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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-1826-780-EN
Registration number:	NEPD-1826-780-EN
ECO Platform reference number:	-
Issue date:	11.07.2019
Valid to:	11.07.2024

Penguard WF, PT. Jotun Indonesia

Jotun A/S

www.epd-norge.no

General information

Product:

Penguard WF, PT. Jotun Indonesia

Owner of the declaration:

Jotun A/S
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Manufacturer:

Jotun A/S

Declaration number: NEPD-1826-780-EN

Place of production:

PT. Jotun Indonesia
Kawasan Industri MM2100, Jalan Irian III,Blok KK1 Cikarang Barat, Bekasi 17520, Indonesia

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: 11.07.2019

Valid to: 11.07.2024

Declared unit:

1 kg Penguard WF, PT. Jotun Indonesia

Year of study:

2019

Declared unit with option:

A1,A2,A3

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 v3.0 from LCA.no
Approval:
Company specific data are:

Collected/registered by:	Anne Elisabeth Årdal
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:

Penguard WF is a two component water borne epoxy coating for corrosion protection. It is a versatile, fast drying product containing flash rust inhibitors that cures down to 41 °F (5 °C). This product is specially designed for new construction where short dry to handle and over coating times are required. It can be used as primer, mid coat, finish coat or as single coat system in atmospheric environments and is suitable for properly prepared carbon steel, aluminum, concrete and galvanized steel substrates. Penguard WF is available with hardener for application at low substrate temperatures.

The declared product is suitable for structural steel and piping to be exposed to corrosive environments up to high and is recommended for offshore environments, refineries, power plants, bridges, buildings and mining equipment. It is also suitable for over coating with water borne acrylics, water borne epoxy and suitable solvent borne coatings.

Product specification

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

The material composition of the declared product is given below:

Materials	
Binder	25 - 50 %
Water	25 - 50 %
Filler	10 - 25 %
Titanium dioxide	5 - 10 %
Pigment	3 - 5 %
Solvent	3 - 5 %
Additive	0.3 - 1 %
Biocide	<0.1 %

Technical data:

Product mixing ratio (by volume):
Penguard WF Comp A: 2 parts
Penguard WF Comp B: 1 part

Density: 1.3 kg/l
Solids by volume: 51 ± 2%
Dry film thickness: 75 - 150 µm
Wet film thickness: 145 - 295 µm
Theoretical spreading rate: 6.8 - 3.4 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:

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

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 Penguard WF, PT. Jotun Indonesia

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. These cut-off criteria do 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.

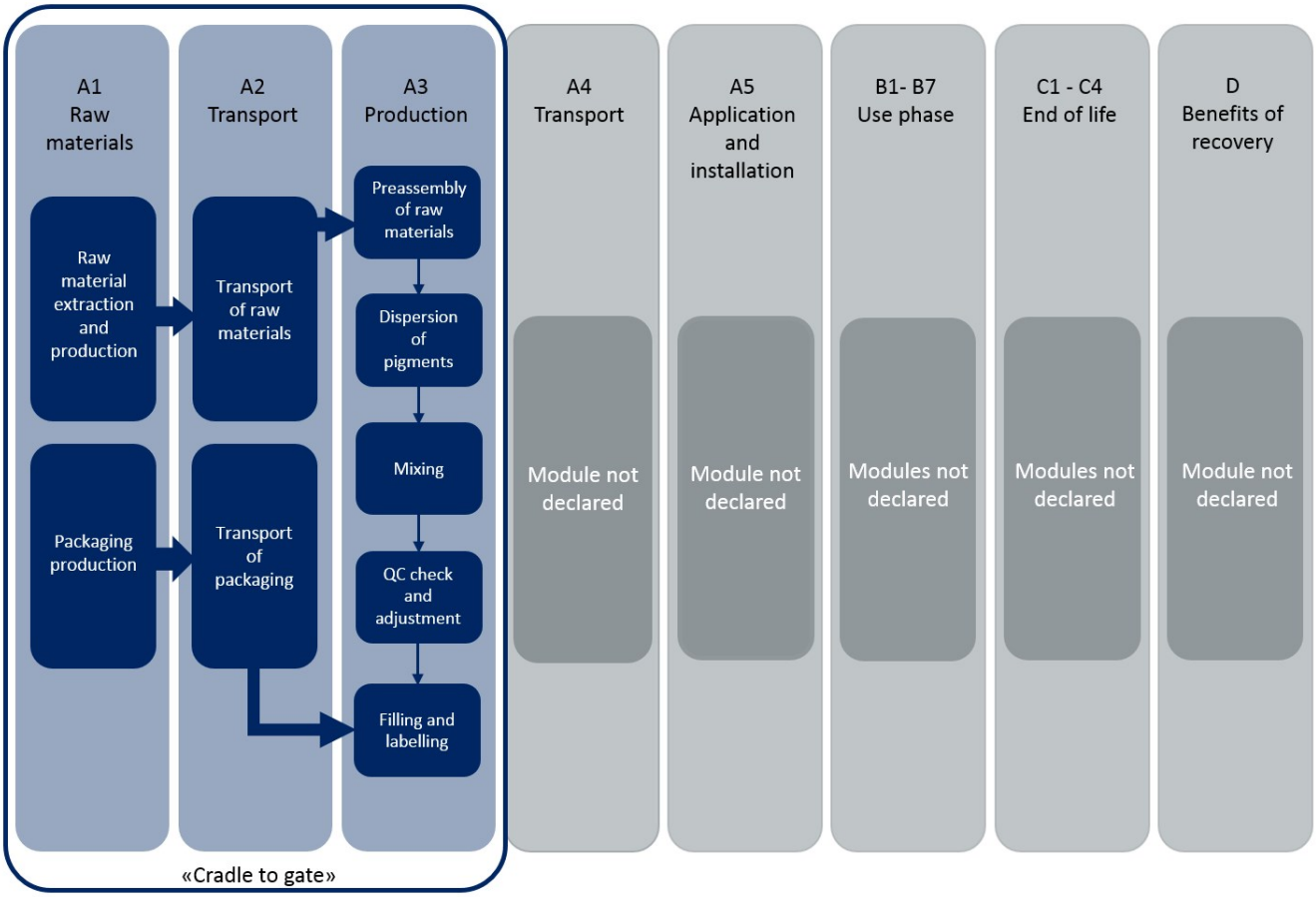
Data quality:

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
Packaging	Østfoldforskning	Database	2017
Penguard WF Comp A, PT. Jotun Indonesia	Owner of EPD	Database	2019
Penguard WF Comp B, PT. Jotun Indonesia	Owner of EPD	Database	2019

System boundary:

The flowchart in the figure below illustrates the system boundaries for the analysis, in accordance with the modular principle of EN 15804. The analysis is a cradle-to-gate (A1 - A3) study.



Additional information:

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

LEED®v4 (2013):
EQ credit: Low emitting materials
- VOC content for Industrial Maintenance Coatings (250 g/l) (CARB (SCM) 2007) and emissions between 0.5 and 5.0 mg/m3 (CDPH method 1.1).
MR credit: Building product disclosure and optimization
- Material Ingredients, Option 2: Material Ingredient Optimization, International Alternative Compliance Path - REACH optimization: Fully inventoried chemical ingredients to 100 ppm and not containing 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 Jotun U.A.E. Ltd. (L.L.C.), Jotun Coatings (Zhangjiagang) Co. Ltd., Jotun India Private Ltd. and PT. Jotun Indonesia.

LEED® (2009):
IEQ Credit 4.2: The VOC requirements of Green Seal Standard GC-03, 1997.

BREEAM International (2016):
Mat 01: Product-specific Type III EPD (ISO 14025;21930, EN 15804) for Jotun U.A.E. Ltd. (L.L.C.), Jotun Coatings (Zhangjiagang) Co. Ltd., Jotun India Private Ltd. and PT. Jotun Indonesia.

BREEAM International (2013):
Hea 02: VOC content for Two-pack Performance Coating WB (140 g/l) (EU Directive 2004/42/CE).

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.

This is a cradle to gate (A1-A3) EPD with no declared modules after the factory gate. Transport from place of production to user (A4) has to be calculated by the user.

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					l/tkm	
Railway					l/tkm	
Boat					l/tkm	
Other Transportation					l/tkm	

Assembly

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

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	

ment (B4)/Refurbishment (B5)

.	Unit	Value
Electric	kWh	
Replacement		

* Described above

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	

Scenarios after A1-A3 are not included

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	.	MND

Environmental impact

Parameter	Unit	A1-A3
GWP	kg CO_2 -eq	3,80E+00
ODP	kg CFC11 -eq	2,62E-07
POCP	kg C_2H_4-eq	1,29E-03
AP	kg SO_2 -eq	1,95E-02
EP	kg PO_4^{3-} -eq	5,81E-03
ADPM	kg Sb -eq	2,27E-05
ADPE	MJ	5,16E+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
*INA Indicator Not Assessed

Resource use

Parameter	Unit	A1-A3
RPEE	MJ	5,56E+00
RPEM	MJ	5,27E-01
TPE	MJ	6,09E+00
NRPE	MJ	5,60E+01
NRPM	MJ	0,00E+00
TRPE	MJ	5,60E+01
SM	kg	0,00E+00
RSF	MJ	0,00E+00
NRSF	MJ	0,00E+00
W	m^3	4,87E-01

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
*INA Indicator Not Assessed

End of life - Waste

Parameter	Unit	A1-A3
HW	kg	8,83E-03
NHW	kg	1,61E+00
RW	kg	INA*

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
*INA Indicator Not Assessed

End of life - Output flow

Parameter	Unit	A1-A3
CR	kg	0,00E+00
MR	kg	2,26E-04
MER	kg	5,64E-04
EEE	MJ	INA*
ETE	MJ	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*10-3 = 0,009
*INA Indicator Not Assessed

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, Indonesia (kWh)	ecoinvent 3.3 Alloc Rec	1182,02	g CO2-ekv/kWh

Dangerous substances

The product contains substances given by the REACH Candidate list that are less than 0,01 % by weight (100 ppm), which is the requirement to fulfill the LEEDv4 MR credit: Building product disclosure and optimization - Material Ingredients, Option 2: Material Ingredient Optimization, International Alternative Compliance Path - REACH optimization

Indoor environment

The declared product is emission tested by RISE Research Institutes of Sweden/SP Technical Research Institute of Sweden or Eurofins in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010.

Bibliography

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BREEAM International (2016): BREEAM International New Construction Technical Manual. SD233-2.0:2017
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EU Directive 2004/42/CE: The limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products
GC-03 (1997): Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition
LEED® (2009): LEED® 2009 for New construction and Major renovations Rating system. U.S. Green Building Council®
LEED® v4 (2013): LEED® v4 for Building design and construction, U.S. Green Building Council®
REACH (2006): Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006. REACH Authorization list – Annex XIV, the Restriction list – Annex XVII and the SVHC candidate list

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