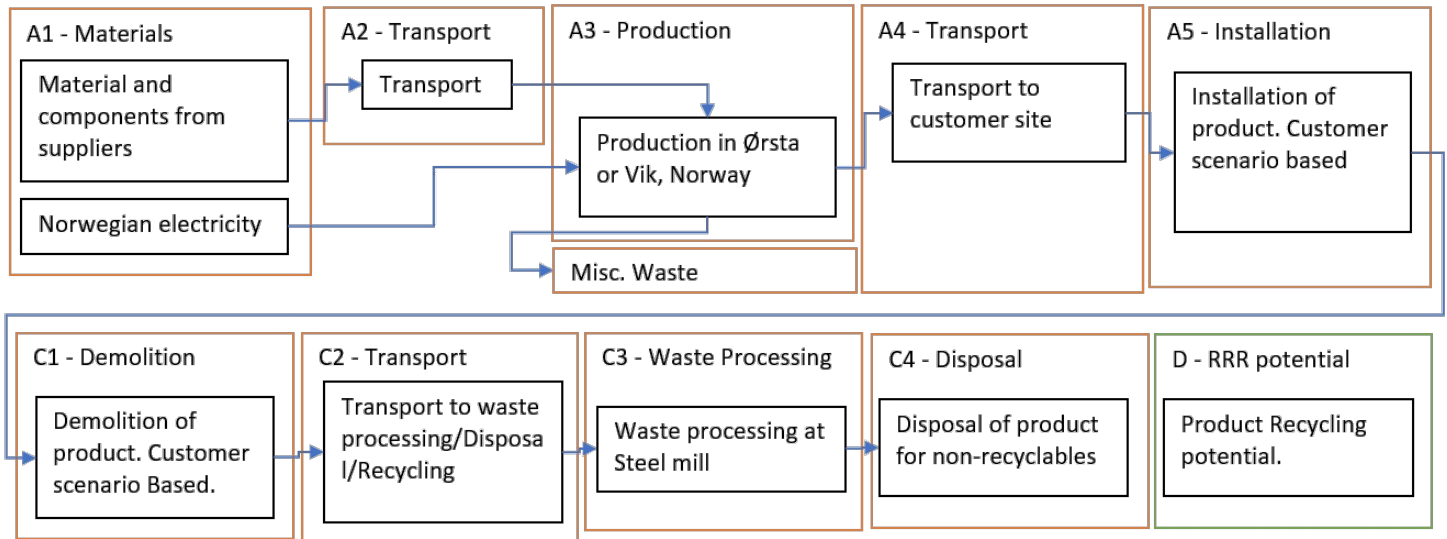
| Materials | Source | Data quality | Year |
|-------------------------|------------------------------|--------------|------|
| Steel | Owner of product declaration | EPD | 2014 |
| Rebar of recycled steel | NEPD-434.305-EN | EPD | 2016 |
| Steel | NEPD-475-331-EN | EPD | 2016 |
| Plastic | ecoinvent 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 ³ | |
| 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 | |

..

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 ₂ -eq | 1,57E+01 | 3,87E-01 | 3,56E+01 | 4,35E-04 | 1,99E+00 | 0,00E+00 | 0 | -2,39E+00 |
| ODP | kg CFC11 -eq | 5,43E-07 | 7,96E-08 | 6,42E-06 | 4,10E-11 | 3,74E-07 | 0,00E+00 | 0 | -9,57E-09 |
| POCP | kg C ₂ H ₄ -eq | 4,01E-03 | 6,06E-05 | 7,13E-03 | 9,74E-08 | 3,01E-04 | 0,00E+00 | 0 | -3,71E-04 |
| AP | kg SO ₂ -eq | 6,63E-02 | 1,00E-03 | 2,70E-01 | 2,03E-06 | 4,67E-03 | 0,00E+00 | 0 | -4,50E-03 |
| EP | kg PO ₄ ³⁻ -eq | 1,09E-02 | 1,38E-04 | 5,80E-02 | 4,89E-07 | 6,14E-04 | 0,00E+00 | 0 | -4,90E-04 |
| ADPM | kg Sb -eq | 3,72E-03 | 9,22E-07 | 1,20E-05 | 7,12E-09 | 6,18E-06 | 0,00E+00 | 0 | -1,24E-05 |
| ADPE | MJ | 1,42E+02 | 6,36E+00 | 5,14E+02 | 4,41E-03 | 3,00E+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*10⁻³ = 0,009"

*INA Indicator Not Assessed

Resource use

| Parameter | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|-----------|----------------|----------|----------|----------|----------|----------|----------|----|-----------|
| RPEE | MJ | 1,20E+02 | 1,16E-01 | 3,01E+00 | 5,72E-02 | 4,43E-01 | 0,00E+00 | 0 | -4,31E-01 |
| RPEM | MJ | 4,57E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0 | 0,00E+00 |
| TPE | MJ | 1,20E+02 | 1,16E-01 | 3,01E+00 | 5,72E-02 | 4,43E-01 | 0,00E+00 | 0 | -4,31E-01 |
| NRPE | MJ | 1,30E+02 | 6,56E+00 | 5,18E+02 | 7,58E-03 | 3,07E+01 | 0,00E+00 | 0 | -1,26E+01 |
| NRPM | MJ | 2,28E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0 | -1,19E+01 |
| TRPE | MJ | 1,53E+02 | 6,56E+00 | 5,18E+02 | 7,58E-03 | 3,07E+01 | 0,00E+00 | 0 | -2,45E+01 |
| SM | kg | 1,68E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0 | 0,00E+00 |
| RSF | MJ | 1,40E-02 | 0,00E+00 | 9,93E-06 | 9,93E-06 | 0,00E+00 | 0,00E+00 | 0 | 0,00E+00 |
| NRSF | MJ | 5,91E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0 | 0,00E+00 |
| W | m ³ | 6,98E-01 | 1,55E-03 | 5,46E-02 | 3,16E-06 | 5,81E-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*10⁻³ = 0,009"

*INA Indicator Not Assessed

End of life - Waste

| Parameter | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|-----------|------|----------|----------|----------|----------|----------|----------|----|-----------|
| HW | kg | 1,12E-01 | 3,50E-06 | 2,31E-04 | 9,74E-09 | 1,81E-05 | 0,00E+00 | 0 | -5,25E-02 |
| NHW | kg | 8,69E+00 | 5,99E-01 | 2,48E+00 | 5,74E-04 | 1,65E+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*10⁻³ = 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 | 3,02E+00 | 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*10⁻³ = 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 ₂ -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>epd-norge.no The Norwegian EPD Foundation</p> | <p>Program operator and publisher 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>Owner of the declaration 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>Author of the Life Cycle Assessment 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>Developer of EPD generator LCA.no AS Dokka 1C, 1671 Kråkerøy</p> | <p>Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no</p> |