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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:	Foamrox AS
Program operator:	V@/p[!, ^* aa ÁÚÓÁ[~ } áaa }
Publisher:	The Norwegian EPD Foundation
Declaration number:	þÓÚÓÉÍ Jì È Ì ÈÞ
Registration number:	þÓÚÓÉÍ Jì È Ì ÈÞ
ECO Platform reference number:	È
Issue date:	Fì ÈFÈEFJ
Valid to:	Fì ÈFÈEG (validity extended to 01.07.2024)

Foamrox insulation element with a thickness of 104mm

Foamrox AS



www.epd-norge.no



General information

Product:

Foamrox insulation element of 104mm width

Program operator:

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 Phone: ÉI Í ÁÍ Í ÁGÁEGE
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Declaration number:

PÓUÓÉI JI ÉI I ÉP

ECO Platform reference number:
This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR.
 NPCR on construction products and services, Part A, 04
 2019 ver 1.0 followed

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 evidence.

Declared unit:

The declared unit is 1 m² of Foamrox element, with a thickness of 104 mm and with a fire resistance classification of EI 60 according to EN 13501-2:2016.

Declared unit with option:
Functional unit:
Verification:

The CEN Norm EN 15804 serves as the core PCR.
 Independent verification of the declaration and data, according to ISO14025:2010

internal external

Third party verifier:



Lars G. F. Tellnes

(Independent verifier approved by EPD Norway)

Owner of the declaration:

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Manufacturer:

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Place of production:

Foamrox AS, Molandsveien 337, 4849 Arendal

Management system:
Organisation no:

999 015 891

Issue date:

FÍ ÉFÉGGJ

Valid to:

FÍ ÉFÉGG (validity extended to 01.07.2024)

Year of study:

2018

Comparability:


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

The EPD has been worked out by:

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 Nora O. Schjoldager, consultant, Niras Norway
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Approved



Håkon Hauan
 Managing Director of EPD-Norway

Product

Product description:

Foamrox elements are tailor-made for each project. The elements are mainly used for non-load-bearing walls, fire walls, and tunnel inventory components. The elements are made of cellular glass insulation boards, coated with a strong membrane.

Product specification:

Foamrox elements are used in environments where there is need for isolated, watertight solutions and strict fire requirements. Foamrox can be tailor-made for larger sizes.

Materials	kg	%
Foam glass	12,70	76
Coating	4,00*	24
Packaging	1,99	-

* Bigger sizes uses less coating material.

In this EPD, we refer to 1m2 elements but the EPD results can be used for larger sizes by extrapolating the results. The extrapolation assumes higher consumption of coating than in reality (see following table) and thereby extrapolation will give a relative conservative environmental impact.

Variacion dependent on size

Size of element	Material consumption (kg)	
	Foam glass	Coating
1 m2 (1m x 1m)	12,7	4,0
2 m2 (1m x 2m)	25,4	7,7
3 m2 (1,73m x 1,73m)	38,1	11,2
4 m2 (2m x 2m)	50,8	14,7

It is calculated that the shown variations in size do not change the results of the impact assessment significantly and the change is less than 6%.

Technical data:

The weight of the Foamrox insulation element is 17kg/m2. Thickness is 104mm.

Market:

International. The Norwegian market is used for A4.

Reference service life, product:

Due to its closed-cell glass structure, foam glass has good insulating capabilities and a long life span (EPD Glapor, 2017). The membrane is made of polyurea, a strong coating material (EPAFLEX, 2017).

Reference service life, building:

LCA: Calculation rules

Declared unit:

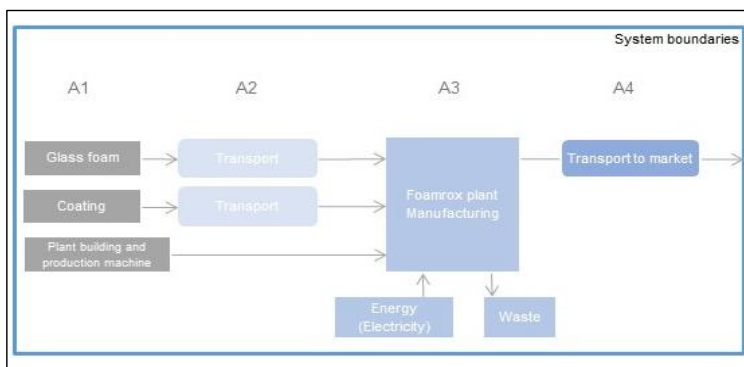
The declared unit is 1 m2 of Foamrox element, with a thickness of 104 mm and with a fire resistance classification of EI 60 according to EN 13501-2:2016.

System boundary:

All processes from raw material extraction to production at the factory are included in the analysis (A1-A3). In addition, life cycle scenario for transportation to market (Norway) (A4) is included.

Description of manufacturing process:

Foamrox is based on a combination of two materials: Lightweight cellular glass boards and a sprayed coating. The cellular glass boards are first cut into the preferred sizes based on the user area. Then the boards are sprayed on all sides by a two-component coating called polyurea. The boards will then cure within a few minutes.



Data quality:

General requirements concerning use of generic and specific data and the quality of those are as described in EN 15804:2012, clause 6.3.6 and 6.3.7. The data is representative according to temporal, geographical and technological requirements.

Temporal: Data for use in module A3 consists of the total material and energy consumption for one month in 2018. Specific data has been collected through 2018. Generic data has been created or updated within the last 10 years.

Geographical: The geographic region of the production sites for raw materials included in the calculation is Europe.

Technological: Data represents technology in use.

Data source: SimaPro, Ecoinvent 3.4 (cut-off system model).

Cut-off criteria:

All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. There has been no allocation to co-products. The recycling process and transportation of the material is allocated to this analysis.

LCA: Scenarios and additional technical information

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

The scenario used for stage A4 represents the most likely scenario for transport to site.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	45	Lorry 16-32t, EURO 5	200	0,044 l/tkm	2,22

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	

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	

Replacement (B4)/Refurbishment (B5)

	Unit	Value
Replacement cycle*		
Electricity consumption	kWh	
Replacement of worn parts	0	

* Number or RSL (Reference Service Life)

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	Value (l/t)
Truck				l/tkm	
Railway				kWh/tkm	
Boat				l/tkm	
<Other Transportation>				<xx>	

Benefits and loads beyond the system boundaries (D)

	Unit	Value

Additional technical information
LCA: Results
System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage				Assembly 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	

Environmental impact

Parameter	Unit	A1	A2	A3	A1- A3	A4			
GWP	kg CO ₂ -eqv	3,10E+01	3,26E+00	1,08E-01	3,45E+01	5,17E-01			
ODP	kg CFC11-eqv	1,04E+00	6,01E-07	6,47E-10	1,77E-06	9,56E-08			
POCP	kg C ₂ H ₄ -eqv	1,12E-01	4,19E-04	5,67E-07	5,96E-03	6,68E-05			
AP	kg SO ₂ -eqv	1,13E-01	8,80E-03	6,34E-05	1,22E-01	1,40E-03			
EP	kg PO ₄ ³⁻ -eqv	2,17E-02	1,48E-03	2,87E-05	2,34E-02	2,36E-04			
ADPM	kg Sb-eqv	6,64E-04	7,35E-09	1,45E-09	1,91E-05	1,17E-09			
ADPE	MJ	4,78E+02	4,67E+01	6,79E-02	5,26E+02	7,42E+00			

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

Resource use

Parameter	Unit	A1	A2	A3	A1-A3	A4			
RPEE	MJ	2,96E+01	1,09E-01	8,20E-04	2,97E+01	1,74E-02			
RPEM	MJ	5,10E+00	INA	INA	5,10E+00	INA			
TPE	MJ	3,47E+01	1,09E-01	8,20E-04	3,48E+01	1,74E-02			
NRPE	MJ	2,07E+02	4,66E+01	6,91E-02	2,54E+02	7,41E+00			
NRPM	MJ	3,37E+02	INA	INA	3,37E+02	INA			
TRPE	MJ	5,44E+02	4,66E+01	6,91E-02	5,91E+02	7,41E+00			
SM	kg	INA	INA	INA	INA	INA			
RSF	MJ	INA	INA	INA	INA	INA			
NRSF	MJ	INA	INA	INA	INA	INA			
W	m ³	5,01E-01	2,66E-03	2,06E-04	5,04E-01	4,22E-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

End of life - Waste

Parameter	Unit	A1	A2	A3	A1- A3	A4			
HW	kg	3,52E-02	8,78E-06	1,13E-07	3,52E-02	1,40E-06			
NHW	kg	4,06E-01	2,67E-03	2,40E-03	4,11E-01	4,24E-04			
RW	kg	7,87E-04	3,38E-04	1,07E-07	1,12E-03	5,36E-05			

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life - Output flow

Parameter	Unit	A1	A2	A3	A1- A3	A4			
CR	kg	INA	INA	1,80E+00	1,80E+00	INA			
MR	kg	INA	INA	INA	INA	INA			
MER	kg	INA	INA	2,40E-01	2,40E-01	INA			
EEE	MJ	INA	INA	INA	INA	INA			
ETE	MJ	INA	INA	INA	INA	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 = $9,0 \cdot 10^{-3}$ = 0,009

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase

National consumption mix, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing proses (A1).

Data source	Amount	Unit
Ecoinvent v3.4	0,0207	kg CO ₂ -eqv/kWh

Dangerous substances

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskriften, Annex III), see table.

Name	CAS no.	Amount

Indoor environment





Not relevant

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 13501-2:2016	<i>Fire classification of construction products and building elements. Classification using test data from reaction to fire tests</i>
EN 15804:2012+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
EPAFLEX 2016	<i>EPAFLEX, Datasheet, Epaproof fpcs 94, rev. 06.020817</i>
EPD Glapor 2017	<i>GLAPOR cellular glass, IBU, EPD-GLP-20170195-CBA1-EN</i>
ISO 14025: 2010	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
LCI Report	<i>Insulation elements for tunnels, Foamrox. NIRAS, 2018</i>
NPRC 2017	<i>NPCR for construction products and services, Part A, 04 2017 ver. 1.0</i>
RISE 2017	<i>RISE Report 150002-03, TDP AS, RI.se</i>

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