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The Norwegian EPD Foundation

# ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

| | |
|---|---|
| Owner of the declaration: | Jotun A/S |
| Program operator: | The Norwegian EPD Foundation |
| Publisher: | The Norwegian EPD Foundation |
| Declaration number: | NEPD-1479-497-EN |
| Registration number: | NEPD-1479-497-EN |
| ECO Platform reference number: | - |
| Issue date: | 19.12.2017 |
| Valid to: | 19.12.2022 |

# Jotashield SuperDurable Silk, Jotun Boya San. ve Tic. A.S.

Jotun A/S

www.epd-norge.no

## General information

**Product:**

Jotashield SuperDurable Silk, Jotun Boya San. ve Tic. A.S.

**Owner of the declaration:**

Jotun A/S
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**Program operator:**

The Norwegian EPD Foundation
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Phone: +47 23 08 80 00
e-mail: post@epd-norge.no

**Manufacturer:**

Jotun A/S

**Declaration number:** NEPD-1479-497-EN

**Place of production:**

Jotun Boya San. ve Tic. A.S.
Organize Sanayi Bolgesi, G.O.P. Mahallesi, Ulusoy Cad, No:8, Cerkezköy 59500 Tekirdag, Turkey

**ECO Platform reference number:**

**Management system:**

ISO 9001:2008 Certificate nr: 0044915-00, ISO 14001:2004 Certificate nr 0044914-00, OHSAS 18001:2007 Certificate nr: 0044916-00.

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

CEN Standard EN 15804:2012+A1:2013 serves as core PCR.
Product descriptions and scenarios are based on IBU PCR Part B for coatings with organic binders. This also applies for inorganic coatings.

**Organisation no:**

923 248 579

**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.

**Issue date:** 19.12.2017

**Valid to:** 19.12.2022

**Declared unit:**

1 kg Jotashield SuperDurable Silk, Jotun Boya San. ve Tic. A.S.

**Year of study:**

2017

**Declared unit with option:**

A1,A2,A3,A4

**Comparability:**

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

**Functional unit:**

**Author of the Life Cycle Assessment:**

The declaration is developed using eEPD v2.0
Approval:
Company specific data are:

| | |
|---|---|
| Collected/registered by: | Anne Elisabeth Thorstensen |
| Internal verification by: | Anne Lill Gade |

**Verification:**

Independent verification of data, other environmental information and the declaration according to ISO14025:2010, § 8.1.3 and § 8.1.4

External

Third party verifier:

Sign

Senior Research Scientist, Anne Rønning

(Independent verifier approved by EPD Norway)

**Approved:**

Sign

Håkon Hauan
Managing Director of EPD-Norway

## Product

**Product description:**

Jotashield SuperDurable Silk is a superior quality, exterior water based paint. This product is based on extremely durable, 100 % pure silicon acrylic emulsion. Its unique formulation protects concrete from carbonation (acts as anticarbonation coating). The unique UV protected colours offer outstanding protection against distractive effect of UV rays present in sunlight. The special acrylic binder provides durable and long lasting silk finish with low dirt pick up.

The declared product is specially designed to withstand harsh climate and weather conditions. It is ideal for decorating and protecting exterior surfaces, also as a topcoat on textured systems.

**Product specification**

For information on Green Building Standard credits, see "Additional Information" on page 4.

The material composition of the declared mixed product is given below:

| Materials | |
|---|---|
| Water | 25 - 50 % |
| Binder | 10 - 25 % |
| Filler | 10 - 25 % |
| Titanium dioxide | 10 - 25 % |
| Solvent | 10 - 25 % |
| Additive | 0.1 - 0.3 % |
| Biocide | <0.1 % |

**Technical data:**

Specific gravity: 1.32
Solids by volume: 40 ± 2 volume%
Dry film thickness: 30 - 50 µm
Wet film thickness: 75 - 125 µm
Theoretical spreading rate: 13 - 8 m²/l

The most representative and worst case formulation produced at the manufacturing site is chosen for this EPD. For products with a selection of colours, this will be the formulation with the highest content of titanium dioxide.

The product packaging is based on an average sized metal packaging, including secondary packaging such as pallets and plastic wrapping.

For safety, health and environmental conditions, see the Safety Data Sheet for the declared product on www.jotun.com.

For information on technical data, application and use of the product, see the Technical Data Sheet for the declared product on www.jotun.com.

**Market:**

Turkey

**Reference service life, product**

The reference service life of the product is highly dependent on the conditions of use.

**Estimated service life, object**

The coated object is not declared.

## LCA: Calculation rules

**Declared unit:**

1 kg Jotashield SuperDurable Silk, Jotun Boya San. ve Tic. A.S.

**Cut-off criteria:**

All major raw materials and essential energy is included. The production process for raw materials and energy flows with very small amounts (less than 0.1 % dry matter) are not included. In total, more than 99% of the material input is included. This cut-off rule does not apply for non-energy related emissions (such as wastes, hazardous materials and substances).

**Allocation:**

The allocation is made in accordance with the provisions of EN 15804. Incoming energy, water and waste production in-house is primarily allocated equally among all products through mass allocation. Specific allocation was performed for certain waste flows according to information provided by the site manager. VOC emissions have been allocated entirely to the production of solvent based paints. 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.

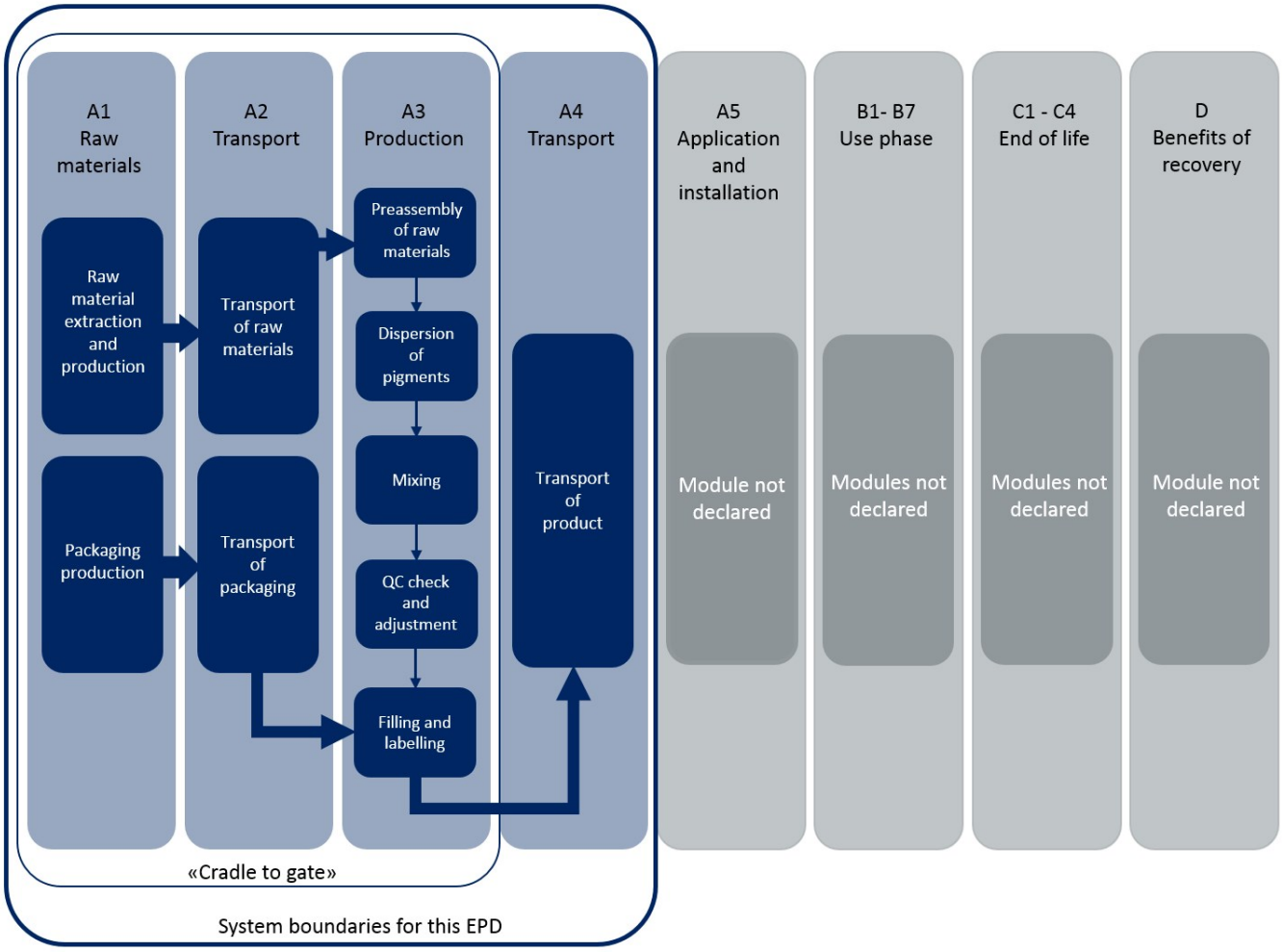
**Data quality:**

The CEPE database is used as basis for the raw material composition. Specific data for the product composition and raw material amounts has been provided by the manufacturer and represents the production of the declared product. Production site data was collected in 2015. Representative data from ecoinvent v3.2 was used for other processes. The data quality for the material input in A1 is presented in tabular form.

| Materials | Source | Data quality | Year |
|---|---|---|---|
| Additives | CEPE RM Database v3.0 | Database | 2016 |
| Binders and Resins | CEPE RM Database v3.0 | Database | 2016 |
| Others | CEPE RM Database v3.0 | Database | 2016 |
| Pigments and Fillers | CEPE RM Database v3.0 | Database | 2016 |
| Solvents | CEPE RM Database v3.0 | Database | 2016 |
| Packaging | Østfoldforskning | Database | 2017 |

**System boundary:**

The flowchart in the figure below illustrates the system boundaries. They are in accordance with EN15804. The analysis is a cradle-to-gate study. EPD Norway requires also A4 to be added. This implies that the EPD modules A1 to A3 with option A4 are included.




**Additional information:**

The declared product contributes to Green Building Standard credits by meeting the following specific requirements:

LEED®v4 (2013)
MR credit: Building product disclosure and optimization
- Material Ingredients, Option 2: Material Ingredient Optimization, International Alternative Compliance Path - REACH optimization. The product has fully inventoried chemical ingredients to 100 ppm and do not contain substances on the REACH Authorization list – Annex XIV, the Restriction list – Annex XVII and the SVHC candidate list.
- Environmental Product Declarations. Product-specific Type III EPD (ISO 14025;21930, EN 15804) for Turkey.

BREEAM International (2016)
Mat 01: Product-specific Type III EPD (ISO 14025;21930, EN 15804) for Turkey.

Additional certificates and approvals may be available on request.

## LCA: Scenarios and additional technical information

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

The only scenario module declared after the factory gate is A4 transport to market.

**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 | 53,0 % | Truck World, EURO 3 | 366 | 0,019595 | l/tkm | 7,17 |
| Railway | | | | | l/tkm | |
| Boat | | | | | l/tkm | |
| Other Transportation | | | | | l/tkm | |

**Assembly (A5)**

| . | Unit | Value |
|---|---|---|
| Auxiliary | kg | |
| Water consumption | $m^3$ | |
| Electricity consumption | kWh | |
| Other energy carriers | MJ | |
| Material loss | kg | |
| Output materials from waste treatment | kg | |
| Dust in the air | kg | |
| VOC emissions | kg | |

**Use (B1)**

| . | Unit | Value |
|---|---|---|
| | | |

**Maintenance (B2)/Repair (B3)**

| . | Unit | Value |
|---|---|---|
| Maintenance cycle* | . | |
| Auxiliary | kg | |
| Other resources | kg | |
| Water consumption | $m^3$ | |
| Electricity consumption | kWh | |
| Other energy carriers | MJ | |
| Material loss | kg | |
| VOC emissions | kg | |

**Replacement (B4)/Refurbishment (B5)**

| . | Unit | Value |
|---|---|---|
| Replacement cycle* | | |
| Electricity consumption | kWh | |
| Replacement of worn parts | | |

* Described above if relevant

**Operational energy (B6) and water consumption (B7)**

| . | Unit | Value |
|---|---|---|
| Water consumption | $m^3$ | |
| Electricity consumption | kWh | |
| Other energy carriers | MJ | |
| Power output of equipment | kW | |

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

| . | Unit | Value |
|---|---|---|
| Hazardous waste disposed | kg | |
| Collected as mixed construction waste | kg | |
| Reuse | kg | |
| Recycling | kg | |
| 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 | | | | | l/tkm | |
| Railway | | | | | l/tkm | |
| Boat | | | | | l/tkm | |
| Other Transportation | | | | | l/tkm | |

## LCA: Results

## 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 bondaries |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | . | MND |

### Environmental impact

| Parameter | Unit | A1 | A2 | A3 | A4 |
|---|---|---|---|---|---|
| GWP | kg $CO_2$ -eq | 3,02E+00 | 1,96E-01 | 1,30E-02 | 3,45E-02 |
| ODP | kg CFC11 -eq | 3,12E-07 | 3,70E-08 | 1,37E-09 | 6,72E-09 |
| POCP | kg $C_2H_4$-eq | 1,70E-03 | 8,84E-05 | 5,27E-06 | 6,48E-06 |
| AP | kg $SO_2$ -eq | 1,93E-02 | 2,69E-03 | 7,30E-05 | 1,83E-04 |
| EP | kg $PO_4^{3-}$ -eq | 4,55E-03 | 3,38E-04 | 2,63E-04 | 4,23E-05 |
| ADPM | kg Sb -eq | 2,54E-05 | 1,92E-07 | 3,33E-09 | 6,35E-08 |
| ADPE | MJ | 4,44E+01 | 3,06E+00 | 3,98E-01 | 5,71E-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

## Resource use

| Parameter | Unit | A1 | A2 | A3 | A4 |
|---|---|---|---|---|---|
| RPEE | MJ | 3,32E+00 | 5,93E-02 | 1,12E-03 | 7,45E-03 |
| RPEM | MJ | 6,99E-01 | 1,28E-02 | 3,21E-04 | 2,30E-03 |
| TPE | MJ | 4,02E+00 | 7,20E-02 | 1,44E-03 | 9,75E-03 |
| NRPE | MJ | 4,86E+01 | 3,17E+00 | 4,02E-01 | 5,79E-01 |
| NRPM | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| TRPE | MJ | 4,86E+01 | 3,17E+00 | 4,02E-01 | 5,79E-01 |
| SM | MJ | 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 |
| NRSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| W | $m^3$ | 5,06E-02 | 5,54E-04 | 2,93E-05 | 1,29E-04 |

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

## End of life - Waste

| Parameter | Unit | A1 | A2 | A3 | A4 |
|---|---|---|---|---|---|
| HW | kg | 4,46E-05 | 1,59E-06 | 2,56E-07 | 3,08E-07 |
| NHW | kg | 1,95E+00 | 1,47E-01 | 7,90E-02 | 4,86E-02 |
| RW | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

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

## End of life - Output flow

| Parameter | Unit | A1 | A2 | A3 | A4 |
|---|---|---|---|---|---|
| CR | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| MR | kg | 0,00E+00 | 0,00E+00 | 3,34E-03 | 0,00E+00 |
| MER | kg | 0,00E+00 | 0,00E+00 | 8,35E-03 | 0,00E+00 |
| EEE | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| ETE | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

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

## 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 | Data source | Amount | Unit |
|---|---|---|---|
| Electricity, Turkey (kWh) | ecoinvent 3.3 Alloc Rec | 696,97 | g CO2-ekv/kWh |

**Dangerous substances**

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

**Indoor environment**

Not applicable for externally applied products.

## 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 21930:2007 Sustainability in building construction - Environmental declaration of building products
IBU PCR Part B: Requirements on the EPD for Coatings with organic binders. v1.4, September 2016
Vold et al (2017). EPD and LCA tool for Jotun - Technical description and background information, OR 01.17, Ostfold Research, Fredrikstad 2017
CEPE v3.0 Raw materials LCI database for the European coatings and printing ink industries
ecoinvent v3.2 Alloc Rec, Swiss Centre of Life Cycle Inventories

BREEAM International (2016): BREEAM International New Construction Technical Manual. SD233-2.0:2017
LEED® v4: LEED® v4 for Building design and construction, U.S. Green Building Council®, 2013
REACH. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006
SVHC candidate list. Candidate List of substances of very high concern for Authorisation IAW Article 59(10) of the REACH Regulation



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