epd-norge
Global program operatør

# Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

## Protecta FR Graphite (plastic cartridge)




Polyseam

The Norwegian EPD Foundation

**Owner of the declaration:**
Polyseam AS

**Product:**
Protecta FR Graphite (plastic cartridge)

**Declared unit:**
1 kg

**This declaration is based on Product Category Rules:**
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 009:2021 Part B for Technical - Chemical products for building and construction industry

**Program operator:**
The Norwegian EPD Foundation

**Declaration number:**

**Registration number:**

**Issue date:**

**Valid to:**

**EPD software:**
LCAno EPD generator ID: 415574

## General information

**Product**

Protecta FR Graphite (plastic cartridge)

**Owner of the declaration:**

Polyseam AS
Contact person: Andrea Bogstad
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**Program operator:**

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
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**Manufacturer:**

Polyseam Ltd

**Declaration number:**

**Place of production:**

Polyseam Ltd
St Andrews Road 15
HD1 6SB Huddersfield, West Yorkshire, United Kingdom

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

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 009:2021 Part B for Technical - Chemical products for building and construction industry

**Management system:**

ISO 9001, ISO 14001

**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:**

986 426 051

**Declared unit:**

1 kg Protecta FR Graphite (plastic cartridge)

**Issue date:**

**Declared unit with option:**

A1,A2,A3

**Valid to:**

**Year of study:**

2022

**Functional unit:**

**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: Andrea Bogstad

Reviewer of company-specific input data and EPD: Wol Hluchan

**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. NEPDT73

**Approved:**

Third party verifier:

Linda Høibye, Life Cycle Assessment Consulting

(no signature required)

## Product

### Product description:

Protecta FR Graphite is a high specification mastic designed to prevent the spread of fire, smoke and gases through openings in fire rated walls and floors. The mastic material expands when exposed to fire. It effectively seals openings around penetrations once any combustible or low-temperature melting materials have burned away. It also seals difficult services which traditional fire rated mastics do not achieve, including large plastic pipes.

FR Graphite can be used with a suitable filling material in order to ensure the correct width to depth ratio to reduce the shrinking of the sealant during curing. Thermal activation takes place at 150 degrees when the material will expand to prevent the passage of fire and smoke for periods up to 4 hours.

### Product specification

| Materials | Value | Unit |
|---|---|---|
| MATERIALS | | |
| Preservative | 0,02 | % |
| Filler | 1-10 | % |
| Binder | 20-30 | % |
| Chemical | 10-20 | % |
| Mineral | 30-60 | % |
| Solvent | 10-15 | % |
| PACKAGING | | |
| Packaging - Cardboard | 0,03 | kg |
| Packaging - Plastic | 0,08 | kg |
| Packaging - Wood | 0,03 | kg |

### Technical data:

The product has third-party verified ETAs and UKTAs issued in accordance with regulation (EU) No 305/2011 on the basis of EAD 350454-00-1104, tested to EN 1366-3, in conjunction with EN 1363-1. The product holds the following approval marks; CE-mark for Europe, UKCA-mark for UK, UL-EU Certificate Internationally, UAE Certificate of Compliance & AS assessment for Australia and New Zealand.

For more information, please see https://protecta.co.uk/product/fire-rated-graphite/

### Market:

Global. Transport to market is not included in this EPD.

### Reference service life, product

The reference service life of the product depends on its application area.

### Reference service life, building

N/A

## LCA: Calculation rules

### Declared unit:

1 kg Protecta FR Graphite (plastic cartridge)

### 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.

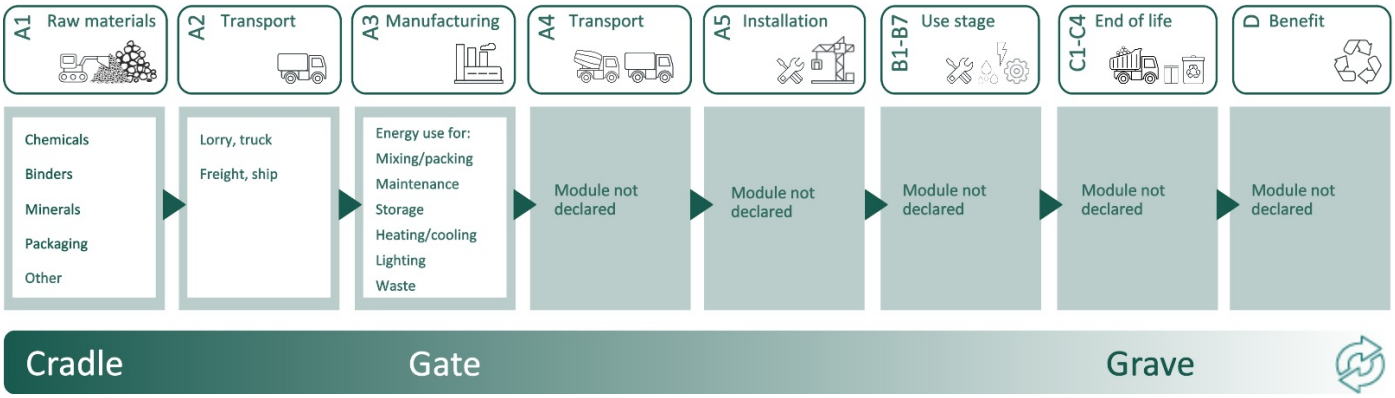
| Materials | Source | Data quality | Year |
|---|---|---|---|
| Binder | ecoinvent 3.6 | Database | 2019 |
| Chemical | ecoinvent 3.6 | Database | 2019 |
| Chemical | Modified ecoinvent 3.6 | Database | 2019 |
| Filler | ecoinvent 3.6 | Database | 2019 |
| Mineral | ecoinvent 3.6 | Database | 2019 |
| Packaging - Cardboard | Modified ecoinvent 3.6 | Database | 2019 |
| Packaging - Plastic | ecoinvent 3.6 | Database | 2019 |
| Packaging - Wood | Modified ecoinvent 3.6 | Database | 2019 |
| Preservative | ecoinvent 3.6 | Database | 2019 |
| Solvent | 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 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

### System boundary:

The life cycle analysis is a cradle-to-gate (A1 - A3) study. It includes the extraction and production of raw materials and packaging, transportation to the manufacturing site, as well as the manufacturing process itself.




### Additional technical information:

Protecta FR Graphite can be removed with a knife/scraper and disposed of at an approved waste facility.

Polyseam's factory is certified according to the ISO 14001 Environmental Management Systems (EMS). It provides a framework for organisations to design and implement an EMS, and continually improve their environmental performance.

Learn more: https://www.polyseam.com/sustainability/

## LCA: Scenarios and additional technical information

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

## 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 | A2 | A3 |
| | GWP-total | kg $CO_2$ -eq | 1,45E+00 | 8,45E-02 | 5,40E-02 |
| | GWP-fossil | kg $CO_2$ -eq | 1,45E+00 | 8,44E-02 | 5,23E-02 |
| | GWP-biogenic | kg $CO_2$ -eq | 4,00E-03 | 2,87E-05 | 1,68E-03 |
| | GWP-luluc | kg $CO_2$ -eq | 1,14E-03 | 4,18E-05 | 5,97E-05 |
| | ODP | kg CFC11 -eq | 1,32E-07 | 1,85E-08 | 4,67E-09 |
| | AP | mol H+ -eq | 8,47E-03 | 1,61E-03 | 1,83E-04 |
| | EP-FreshWater | kg P -eq | 5,36E-05 | 4,95E-07 | 1,34E-06 |
| | EP-Marine | kg N -eq | 1,50E-03 | 4,10E-04 | 3,70E-05 |
| | EP-Terrestial | mol N -eq | 1,60E-02 | 4,55E-03 | 4,03E-04 |
| | POCP | kg NMVOC -eq | 8,73E-03 | 1,21E-03 | 1,05E-04 |
| | ADP-minerals&metals[1] | kg Sb-eq | 6,67E-04 | 1,19E-06 | 6,49E-07 |
| | ADP-fossil[1] | MJ | 3,26E+01 | 1,19E+00 | 1,07E+00 |
| | WDP[1] | $m^3$ | 6,11E+01 | 6,48E-01 | 4,62E+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 | A2 | A3 |
| | PM | Disease incidence | 8,52E-08 | 4,01E-09 | 7,27E-10 |
| | IRP[2] | kgBq U235 -eq | 5,42E-02 | 5,16E-03 | 1,72E-02 |
| | ETP-fw[1] | CTUe | 3,08E+01 | 7,87E-01 | 7,72E-01 |
| | HTP-c[1] | CTUh | 2,66E-09 | 0,00E+00 | 1,90E-11 |
| | HTP-nc[1] | CTUh | 3,36E-08 | 6,82E-10 | 6,56E-10 |
| | SQP[1] | dimensionless | 2,01E+01 | 6,90E-01 | 8,97E-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 | A2 | A3 |
| | PERE | MJ | 1,96E+00 | 1,21E-02 | 2,94E-01 |
| | PERM | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| | PERT | MJ | 1,96E+00 | 1,21E-02 | 2,94E-01 |
| | PENRE | MJ | 2,95E+01 | 1,19E+00 | 1,07E+00 |
| | PENRM | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| | PENRT | MJ | 2,95E+01 | 1,19E+00 | 1,07E+00 |
| | SM | kg | 1,61E-02 | 0,00E+00 | 0,00E+00 |
| | RSF | MJ | 5,32E-02 | 3,89E-04 | 4,26E-04 |
| | NRSF | MJ | 8,58E-03 | 1,69E-03 | 4,96E-04 |
| | FW | $m^3$ | 3,44E-02 | 9,87E-05 | 4,30E-04 |

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 | A2 | A3 |
|---|---|---|---|---|---|
| | HWD | kg | 3,60E-03 | 5,71E-05 | 3,21E-03 |
| | NHWD | kg | 1,26E-01 | 4,70E-02 | 6,31E-03 |
| | RWD | kg | 5,43E-05 | 8,20E-06 | 8,58E-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 | A2 | A3 |
|---|---|---|---|---|---|
| | CRU | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| | MFR | kg | 5,25E-04 | 0,00E+00 | 1,10E-02 |
| | MER | kg | 2,59E-05 | 0,00E+00 | 8,75E-08 |
| | EEE | MJ | 1,68E-04 | 0,00E+00 | 8,41E-03 |
| | EET | MJ | 2,54E-03 | 0,00E+00 | 1,27E-01 |

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 | 0,00E+00 |

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, United Kingdom, Market mix (kWh) | ecoinvent 3.6 | 386,67 | g CO2-eq/kWh |
| Electricity, United Kingdom, Solar (kWh) | ecoinvent 3.6 | 78,98 | g CO2-eq/kWh |

### Dangerous substances

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

### Indoor environment

Protecta FR Graphite has been emission tested by Normec Product Testing. Meets the exemplary level criteria for indoor air quality as specified in the BREEAM UK New Construction Manual 2023 v6.1.

## Additional Environmental Information

| Additional environmental impact indicators required in NPCR Part A for construction products | | | | |
|---|---|---|---|---|
| **Indicator** | **Unit** | A1 | A2 | A3 |
| GWPIOBC | kg $CO_2$ -eq | 1,45E+00 | 8,45E-02 | 6,15E-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.
ecoinvent v3, (2019) Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.
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Graafland, J. and Ruttenborg, M. (2023) EPD generator for NPCR009:2021, Part B for Technical - Chemical products (non-cement based products), Background information for EPD generator application and LCA data, LCA.no report number: 12.23.
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NPCR 009 Part B for Technical - Chemical products for building and construction industry, Ver. 3.0, 06.10.2021, EPD Norway.

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