epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

JACKOFOAM XPS NORWAY



The Norwegian EPD Foundation

Owner of the declaration:
BEWI ASA, Insulation and Construction

Product:
JACKOFOAM XPS NORWAY

Declared unit:
1 m2

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR.
NPCR 012:2022 Part B for Thermal insulation products

Program operator:
The Norwegian EPD Foundation

Declaration number:

Registration number:

Issue date:

Valid to:

EPD software:
LCAno EPD generator ID: 263464

General information

Product

JACKOFOAM XPS NORWAY

Owner of the declaration:

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Program operator:

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Manufacturer:

BEWI ASA, Insulation and Construction
Hammarvikringen 64
HAMAR 7263, Norway

Declaration number:

Place of production:

BEWI Fredrikstad
Sørkilen 3
1621 Gressvik, Norway

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR.
NPCR 012:2022 Part B for Thermal insulation products

Management system:

ISO 14001 og 9001 for all production sites

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:

925437948

Declared unit:

1 m2 JACKOFOAM XPS NORWAY

Issue date:

Declared unit with option:

A1,A2,A3,A4,A5,C1,C2,C3,C4,D

Valid to:

Year of study:

2023

Functional unit:

1 m^2 Jackofoam 300 XPS insulation board with 34 mm thickness at R=1 m^2 K/W, transportation to site, waste handling and recovery.

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804:2012+A2:2019 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: Svein Tore Larsen

Reviewer of company-specific input data and EPD: Jostein Häckert

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.

Approved:

Third party verifier:

VERIFIER NAME

(no signature required)

Product

Product description:

The insulation board is provided in several dimensions and thicknesses. Please use the conversion table below for other sizes than the declared unit.

Extruded polystyrene (XPS) is a common material used for thermal insulation of buildings and constructions. It's a polymer foam, consisting of airfilled polystyrene cells. As most of the material is air, XPS provides good insulating properties at a low weight. Other characteristics of the material
include low moisture absorption, long service life and high compressive strength.

This LCA is based on Jackofoam 300 and can be used for all Jackofoam products with the conversion factor which can be found under System boundaries.

Jackofoam XPS is containing 20% of recycled raw materials, which decrease the emissions of the raw materials by 15% (A1).

Product specification

XPS is manufactured through an extruder where polystyrene granulates are mixed with additives and foaming
agents to produce the foam mass. The foam mass is pressed out flat to a board through a nozzle in deisre thickness and cut into correct dimensions. Some of the remaining blowing agents are aired out before the product leaves the factory gate.
The number of the product is the pressure class; here 300 which means a short dermation of 10% when the load of the product is 300 kN/m2.

Weight per declared unit is 1,071 kg given a density of 31,5 kg/cubic meter with a thickness of 34 mm including packaging material.

Materials	kg	%
Expansion gas	0,09	7,87
Plastic - Polystyrene expandable (EPS)	0,84	73,70
Plastic - Recycled	0,21	18,43
Total	1,14	

Packaging	kg	%
Packaging - Plastic	0,03	100,00
Total incl. packaging	1,17	

Technical data:

CE marking: XPS insulation boards are CE certified according to NS-EN 13164
Typical size: 600 mm x 1200 mm, 600 x 2400mm
Typical thickness: 10 mm - 150 mm
Moisture absorption: <0,7 vol%

Density:
Jackofoam 250: 30,0 kg/m3
Jackofoam 300: 31,5 kg/m3
Jackofoam 400: 34,0 kg/m3
Jackofoam 500: 37,5 kg/m3
Jackofoam 700: 48,0 kg/m3

Market:

Norway, Sweden, Denmark, UK

Reference service life, product

As in the construction where it is used.

Reference service life, building or construction works

As in the construction where it is used.

LCA: Calculation rules

Declared unit:

1 m2 JACKOFOAM XPS NORWAY

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+A2. 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:

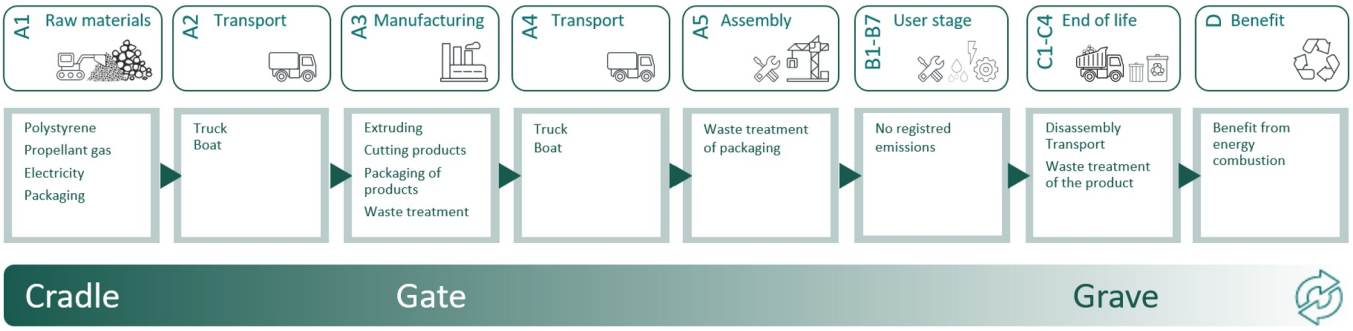
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the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

Materials	Source	Data quality	Year
Expansion gas	ecoinvent 3.6	Database	2019
Expansion gas	ecoinvent 3.6	Database	2020
Packaging - Plastic	ecoinvent 3.6	Database	2019
Plastic - Polystyrene expandable (EPS)	Plastics Europe + ecoinvent 3.6	European average.	2019
Plastic - Recycled		EPD	2023

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:



Kvalitet	34 mm	50 mm	100 mm	150 mm	200 mm	Kubikk
250	0,95	1,40	2,81	4,21	5,61	28,05
300	**1,00**	1,47	2,94	4,41	5,88	29,41
400	1,07	1,58	3,16	4,74	6,32	31,58
500	1,18	1,73	3,46	5,19	6,92	34,61
700	1,49	2,18	4,37	6,55	8,74	43,68

Additional technical information:

LCA: Scenarios and additional technical information

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

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 7.5-16 tonnes, EURO 6 (kgkm)	35,4 %	300	0,056	l/tkm	16,80

Assembly (A5)	Unit	Value			
Waste, packaging, plastic to average treatment - A5 (inkl transport) (kg)	kg	0,03			

De-construction demolition (C1)	Unit	Value			
Manual demolition of EPS in C1	kg/DU	1,08			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (kgkm)	53,3 %	83	0,023	l/tkm	1,91

Waste processing (C3)	Unit	Value			
Waste, Polystyrene, incineration	kg	1,08			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of PS	kg	0,00			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
substitution of electricity (MJ)	MJ	0,62			
Substitution of thermal energy (MJ)	MJ	34,40			

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	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	2,14E+00	1,91E-01	4,96E-02	6,78E-02	2,11E-03	0,00E+00	7,62E-03	3,43E+00	1,67E-04	-1,96E-01
	GWP-fossil	kg CO_2 -eq	2,13E+00	1,91E-01	4,58E-02	6,77E-02	2,11E-03	0,00E+00	7,62E-03	3,43E+00	1,67E-04	-1,89E-01
	GWP-biogenic	kg CO_2 -eq	8,41E-03	8,17E-05	3,67E-03	3,13E-05	2,91E-07	0,00E+00	3,26E-06	2,37E-05	8,87E-08	-1,13E-04
	GWP-luluc	kg CO_2 -eq	1,05E-03	5,86E-05	8,34E-05	2,93E-05	1,62E-07	0,00E+00	2,32E-06	3,75E-06	2,57E-08	-6,83E-03
	ODP	kg CFC11 -eq	4,85E-08	4,60E-08	1,64E-09	1,49E-08	1,27E-10	0,00E+00	1,84E-09	2,46E-09	1,80E-11	-1,45E-02
	AP	mol H+ -eq	4,80E-03	6,52E-04	9,41E-05	1,95E-04	2,60E-06	0,00E+00	2,45E-05	4,08E-04	5,89E-07	-1,56E-03
	EP-FreshWater	kg P -eq	1,31E-05	1,52E-06	9,31E-07	6,21E-07	4,34E-09	0,00E+00	6,06E-08	2,43E-07	2,26E-09	-1,69E-05
	EP-Marine	kg N -eq	1,18E-03	1,44E-04	2,38E-05	3,68E-05	2,38E-06	0,00E+00	5,37E-06	1,96E-04	1,84E-07	-5,28E-04
	EP-Terrestial	mol N -eq	1,28E-02	1,61E-03	2,27E-04	4,13E-04	9,31E-06	0,00E+00	5,99E-05	2,10E-03	2,09E-06	-5,69E-03
	POCP	kg NMVOC -eq	5,26E-03	6,15E-04	3,77E-03	1,58E-04	3,06E-06	0,00E+00	2,35E-05	5,04E-04	5,78E-07	-1,57E-03
	ADP-minerals&metals[1]	kg Sb-eq	2,92E-06	3,39E-06	5,27E-07	2,44E-06	1,12E-08	0,00E+00	1,36E-07	1,06E-07	9,37E-10	-1,18E-06
	ADP-fossil[1]	MJ	7,11E+01	3,10E+00	3,00E-01	1,01E+00	8,69E-03	0,00E+00	1,24E-01	2,10E-01	1,52E-03	-2,70E+00
	WDP[1]	m^3	-8,24E-01	2,37E+00	4,77E+01	1,21E+00	3,07E-02	0,00E+00	9,49E-02	4,67E-01	1,58E-02	-9,81E+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	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	3,26E-08	1,75E-08	8,85E-10	3,79E-09	4,70E-11	0,00E+00	7,00E-10	1,72E-09	7,00E-12	-9,90E-08
	IRP[2]	kgBq U235 -eq	5,78E-02	1,35E-02	5,12E-03	4,42E-03	3,93E-05	0,00E+00	5,41E-04	3,52E-04	7,22E-06	-1,55E-02
	ETP-fw[1]	CTUe	3,20E+02	2,26E+00	5,56E-01	7,88E-01	8,29E-03	0,00E+00	9,05E-02	5,08E-01	2,80E-03	-1,48E+01
	HTP-c[1]	CTUh	8,14E-10	0,00E+00	3,20E-11	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,44E-10	0,00E+00	-2,53E-10
	HTP-nc[1]	CTUh	3,57E-08	2,19E-09	7,08E-10	9,49E-10	8,00E-12	0,00E+00	8,70E-11	5,71E-09	5,00E-12	-1,41E-08
	SQP[1]	dimensionless	3,21E+00	3,54E+00	1,43E-01	6,01E-01	1,52E-02	0,00E+00	1,42E-01	2,51E-02	4,20E-03	-1,90E+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	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	7,67E-01	3,89E-02	3,51E+00	1,72E-02	2,19E-04	0,00E+00	1,56E-03	6,06E-03	8,87E-05	-1,57E+01
	PERM	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	0,00E+00
	PERT	MJ	7,67E-01	3,89E-02	3,51E+00	1,72E-02	2,19E-04	0,00E+00	1,56E-03	6,06E-03	8,87E-05	-1,57E+01
	PENRE	MJ	4,73E+01	3,10E+00	3,00E-01	1,01E+00	8,69E-03	0,00E+00	1,24E-01	2,10E-01	1,52E-03	-2,70E+00
	PENRM	MJ	2,83E+01	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
	PENRT	MJ	7,56E+01	3,10E+00	3,00E-01	1,01E+00	8,69E-03	0,00E+00	1,24E-01	2,10E-01	1,52E-03	-2,70E+00
	SM	kg	2,38E-01	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
	RSF	MJ	1,07E-02	1,36E-03	3,01E-03	6,21E-04	5,75E-06	0,00E+00	5,45E-05	1,69E-04	2,21E-06	-1,59E-03
	NRSF	MJ	2,55E-03	4,55E-03	7,55E-03	2,26E-03	1,51E-05	0,00E+00	1,83E-04	0,00E+00	3,51E-04	-1,04E+00
	FW	m^3	5,69E-02	3,52E-04	3,02E-02	1,20E-04	4,59E-06	0,00E+00	1,41E-05	5,95E-04	1,40E-06	-6,95E-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	A2	A3	A4	A5	C1	C2	C3	C4	D
	HWD	kg	3,07E-03	1,69E-04	5,53E-03	5,60E-05	0,00E+00	0,00E+00	6,77E-06	0,00E+00	2,78E-03	-3,94E-05
	NHWD	kg	8,90E-02	2,68E-01	2,90E-02	3,99E-02	2,66E-02	0,00E+00	1,08E-02	0,00E+00	1,38E-03	-5,60E-02
	RWD	kg	2,37E-05	2,12E-05	2,63E-06	6,82E-06	0,00E+00	0,00E+00	8,45E-07	0,00E+00	9,18E-09	-1,36E-05

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	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	0,00E+00	0,00E+00
	MFR	kg	2,24E-02	0,00E+00	1,95E-02	0,00E+00	1,36E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MER	kg	4,98E-03	0,00E+00	2,97E-02	0,00E+00	1,33E-06	0,00E+00	0,00E+00	1,08E+00	0,00E+00	0,00E+00
	EEE	MJ	7,66E-03	0,00E+00	1,91E-02	0,00E+00	2,04E-06	0,00E+00	0,00E+00	1,90E+00	0,00E+00	0,00E+00
	EET	MJ	1,16E-01	0,00E+00	2,89E-01	0,00E+00	3,09E-05	0,00E+00	0,00E+00	2,87E+01	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	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	Data source	Amount	Unit
Electricity, Norway (kWh)	ecoinvent 3.6	21,18	g CO2-eq/kWh

Dangerous substances

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

Indoor environment

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products											
Indicator	**Unit**	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	2,14E+00	1,91E-01	5,15E-02	6,78E-02	2,11E-03	0,00E+00	7,62E-03	3,43E+00	1,74E-04	-1,93E-01

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

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NPCR Part A: Construction products and services. Ver. 2.0. April 2021, EPD-Norge.
NPCR 012 Part B for Part B for Thermal insulation products, Ver. 2.0, 31.03.2022, EPD Norway.

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ECO PLATFORM EPD VERIFIED	ECO Platform ECO Portal	web: www.eco-platform.org web: ECO Portal