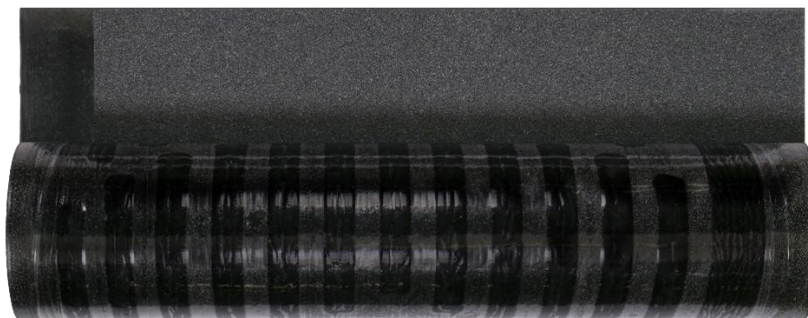
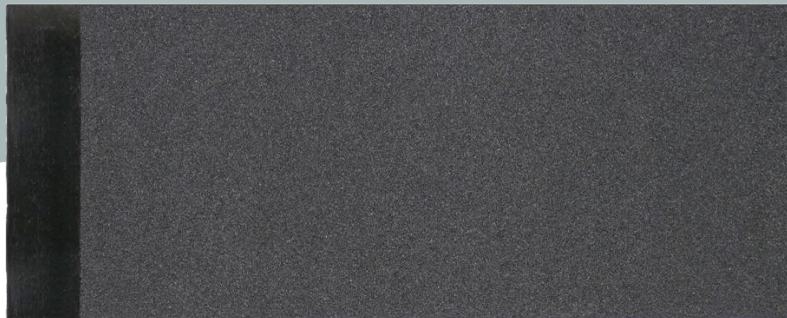


Owner: Derbigum  
No.: MD-23005-EN  
Issued: 30-06-2023  
Valid to: 30-06-2028

3<sup>rd</sup> PARTY VERIFIED

**EPD**

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



**Owner of declaration**

Imperbel NV/SA  
Chaussée de Wavre 67, 1360  
Perwez  
BE 0400.484.591


**Issued:**

30-06-2023

**Valid to:**

30-06-2028

**Programme**

EPD Danmark  
[www.epddanmark.dk](http://www.epddanmark.dk)



- Industry EPD  
 Product EPD

**Basis of calculation**

This EPD is developed in accordance with the European standard EN 15804+A2.

**Comparability**

EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

**Validity**

This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

**Use**

The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

**Declared product(s)**

Derbicolor NT Patch

Number of declared datasets/product variations: 1

**Production site**

Perwez, Belgium

Renewable electricity is used in A3 (production).

**EPD type**

- Cradle-to-gate with modules C1-C4 and D  
 Cradle-to-gate with options, modules C1-C4 and D  
 Cradle-to-grave and module D  
 Cradle-to-gate  
 Cradle-to-gate with options

**Product(s) use**

Bituminous roofing material

**Declared/ functional unit**

Functional unit: 1 m<sup>2</sup> installed roof waterproofing, from cradle-to-grave, with activities needed for a study period of 50 years for the building

**Year of production site data (A3)**

2021

**EPD version**

First version

CEN standard EN 15804 serves as the core PCR

Independent verification of the declaration and data, according to EN ISO 14025

- internal  external

Third party verifier:

Linda Højbye

Martha Katrine Sørensen  
EPD Danmark

**Life cycle stages and modules (MND = module not declared)**

| Product             |           |               | Construction process |                      | Use |             |        |             |               |                        |                       | End of life                |           |                  |          | Beyond the system boundary               |
|---------------------|-----------|---------------|----------------------|----------------------|-----|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|--|
| Raw material supply | Transport | Manufacturing | Transport            | Installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Re-use, recovery and 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           | X             | X                      | X                     | X                          | X         | X                | X        | X  |

# Product information

## Product description

Derbicolor NT patch is a bituminous waterproofing membrane, following the technical specification of EN13707:2004+A2:2009. The single-layer bitumen sheet is installed to provide the desired roof waterproofing function. On site, the layer is fixed thanks to self-sticky patches and/or torching.

Derbicolor NT Patch partly consists of bitumen extracted from recycled cutting waste from installing bituminous waterproofing membranes and used bituminous roofing membranes. The main product components are shown in the table below.

| Material          | Weight-% of declared product |
|-------------------|------------------------------|
| Bitumen, virgin   | 32 %                         |
| Bitumen, recycled | 8 %                          |
| Polymers          | 15 %                         |
| Filler            | 16 %                         |
| Reinforcements    | 3 %                          |
| Surfacing         | 25 %                         |

## Product packaging:

The different packaging materials weight in total <0,02 kg/m<sup>2</sup>. The composition of the sales- and transport packaging of the product is shown in the table below.

| Material                  | Weight-% of packaging |
|---------------------------|-----------------------|
| Tapes and Labelling       | 1%                    |
| Plastic wrapping          | 50%                   |
| Corrugated fibreboard box | 16%                   |
| Pallet                    | 33%                   |

## Representativity

This declaration, including data collection and the modelled foreground system including results, represents the production of one square meter Derbicolor NT Patch bitumen roof waterproofing system on the production site located in Perwez, Belgium. The product specific data, covering the production process and packaging of the products, as well as supplier location and information on inbound transport, has been

collected for the year 2021. Allocation of manufacturing data is based on the factory data from 2021 and allocated both based on the blend weight and production process specific parameters.

## Hazardous substances

Derbicolor NT patch contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation" in a concentration below 0.1% w/w.

(<http://echa.europa.eu/candidate-list-table>)

## Essential characteristics

The essential characteristics of the modified bituminous roofing membrane is covered by harmonized technical specification EN13707:2004+A2:2009. Declaration of performance according to EU regulation 305/2011 is available for the declared product.

Fire resistance: In accordance with EN 13501-5, class BROOF (t2,) according to method CEN/TS 1187.

The product has a technical service life of at least 50 years.

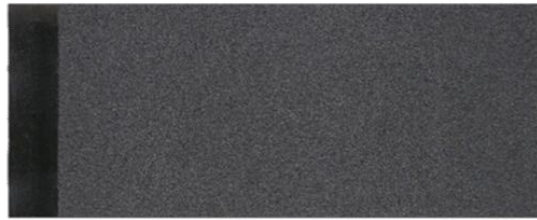
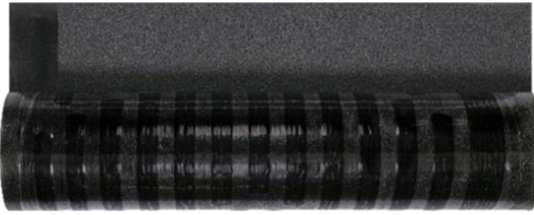
Further technical information can be obtained by contacting the manufacturer or on the manufacturer's website: [www.derbigum.dk/](http://www.derbigum.dk/)

## Reference Service Life (RSL)

The reference service life of the building is set to 50 years.

The Derbicolor NT Patch product system is expected to fulfil its function for the entirety of its installation, thus no replacement is expected for the Derbicolor NT Patch product system. Due to the technical characteristics the product is expected to last 50 years, in line with other products in Derbigums product range for which at least 50 year lifetime was observed (cf. TGA.2017/002).

Picture of product(s)



## LCA background

### Functional unit

The functional unit is defined as: “1 m<sup>2</sup> installed roof waterproofing, from cradle-to-grave, with activities needed for a study period of 50 years for the building”. The weight of the functional unit thus includes the production per square metre (5.59 kg/m<sup>2</sup>) in the modules A1-A3, the production of an estimated 11% overlap-joint needed for waterproof installation (0.62 kg/m<sup>2</sup>) in the modules A1-A3 and installation wastage (0.12 kg/m<sup>2</sup>) in the module A5.

| Name                      | Value        | Unit  |
|---------------------------|--------------|---|
| Functional unit           | 1            | m <sup>2</sup> installed roof waterproofing during 50 years |
| Weight per unit           | 6.33 (A1-A5) | kg/m <sup>2</sup>   |
| Conversion factor to 1 kg | 0.16         | m <sup>2</sup> /kg  |

### PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804:2012+A2:2019, and NPCR 022 version 2.0 (PCR – Part B for roof waterproofing), referred to as reference PCR. The reference PCR suggests an RSL of 60 years. To reflect Danish calculation rules, according to LCAbyg, this was changed to 50 years.

### Guarantee of Origin – certificates Foreground system:

The product is produced using electricity from renewable sources in Belgium, substantiated by a Guarantee of Origin. Other energy inputs, i.e., natural gas, propane and diesel are used for thermal energy and is modelled using a European consumption mix.

## System boundary

This is a product specific EPD with results per functional unit. The LCA study per functional unit uses a cradle-to-grave and module D system boundary. The LCA accounts for 100 product-weight-%.

The cut-off criteria, meaning the general rules for the exclusion of inputs and outputs, follows the requirements in EN 15804, 6.3.6, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of renewable and non-renewable primary energy usage and mass for unit processes. The application of cut-off criteria is described below.

### Excluded processes:

In addition to the processes explicitly excluded from the system boundary by EN 15804 and the reference PCR, the following exclusions have been made based on the cut-off criteria:

- Production and waste management of packaging materials used for incoming raw materials to Derbigum. This is assessed to fall well under the cut-off rules, as the total incoming packaging material is of marginal weight in comparison to the weight of the delivered raw material.

### Product stage (A1-A3) includes:

#### A1 – Raw material supply

Module A1 comprises impacts from extraction and processing of raw materials including bitumen, polymers, reinforcements (glass- and polyester fiber), fillers, etc. The module also includes the production of purchased electricity used at the Derbigum production site. The recycling process of secondary raw materials used in the product is also included in module A1.

#### A2 – Transport (to the production site)

Module A2 comprises impacts from transportation of raw materials to the Derbigum production site, which includes extraction and production of the fuels as well as the combustion of the fuel during the transportation.

#### A3 – Manufacturing

Module A3 includes the manufacturing of the final product, production of outgoing packaging,

combustion of fuels on site (natural gas, diesel, and propane), as well as end-of-life treatment of waste generated during manufacturing. Inflows and outflows of water that is used in the manufacturing is also included as well as the wastewater treatment.

The LCA results are declared in aggregated form for the product stage, which means that the sub-modules A1, A2 and A3 are declared as one module; A1-A3. The results in A1-A3 include the production of 1 m<sup>2</sup> waterproofing (5.59 kg/m<sup>2</sup>) as well as the production of an estimated 11% overlap-joint needed for waterproof installation (0.62 kg/m<sup>2</sup>).

### Construction process stage (A4-A5) includes:

#### A4 – Transport

Module A4 includes impacts from transportation of the finished product to an assumed installation site in Denmark. The distance is modelled as a distance from the manufacturing site in Perwez to a specific storage location in Denmark plus a transport distance from the storage location to a building site (300 km, default value from the reference PCR). The module includes extraction of the fuels and the combustion of the fuel during the transport.

#### A5 – Construction installation process

Module A5 represents installation of the product to the building at the installation site. The module includes additional production processes to compensate for the loss of wastage of products during installation (2% losses). It also includes production and combustion of propane for torching.

Waste from the installation is classified as materials for recycling (95%) and waste for incineration (5%), in accordance with Derbigums international internal statistics and experience. Impacts from these waste management processes are included in module A5 whereas potential benefits are reported in module D.

**Use stage (B1-B7) includes:****B1 – Use**

No impacts from use have been included in accordance with the default values provided in the reference PCR.

**B2 – Maintenance**

No impacts from maintenance have been included in accordance with the default values provided in the reference PCR.

**B3 – Repair**

No impacts from repair have been included in accordance with the default values provided in the reference PCR. Planned replacement is accounted for in module B4 as required by the reference PCR.

**B4 – Replacement**

No impacts from replacement have been included since the product is expected to fulfill its function for 50 years and thus no replacement is needed.

**B5 – Refurbishment**

No impacts from the refurbishment have been included in accordance with the default values provided in the reference PCR. Planned replacement is accounted for in B4 as required by the reference PCR.

**B6 – Operational energy use**

The roofing system does not require energy to operate and therefore no operational energy use is included.

**B7 – Operational water use**

The roofing system does not require water to operate, there is therefore no operational water use for either of the product systems.

**End of Life (C1-C4) includes:**

All Derbigum roofs sold on the Danish market come with a “take back” guarantee incentivizing recycling. This recycling is seen as the only relevant common practice for waste treatment.

The recycling scenario is assumed to consist of 95% for material recycling and the remaining 5% to incineration for energy recovery in Denmark. (The scenario shall represent the situation if 100% of the roof shall be recycled but incorporates the in reality observed inefficiency of

that process, i.e., including collection and sorting loss, compare CEN/TR 16970:2016 ch. 6.3.8.)

**C1 – De-construction, demolition**

De-construction of the waterproofing sheet was assumed to be done manually, and thus not require any processes with an environmental impact.

**C2 – Transport (to waste processing)**

Comprises impacts from transportation of the deconstructed products after 50 years to the waste processing (incineration or recycling site).

**C3 – Waste processing**

Module C3 consists of the waste processing steps of the bitumen sheets at the end-of-life, representing the recycling of the bitumen sheets

Emissions from the incinerated materials in Denmark are reported in module C3 and the benefits from heat and electricity generation are carried forward to module D. These outflows from module C3 are recorded in the result tables as “exported electrical energy” (EEE) for exported electricity, “exported thermal energy” (EET) for heat, “materials for recycling” (MFR) for materials that are recycled.

The recycling of the decommissioned roofing material produced is not processed within the system boundaries since it is collected by Derbigum for recycling. The decommissioned roofing material is judged to reach an end-of-waste state when it arrives at the Derbigum site in Perwez, Belgium. Hence, the waste flow is reported as materials for recycling in C3, but the burden from the recycling process and the benefits from replacing material is recorded in module D.

**C4 – Disposal**

Ashes and other remains after incineration are reported in stage C4.

**Re-use, recovery and recycling potential (D) includes:**

Module D includes recovery and/or recycling potential, expressed as net impact and benefits.

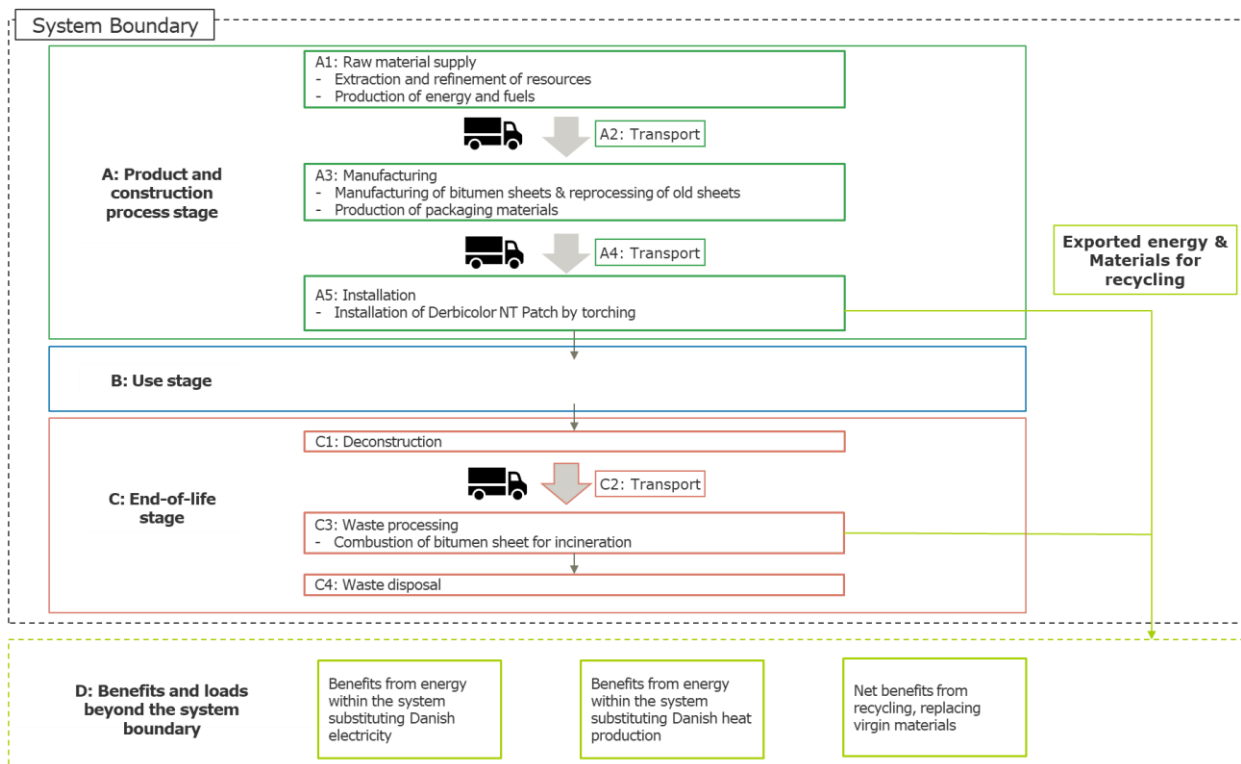
In this study material and energy flows (heat and electricity) enters module D from different modules:

- the bitumen waste material (trimmings) produced in module A5 that is sent to recycling,
- energy flows from incineration of bitumen waste material (trimmings) produced in module A5
- energy flows from incineration of packaging in module A5
- bitumen material from module C3 that is sent to recycling
- energy flows from incineration of bitumen waste material from C-module that is sent to incineration with energy recovery

When bitumen sheets are sent to recycling throughout the modules, the burden from the recycling process and the net benefit of this recycling is reported in module D. The net benefit consists of the virgin material in the bitumen sheet replacing alternative material production.

When the product is incinerated the burdens of the incineration are reported in the respective originating modules (modules A5 and C3). The produced energy (heat and electricity) is recovered and assumed to replace the heat and electricity that would otherwise have been produced from other sources. This benefit is reported in module D.

**Flowdiagram**



# LCA results per functional unit

## Results per functional unit

| ENVIRONMENTAL IMPACTS per m2 installed roof waterproofing during 50 years |   |          |          |          |          |          |          |          |          |           |
|---|---|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter   | Unit  | A1-A3    | A4       | A5       | B1-B7    | C1       | C2       | C3       | C4       | D         |
| GWP-total   | [kg CO <sub>2</sub> eq.]  | 2.88E+00 | 6.65E-01 | 2.72E-01 | 0.00E+00 | 0.00E+00 | 6.31E-01 | 7.49E-01 | 0.00E+00 | -2.49E+00 |
| GWP-fossil  | [kg CO <sub>2</sub> eq.]  | 2.87E+00 | 6.58E-01 | 2.54E-01 | 0.00E+00 | 0.00E+00 | 6.24E-01 | 7.49E-01 | 0.00E+00 | -2.49E+00 |
| GWP-biogenic  | [kg CO <sub>2</sub> eq.]  | 1.09E-02 | 2.77E-03 | 1.87E-02 | 0.00E+00 | 0.00E+00 | 2.63E-03 | 1.15E-04 | 0.00E+00 | -4.22E-03 |
| GWP-luluc   | [kg CO <sub>2</sub> eq.]  | 1.47E-03 | 4.49E-03 | 1.47E-04 | 0.00E+00 | 0.00E+00 | 4.26E-03 | 1.62E-05 | 0.00E+00 | -1.12E-03 |
| ODP   | [kg CFC 11 eq.]   | 8.95E-08 | 8.24E-14 | 1.10E-08 | 0.00E+00 | 0.00E+00 | 7.82E-14 | 3.28E-09 | 0.00E+00 | -7.27E-08 |
| AP  | [mol H <sup>+</sup> eq.]  | 8.98E-03 | 1.14E-03 | 5.65E-04 | 0.00E+00 | 0.00E+00 | 1.08E-03 | 2.65E-04 | 0.00E+00 | -6.78E-03 |
| EP-freshwater   | [kg PO <sub>4</sub> eq.]  | 1.67E-04 | 2.39E-06 | 1.26E-05 | 0.00E+00 | 0.00E+00 | 2.27E-06 | 3.48E-06 | 0.00E+00 | -1.59E-04 |
| EP-marine   | [kg N eq.]  | 2.45E-03 | 4.52E-04 | 1.57E-04 | 0.00E+00 | 0.00E+00 | 4.29E-04 | 7.69E-05 | 0.00E+00 | -1.73E-03 |
| EP-terrestrial  | [mol N eq.]   | 2.67E-02 | 5.13E-03 | 1.71E-03 | 0.00E+00 | 0.00E+00 | 4.87E-03 | 7.11E-04 | 0.00E+00 | -1.67E-02 |
| POCP  | [kg NMVOC eq.]  | 8.97E-03 | 1.01E-03 | 5.77E-04 | 0.00E+00 | 0.00E+00 | 9.57E-04 | 1.82E-04 | 0.00E+00 | -6.40E-03 |
| ADPm <sup>1</sup>   | [kg Sb eq.]   | 3.58E-06 | 6.78E-08 | 5.13E-07 | 0.00E+00 | 0.00E+00 | 6.44E-08 | 8.44E-08 | 0.00E+00 | 1.19E-06  |
| ADPf <sup>1</sup>   | [MJ]  | 1.70E+02 | 8.84E+00 | 6.59E+00 | 0.00E+00 | 0.00E+00 | 8.39E+00 | 1.88E-01 | 0.00E+00 | -1.62E+02 |
| WDP <sup>1</sup>  | [m <sup>3</sup> world eq. deprived]   | 3.68E-01 | 7.77E-03 | 1.89E-02 | 0.00E+00 | 0.00E+00 | 7.37E-03 | 1.78E-02 | 0.00E+00 | -3.82E-01 |
| Caption   | GWP-total = Globale 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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use |          |          |          |          |          |          |          |          |           |
| Disclaimer  | <sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.  |          |          |          |          |          |          |          |          |           |

| ADDITIONAL ENVIRONMENTAL IMPACTS per m2 installed roof waterproofing during 50 years |  |          |          |          |          |          |          |          |          |           |
|--|--|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter  | Unit   | A1-A3    | A4       | A5       | B1-B7    | C1       | C2       | C3       | C4       | D         |
| PM   | [Disease incidence]  | 6.00E-08 | 7.21E-09 | 5.67E-09 | 0.00E+00 | 0.00E+00 | 6.84E-09 | 1.64E-09 | 0.00E+00 | -1.53E-08 |
| IRP <sup>2</sup>   | [kBq U235 eq.]   | 7.33E-01 | 2.55E-03 | 1.71E-02 | 0.00E+00 | 0.00E+00 | 2.42E-03 | 8.03E-04 | 0.00E+00 | -7.32E-01 |
| ETP-fw <sup>1</sup>  | [CTUe]   | 7.35E+01 | 6.23E+00 | 3.96E+00 | 0.00E+00 | 0.00E+00 | 5.91E+00 | 3.24E-01 | 0.00E+00 | -7.22E+01 |
| HTP-c <sup>1</sup>   | [CTUh]   | 2.57E-09 | 1.28E-10 | 1.29E-10 | 0.00E+00 | 0.00E+00 | 1.22E-10 | 2.35E-11 | 0.00E+00 | -2.54E-09 |
| HTP-nc <sup>1</sup>  | [CTUh]   | 6.78E-08 | 7.14E-09 | 3.68E-09 | 0.00E+00 | 0.00E+00 | 6.78E-09 | 7.46E-10 | 0.00E+00 | -6.81E-08 |
| SQP <sup>1</sup>   | -  | 2.23E+01 | 3.71E+00 | 6.61E-01 | 0.00E+00 | 0.00E+00 | 3.52E+00 | 9.84E-02 | 0.00E+00 | -3.07E+01 |
| Caption  | 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 = Soil Quality (dimensionless)  |          |          |          |          |          |          |          |          |           |
| Disclaimers  | <sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.   |          |          |          |          |          |          |          |          |           |
|  | <sup>2</sup> 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 per m2 installed roof waterproofing during 50 years**

| Parameter | Unit  | A1-A3    | A4       | A5       | B1-B7    | C1       | C2       | C3       | C4       | D         |
|-----------|---|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| PERE      | [MJ]  | 4.34E+00 | 6.15E-01 | 1.34E-01 | 0.00E+00 | 0.00E+00 | 5.83E-01 | 7.88E-03 | 0.00E+00 | -8.29E+00 |
| PERM      | [MJ]  | 1.76E-01 | 0.00E+00 | 3.52E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | -1.74E-01 |
| PERT      | [MJ]  | 4.52E+00 | 6.15E-01 | 1.37E-01 | 0.00E+00 | 0.00E+00 | 5.83E-01 | 7.88E-03 | 0.00E+00 | -8.46E+00 |
| PENRE     | [MJ]  | 3.64E+01 | 8.88E+00 | 3.93E+00 | 0.00E+00 | 0.00E+00 | 8.42E+00 | 1.88E-01 | 0.00E+00 | -3.40E+01 |
| PENRM     | [MJ]  | 2.24E+02 | 0.00E+00 | 4.47E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | -2.21E+02 |
| PENRT     | [MJ]  | 1.68E+02 | 8.88E+00 | 6.56E+00 | 0.00E+00 | 0.00E+00 | 8.42E+00 | 1.88E-01 | 0.00E+00 | -1.64E+02 |
| SM        | [kg]  | 3.03E-01 | 0.00E+00 | 6.07E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | -3.00E-01 |
| RSF       | [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 | 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 | 0.00E+00 | 0.00E+00  |
| FW        | [m <sup>3</sup> ]   | 1.36E-02 | 7.19E-04 | 5.56E-04 | 0.00E+00 | 0.00E+00 | 6.82E-04 | 4.14E-04 | 0.00E+00 | -1.31E-02 |
| Caption   | 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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water |          |          |          |          |          |          |          |          |           |

**WASTE CATEGORIES AND OUTPUT FLOWS per m2 installed roof waterproofing during 50 years**

| Parameter | Unit   | A1-A3    | A4       | A5       | B1-B7    | C1       | C2       | C3       | C4       | D         |
|-----------|--|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| HWD       | [kg]   | 1.36E-02 | 6.47E-11 | 2.72E-04 | 0.00E+00 | 0.00E+00 | 6.14E-11 | 0.00E+00 | 0.00E+00 | -1.34E-02 |
| NHWD      | [kg]   | 1.02E-01 | 1.46E-03 | 4.91E-03 | 0.00E+00 | 0.00E+00 | 1.39E-03 | 0.00E+00 | 0.00E+00 | -1.05E-01 |
| RWD       | [kg]   | 1.56E-03 | 1.72E-05 | 3.39E-05 | 0.00E+00 | 0.00E+00 | 1.63E-05 | 0.00E+00 | 0.00E+00 | -1.63E-03 |
| 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 | 0.00E+00  |
| MFR       | [kg]   | 6.86E-02 | 0.00E+00 | 1.19E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.02E+00 | 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 | 0.00E+00 | 0.00E+00  |
| EEE       | [MJ]   | 0.00E+00 | 0.00E+00 | 9.90E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.23E+00 | 0.00E+00 | 0.00E+00  |
| EET       | [MJ]   | 0.00E+00 | 0.00E+00 | 1.81E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E+00 | 0.00E+00 | 0.00E+00  |
| Caption   | HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy |          |          |          |          |          |          |          |          |           |

**BIOGENIC CARBON CONTENT per m2 installed roof waterproofing during 50 years**

| Parameter   | Unit  | At the factory gate |
|---|---|---------------------|
| Biogenic carbon content in product                | [kg C]  | 0                   |
| Biogenic carbon content in accompanying packaging | [kg C]  | 7.84E-02            |
| Note  | 1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub> |                     |

# Additional information

## Technical information on scenarios in the functional unit

### Transport to the building site (A4)

| Scenario information                        | Value   | Unit |
|---|---|------|
| Fuel type                                   | Diesel  | -    |
| Vehicle type                                | Truck, 20 - 26t gross weight,<br>Euro 0 - 6 mix | -    |
| Transport distance                          | 1230  | km   |
| Capacity utilisation (including empty runs) | 55  | %    |

### Installation of the product in the building (A5)

| Scenario information             | Value         | Unit           |
|----------------------------------|---------------|----------------|
| Wastage of construction products | 0.12          | kg             |
| Water use                        | 0             | m <sup>3</sup> |
| Other resource use               | 0             | kg             |
| Energy type and consumption      | Propane, 0.30 | kg             |
| Output materials (for reuse)     | 0             | kg             |

### Reference service life

| RSL information             |  |
|-----------------------------|--|
| Reference service Life      | 50 years for building, 50 years for product  |
| Declared product properties | Roof waterproofing   |
| Assumed quality of work     | Instructions are available via: <a href="http://www.derbigum.dk/">www.derbigum.dk/</a> |
| Maintenance                 | -  |

### Use (B1-B7)

| Scenario information                      | Value            | Unit |
|---|------------------|------|
| <b>B1 – Use</b>                           |                  |      |
|   | No emissions     |      |
| <b>B2 - Maintenance</b>                   |                  |      |
| Maintenance process                       | No maintenance   | -    |
| <b>B3 – Repair</b>                        |                  |      |
| Repair process                            | No repair        | -    |
| <b>B4 – Replacement</b>                   |                  |      |
| Replacement cycle                         | No replacement   | -    |
| <b>B5 - Refurbishment</b>                 |                  |      |
| Refurbishment process                     | No refurbishment | -    |
| <b>B6 + B7 – Use of energy and water</b>  |                  |      |
| Ancillary materials specified by material | None             | -    |

### End of life (C1-C4)

| Scenario information                 | Value in functional unit recycling scenario   | Unit |
|--------------------------------------|---|------|
| Collected separately                 | 6.02 (95%)  | kg   |
| Collected with mixed waste           | 0.32 (5%)   | kg   |
| For reuse                            | 0 (0%)  | kg   |
| For recycling                        | 6.02 (95%)  | kg   |
| For energy recovery                  | 0.32 (5%)   | kg   |
| For final disposal                   | 0 (0%)  | kg   |
| Assumptions for scenario development | Derbigum's international internal statistics and experience from the take back system |      |

### Re-use, recovery and recycling potential (D)

| Recycling scenario                        | Value | Unit |
|---|-------|------|
| Electricity leaving the system            | 1.34  | MJ   |
| Heat leaving the system                   | 2.61  | MJ   |
| Material for recycling leaving the system | 6.13  | kg   |

#### Indoor air

*The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.*

#### Soil and water

*The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.*

## References

|                                       |  |
|---------------------------------------|--|
| <b>Publisher</b>                      |  epddanmark<br>www.epddanmark.dk<br>Template version 2022.2   |
| <b>Programme operator</b>             | Danish Technological Institute<br>Buildings & Environment<br>Gregersensvej<br>DK-2630 Taastrup<br>www.teknologisk.dk   |
| <b>LCA-practitioner</b>               | <i>Jonathan Klement, Yevgeniya Arushanyan and Niclas Silfverstrand</i><br>Ramboll Sweden AB<br>Email: <a href="mailto:jonathan.klement@ramboll.se">jonathan.klement@ramboll.se</a><br><a href="mailto:yevgeniya.arushanyan@ramboll.se">yevgeniya.arushanyan@ramboll.se</a><br><a href="mailto:niclas.silfverstrand@ramboll.se">niclas.silfverstrand@ramboll.se</a> |
| <b>LCA software / background data</b> | <i>GaBi 10.6.2.9 incl. data from GaBi Professional database 2022.2, Data on demand, ecoinvent version 3.8 and the Eurobitume, 2022 LCI profile version 3.1 with infrastructure.</i>  |
| <b>3<sup>rd</sup> party verifier</b>  | <i>Linda Høibye</i><br>Life Cycle Assessment Consulting<br>Email: <a href="mailto:hoeibye@gmail.com">hoeibye@gmail.com</a>   |

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**General programme instructions**

General Programme Instructions, version 2.0, spring 2020  
www.epddanmark.dk

**EN 15804**

DS/EN 15804 + A2:2019 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

**CEN/TR 16970:2016**

CEN/TR 16970:2016 – "Sustainability of construction works – Guidance for the implementation of EN 15804"

**Product-specific NPCR – EPD Norge**

NPCR 022 version 2.0 (PCR – Part B for roof waterproofing)

**EN 15942**

DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

**ISO 14025**

DS/EN ISO 14025:2010 – " Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

**ISO 14040**

DS/EN ISO 14040:2008 – " Environmental management – Life cycle assessment – Principles and framework"

**ISO 14044**

DS/EN ISO 14044:2008 – " Environmental management – Life cycle assessment – Requirements and guidelines"

**Eurobitume. (2022)**

The Eurobitume Life-Cycle Inventory for bitumen, version 3.1. Brussels: European Bitumen Association. (used together with version 3.0)

**ETA Danmark (2023)**

Teknisk Godkendelse til Anvendelsen Nr. TGA.2017/002

**Ramboll (2023)**

LCA report for Derbicolor NT Patch and Derbicoat NT on the Danish market