epd-norge
Global program operatør

Environmental product declaration

In accordance with ISO 14025 and EN15804+A2

Rebar bolt - B500NC Pc-Coat® GA



The Norwegian EPD Foundation

Owner of the declaration:
Pretec Norge AS

Product:
Rebar bolt - B500NC Pc-Coat® GA

Declared unit:
1 kg

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 013:2021 Part B for Steel and aluminium construction products

Program operator:
The Norwegian EPD Foundation

Declaration number:
NEPD-6323-5586-EN

Registration number:
NEPD-6323-5586-EN

Issue date:
20.03.2024

Valid to:
11.07.2029

EPD software:
LCAno EPD generator ID: 228647

General information

Product

Rebar bolt - B500NC Pc-Coat® GA

Owner of the declaration:

Pretec Norge AS
Contact person: Ernad Sarajlija
Phone: (+47) 69 10 24 60
e-mail: post@pretec.no

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Manufacturer:

Pretec Norge AS
Kampenesmosen 3
1739 Borgenhaugen, Norway

Declaration number:

NEPD-6323-5586-EN

Place of production:

Galvano Industri As
Farvikveien 4
8207 Fauske, Norway

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 013:2021 Part B for Steel and aluminium construction products

Management system:

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

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.

Organisation no:

NO 980 429 245 MVA

Declared unit:

1 kg Rebar bolt - B500NC Pc-Coat® GA

Issue date:

20.03.2024

Declared unit with option:

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

Valid to:

11.07.2029

Year of study:

2024

Functional unit:

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

Comparability:

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

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. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD: Ernad Sarajlija

Reviewer of company-specific input data and EPD: Christine B.-Norén

Verification of EPD tool:

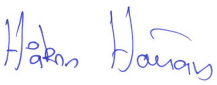
Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Alexander Borg, Asplan Viak AS

(no signature required)

Approved:



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	%
Metal - Steel	0,97	96,42
Metal - Zinc	0,03	2,98
Powder coating	0,01	0,60
Total	1,01	100,00

Packaging	kg	%
Packaging - Pallet	0,01	90,91
Packaging - Plastic	0,00	9,09
Total incl. packaging	1,02	100,00

Technical data:

Material: B500NC acc. NS 3576-3:2012,

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

Rebar Ø20mm is used in NC-bolt M20.

Market:

Worldwide

Reference service life, product

120

Reference service life, building or construction works

LCA: Calculation rules

Declared unit:

1 kg Rebar bolt - B500NC Pc-Coat® GA

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.

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.

Data quality:

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

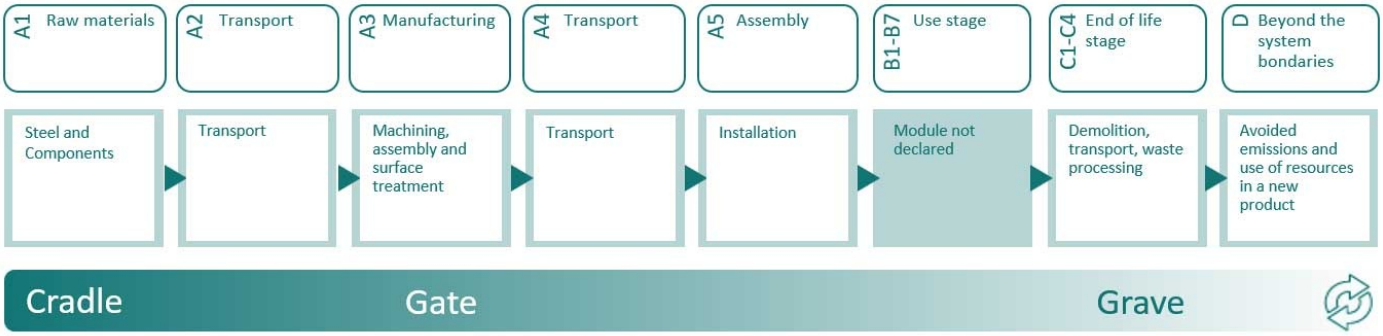
Materials	Source	Data quality	Year
Metal - Steel	S-P-00306	EPD	2021
Metal - Zinc	ecoinvent 3.6	Database	2019
Packaging - Pallet	Modified ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Powder coating	Ecoinvent 3.6	Database	2019

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

Product stage			Construction installation stage		Use 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	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:

This EPD is a "cradle-to-gate with options" EPD. The system boundary for this LCA report is from A1 to A5, 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)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	300	0,043	l/tkm	12,90

Assembly (A5)	Unit	Value			
Waste, packaging, pallet, EUR wooden pallet, reusable, average treatment (kg) - A5, inkl. 85 km transp.	kg	0,01			
Waste, packaging, plastic film (LDPE), to average treatment (kg) - A5, inkl. 85 km transp.	kg	0,00			

De-construction demolition (C1)	Unit	Value			
Diesel, burned (MJ)	MJ/DU	0,63			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (km)	53,3 %	300	0,023	l/tkm	6,90

Waste processing (C3)	Unit	Value			
Materials to recycling (kg)	kg	0,90			
Waste treatment per kg Hazardous waste, incineration (kg) - C3	kg	0,01			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Hazardous waste, from incineration (kg) - C4	kg	0,00			
Waste, scrap steel, to landfill (kg)	kg	0,10			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity, in Norway (MJ)	MJ	0,00			
Substitution of primary steel with net scrap (kg)	kg	-0,10			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	0,00			
Substitution of Zinc (kg)	kg	0,03			

LCA: Results

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

Environmental impact										
	Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	6,51E-01	4,90E-02	1,52E-02	5,73E-02	2,61E-02	1,33E-02	9,25E-04	2,92E-02
	GWP-fossil	kg CO_2 -eq	6,45E-01	4,90E-02	9,27E-05	5,73E-02	2,61E-02	1,33E-02	9,24E-04	3,01E-02
	GWP-biogenic	kg CO_2 -eq	5,12E-03	2,03E-05	1,52E-02	1,07E-05	1,12E-05	3,34E-05	5,61E-07	-6,86E-04
	GWP-luluc	kg CO_2 -eq	2,33E-03	1,74E-05	9,53E-09	4,52E-06	7,96E-06	3,36E-06	1,32E-07	-2,09E-04
	ODP	kg CFC11 -eq	6,09E-08	1,11E-08	7,00E-12	1,24E-08	6,30E-09	1,52E-09	2,32E-10	-4,88E-08
	AP	mol H+ -eq	3,96E-03	1,41E-04	2,06E-07	6,00E-04	8,41E-05	1,95E-05	5,16E-06	-2,28E-04
	EP-FreshWater	kg P -eq	2,69E-05	3,92E-07	3,24E-10	2,09E-07	2,08E-07	3,19E-07	8,00E-09	-2,25E-06
	EP-Marine	kg N -eq	1,04E-03	2,79E-05	1,36E-07	2,65E-04	1,84E-05	4,04E-06	1,82E-06	-5,78E-05
	EP-Terrestial	mol N -eq	1,16E-02	3,12E-04	8,47E-07	2,90E-03	2,05E-04	4,55E-05	2,02E-05	-7,64E-04
	POCP	kg NMVOC -eq	3,01E-03	1,19E-04	2,43E-07	7,98E-04	8,07E-05	1,28E-05	5,77E-06	6,25E-05
	ADP-minerals&metals[1]	kg Sb-eq	2,34E-03	1,35E-06	6,40E-10	8,80E-08	4,66E-07	4,64E-08	4,63E-09	-1,98E-03
	ADP-fossil[1]	MJ	7,06E+00	7,41E-01	4,85E-04	7,89E-01	4,24E-01	5,58E-02	1,61E-02	-2,38E-01
	WDP[1]	m^3	1,27E+02	7,17E-01	1,40E-03	1,68E-01	3,25E-01	2,07E-01	8,83E-02	-8,43E+00

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Remarks to environmental impacts

Additional environmental impact indicators

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	1,72E-08	3,00E-09	3,00E-12	1,59E-08	2,40E-09	3,00E-10	9,60E-11	5,85E-09
	IRP[2]	kgBq U235 -eq	3,11E-02	3,24E-03	2,05E-06	3,38E-03	1,85E-03	2,54E-04	7,28E-05	-8,79E-03
	ETP-fw[1]	CTUe	1,22E+01	5,49E-01	4,92E-04	4,31E-01	3,10E-01	2,71E-01	1,36E-02	1,96E+00
	HTP-c[1]	CTUh	8,15E-10	0,00E+00	0,00E+00	1,70E-11	0,00E+00	1,30E-11	0,00E+00	7,20E-11
	HTP-nc[1]	CTUh	2,17E-08	6,00E-10	1,00E-12	3,96E-10	3,00E-10	7,80E-11	1,70E-11	-2,40E-08
	SQP[1]	dimensionless	2,28E+00	5,18E-01	6,59E-04	1,00E-01	4,87E-01	2,20E-02	5,69E-02	-4,62E-01

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Resource use										
Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	1,32E+01	1,06E-02	1,15E-05	4,27E-03	5,34E-03	1,01E-02	4,96E-04	-7,90E-02
	PERM	MJ	1,48E-01	0,00E+00	-1,39E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,34E+01	1,06E-02	-6,93E-03	4,27E-03	5,34E-03	1,01E-02	4,96E-04	-7,90E-02
	PENRE	MJ	7,03E+00	7,41E-01	4,85E-04	7,89E-01	4,24E-01	5,58E-02	1,61E-02	-2,40E-01
	PENRM	MJ	4,31E-02	0,00E+00	-4,25E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	7,08E+00	7,41E-01	-4,20E-02	7,89E-01	4,24E-01	5,58E-02	1,61E-02	-2,40E-01
	SM	kg	1,11E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	1,67E-02	3,79E-04	3,11E-07	1,05E-04	1,87E-04	2,22E-04	9,54E-06	-8,01E-03
	NRSF	MJ	6,65E-01	1,36E-03	1,65E-06	1,54E-03	6,26E-04	0,00E+00	6,35E-05	-1,16E-01
	FW	m^3	1,22E-01	7,92E-05	2,88E-07	4,06E-05	4,83E-05	5,17E-05	2,06E-05	-2,19E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = 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; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	HWD	kg	2,70E-03	3,82E-05	0,00E+00	2,32E-05	2,32E-05	0,00E+00	0,00E+00	-4,98E-04
	NHWD	kg	3,38E-01	3,60E-02	1,50E-03	9,34E-04	3,69E-02	6,00E-03	1,01E-01	3,26E-02
	RWD	kg	6,88E-05	5,05E-06	0,00E+00	5,48E-06	2,90E-06	0,00E+00	0,00E+00	-6,22E-06

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	CRU	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
	MFR	kg	1,80E-01	0,00E+00	6,92E-04	0,00E+00	0,00E+00	9,00E-01	0,00E+00	0,00E+00
	MER	kg	1,16E-03	0,00E+00	5,09E-08	0,00E+00	0,00E+00	6,00E-03	0,00E+00	0,00E+00
	EEE	MJ	0,00E+00	0,00E+00	2,17E-04	0,00E+00	0,00E+00	5,94E-06	0,00E+00	0,00E+00
	EET	MJ	0,00E+00	0,00E+00	3,28E-03	0,00E+00	0,00E+00	8,99E-05	0,00E+00	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	4,13E-03

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional 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	Source	Amount	Unit
Electricity, Norway (kWh)	ecoinvent 3.6	24,33	g CO2-eq/kWh

Dangerous substances

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

Indoor environment

For outdoor use only

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products									
Indicator	**Unit**	A1-A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	6,49E-01	4,90E-02	0,00E+00	5,67E-02	2,61E-02	1,33E-02	9,24E-04	8,23E-02

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

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+A2:2019 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.
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Iversen et al., (2021) eEPD v2021.09 Background information for EPD generator tool system verification, LCA.no Report number: 07.21
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NPCR 013 Part B for Steel and Aluminium Construction Products , Ver. 4.0, 06.10.2021, EPD Norway.

	Program operator and publisher The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 977 22 020 e-mail: post@epd-norge.no web: www.epd-norge.no
	Owner of the declaration: Pretec Norge AS Kampenesmosen 3, 1739 Borgenhaugen	Phone: (+47) 69 10 24 60 e-mail: post@pretec.no web: www.pretec.no
	Author of the Life Cycle Assessment LCA.no AS Dokka 6B, 1671	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	Developer of EPD generator LCA.no AS Dokka 6B,1671 Kråkerøy	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	ECO Platform ECO Portal	web: www.eco-platform.org web: ECO Portal