

## ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

|                                |                              |
|--------------------------------|------------------------------|
| Owner of the declaration:      | Pretec Norge AS              |
| Program operator:              | The Norwegian EPD Foundation |
| Publisher:                     | The Norwegian EPD Foundation |
| Declaration number:            | NEPD-2704-1407-EN            |
| Registration number:           | NEPD-2704-1407-EN            |
| ECO Platform reference number: | -                            |
| Issue date:                    | 05.03.2021                   |
| Valid to:                      | 05.03.2026                   |

### Rebar bolt - HRB500E Pc-Coat®

Pretec Norge AS



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



## General information

### Product:

Rebar bolt - HRB500E Pc-Coat®

### 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-2704-1407-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 Rebar bolt - HRB500E Pc-Coat®

### Declared unit with option:

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

### Functional unit:

Unthreaded and threaded rebar bolt Ø16-Ø32mm Pc-Coat®

### 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.

Fredrik Moltu Johnsen, Norsus AS

(no signature required)

### Owner of the declaration:

Pretec Norge AS  
Contact person: Fredrik Eggertsen  
Phone: (+47) 69 10 24 60  
e-mail: [post@pretec.no](mailto:post@pretec.no)

### Manufacturer:

Pretec Norge AS  
Kampenesmosen 3, 1739 Borgenhaugen  
Norway

### Place of production:

Pretec China  
1-1 1-1 Danmei Road, Haining City, Zhejiang Province  
China

### Management system:

ISO 14001 and ISO 9001, AAA Certification AB, sert no 794 - EN 1090-1, AAA Certification AB, sert no 2296

### Organisation no:

NO 980 429 245 MVA

### Issue date:

05.03.2021

### Valid to:

05.03.2026

### 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:

Lars Rune Aasberg

Reviewer of company-specific input data and EPD:

Fredrik Eggertsen

### Approved:

Sign



Håkon Hauan, CEO EPD-Norge

## Product

### Product description:

Rock support bolt / Anchor bolt. To be used fully embedded in cementitious grout or anchored with polyester. The bolt is suitable both as immediate work safety support or for permanent support in tunnels and caverns and general rock support in slopes.

### Product specification

Pc-Coat® duplex coating. Provides optimum corrosion protection for steel using three different processes

- Hot-dip galvanizing
- Zinc-manganese phosphating
- Powder coating

CE marked according to NS EN 1090-1.

| Materials      | kg   | %     |
|----------------|------|-------|
| Steel          | 0,95 | 95,10 |
| Powder coating | 0,02 | 1,90  |
| Zinc           | 0,03 | 3,00  |
| Total:         | 1,00 |       |

## LCA: Calculation rules

### Declared unit:

1 kg Rebar bolt - HRB500E Pc-Coat®

### 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.

| Materials      | Source               | Data quality | Year |
|----------------|----------------------|--------------|------|
| Powder coating | ecoinvent 3.5        | Database     | 2018 |
| Zinc           | ecoinvent 3.5        | Database     | 2018 |
| Steel          | ecoinvent 3.6 Cutoff | Database     | 2019 |

### Technical data:

Material: HRB500E according to GB/T 1499.2

Yield Strength: (ReH) 500 MPa Tensile Strength: (Rm) 600 MPa  
Ductility, AGT min 8 %

Rebar Ø20mm is used in NC-bolt M20 which is type approved in Norway by Statens Vegvesen and Banenor

### Market:

Worldwide

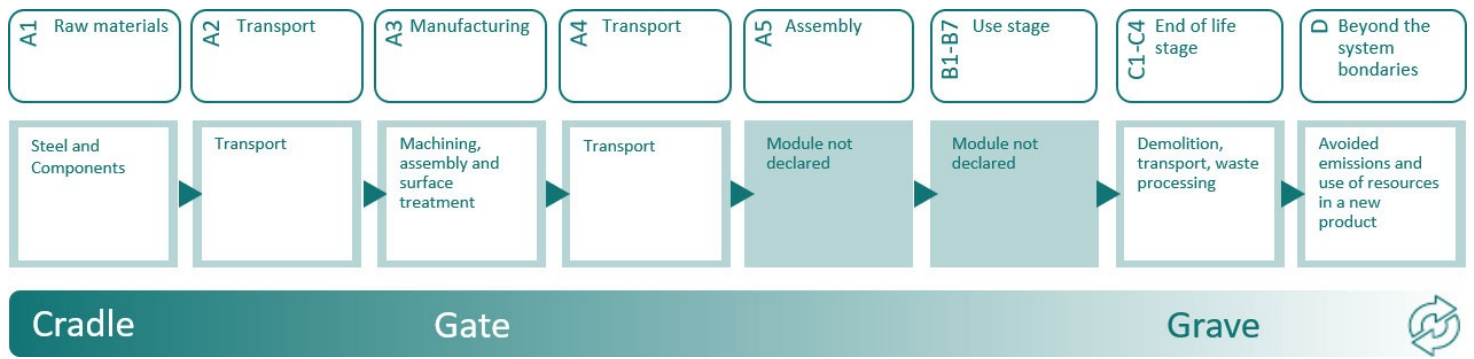
### Reference service life, product

120 years

### Reference service life, building

**System boundary:**

This EPD is a "cradle-to-gate with options" EPD. The system boundary for this LCA report is from A1 to A4, C1-C4 and D



**Additional technical information:**

## LCA: Scenarios and additional technical information

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

Module C "End of life stage" is a generic scenario for decommissioning of construction. Subject to project specific conditions. Grade of recycling for different steel grades is based on statistics obtained from Norsk Stålforbund.

### 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                 | 65,0 %                                | Ship, Freighter, Transoceanic       | 20315       | 0,002976                | l/tkm | 60,46       |
| Other Transportation |                                       |                                     |             |                         | l/tkm |             |

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

|                                       | Unit | Value  |
|---------------------------------------|------|--------|
| Hazardous waste disposed              | kg   |        |
| Collected as mixed construction waste | kg   |        |
| Reuse                                 | kg   |        |
| Recycling                             | kg   | 0,6372 |
| Energy recovery                       | kg   |        |
| To landfill                           | kg   | 0,3138 |

### Transport to waste processing (C2)

| 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 |             |

..

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

|  | Unit | Value |
|--|------|-------|
| Substitution of primary reinforcing steel, with net scrap steel (kg) | kg   | 0,53  |

## 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                          | X         | X                | X        | X                                  |

### Environmental impact

| Parameter | Unit                                 | A1-A3    | A4       | C1       | C2       | C3       | C4       | D         |
|-----------|--------------------------------------|----------|----------|----------|----------|----------|----------|-----------|
| GWP       | kg CO <sub>2</sub> -eq               | 2,76E+00 | 2,71E-01 | 5,67E-02 | 2,48E-02 | 1,27E-04 | 1,63E-03 | -8,81E-01 |
| ODP       | kg CFC11 -eq                         | 1,51E-07 | 4,85E-08 | 9,82E-09 | 5,10E-09 | 1,40E-11 | 5,40E-10 | -3,63E-08 |
| POCP      | kg C <sub>2</sub> H <sub>4</sub> -eq | 1,46E-03 | 1,63E-04 | 9,50E-06 | 3,88E-06 | 3,49E-08 | 4,96E-07 | -6,15E-04 |
| AP        | kg SO <sub>2</sub> -eq               | 1,30E-02 | 4,97E-03 | 4,30E-04 | 6,41E-05 | 7,95E-07 | 1,19E-05 | -3,93E-03 |
| EP        | kg PO <sub>4</sub> <sup>3-</sup> -eq | 1,75E-03 | 4,42E-04 | 9,36E-05 | 8,84E-06 | 1,22E-07 | 2,09E-06 | -1,31E-03 |
| ADPM      | kg Sb -eq                            | 2,04E-04 | 1,21E-07 | 2,45E-10 | 5,91E-08 | 1,00E-11 | 3,10E-11 | -1,70E-05 |
| ADPE      | MJ                                   | 2,78E+01 | 3,80E+00 | 7,84E-01 | 4,08E-01 | 1,19E-03 | 4,57E-02 | -8,28E+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       | C1       | C2       | C3       | C4       | D         |
|-----------|----------------|----------|----------|----------|----------|----------|----------|-----------|
| RPEE      | MJ             | 2,56E+00 | 8,64E-02 | 4,27E-03 | 7,41E-03 | 9,85E-03 | 3,73E-04 | -7,47E-01 |
| RPEM      | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| TPE       | MJ             | 2,56E+00 | 8,64E-02 | 4,27E-03 | 7,41E-03 | 9,85E-03 | 3,73E-04 | -7,47E-01 |
| NRPE      | MJ             | 2,97E+01 | 3,96E+00 | 7,91E-01 | 4,20E-01 | 1,59E-03 | 4,64E-02 | -7,86E+00 |
| NRPM      | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| TRPE      | MJ             | 2,97E+01 | 3,96E+00 | 7,91E-01 | 4,20E-01 | 1,59E-03 | 4,64E-02 | -7,86E+00 |
| SM        | kg             | 1,10E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| RSF       | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| NRSF      | MJ             | 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> | 2,92E-02 | 6,00E-04 | 6,80E-05 | 9,95E-05 | 6,56E-07 | 5,02E-05 | -5,38E-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 =  $9,0 \cdot 10^{-3} = 0,009$ "

\*INA Indicator Not Assessed

## End of life - Waste

| Parameter | Unit | A1-A3    | A4       | C1       | C2       | C3       | C4       | D         |
|-----------|------|----------|----------|----------|----------|----------|----------|-----------|
| HW        | kg   | 2,48E-04 | 2,75E-06 | 2,15E-06 | 2,24E-07 | 3,94E-09 | 6,90E-08 | -7,63E-05 |
| NHW       | kg   | 3,76E+00 | 9,80E-02 | 3,56E-03 | 3,84E-02 | 1,21E-04 | 3,14E-01 | -1,51E+00 |
| RW        | kg   | 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 =  $9,0 \cdot 10^{-3} = 0,009$ "

\*INA Indicator Not Assessed

## End of life - Output flow

| Parameter | Unit | A1-A3    | A4       | 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 |
| MR        | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 6,37E-01 | 0,00E+00 | 0,00E+00 |
| MER       | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| EEE       | MJ   | INA*     | INA*     | INA*     | INA*     | INA*     | INA*     | INA*     |
| ETE       | MJ   | 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 =  $9,0 \cdot 10^{-3} = 0,009$ "

\*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          |
|--------------------------------------|----------------------|--------|---------------|
| Pretec, El-mix China, Zhejiang (kWh) | ecoinvent 3.6 Cutoff | 226,47 | g CO2-ekv/kWh |

### Dangerous substances

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

### Indoor environment

For outdoor use only

## 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 Norsk Stålforbund - Background information and LCA data, LCA.no report number 09.19.

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.

|   |   |   |
|---|---|---|
|  <p><b>epd-norge.no</b><br/>The Norwegian EPD Foundation</p> | <p><b>Program operator and publisher</b><br/>The Norwegian EPD Foundation<br/>Post Box 5250 Majorstuen, 0303 Oslo, Norway</p> | <p>Phone: +47 23 08 80 00<br/>e-mail: post@epd-norge.no<br/>web: www.epd-norge.no</p> |
|  <p>Let's connect</p>  | <p><b>Owner of the declaration</b><br/>Pretec Norge AS<br/>Kampenesmosen 3, 1739 Borgenhaugen</p>                             | <p>Phone: (+47) 69 10 24 60<br/>e-mail: post@pretec.no<br/>web: www.pretec.no</p>     |
|    | <p><b>Author of the Life Cycle Assessment</b><br/>LCA.no AS<br/>Dokka 1C, 1671 Kråkerøy</p>                                   | <p>Phone: +47 916 50 916<br/>e-mail: post@lca.no<br/>web: www.lca.no</p>              |
|    | <p><b>Developer of EPD generator</b><br/>LCA.no AS<br/>Dokka 1C, 1671 Kråkerøy</p>  | <p>Phone: +47 916 50 916<br/>e-mail: post@lca.no<br/>web: www.lca.no</p>              |