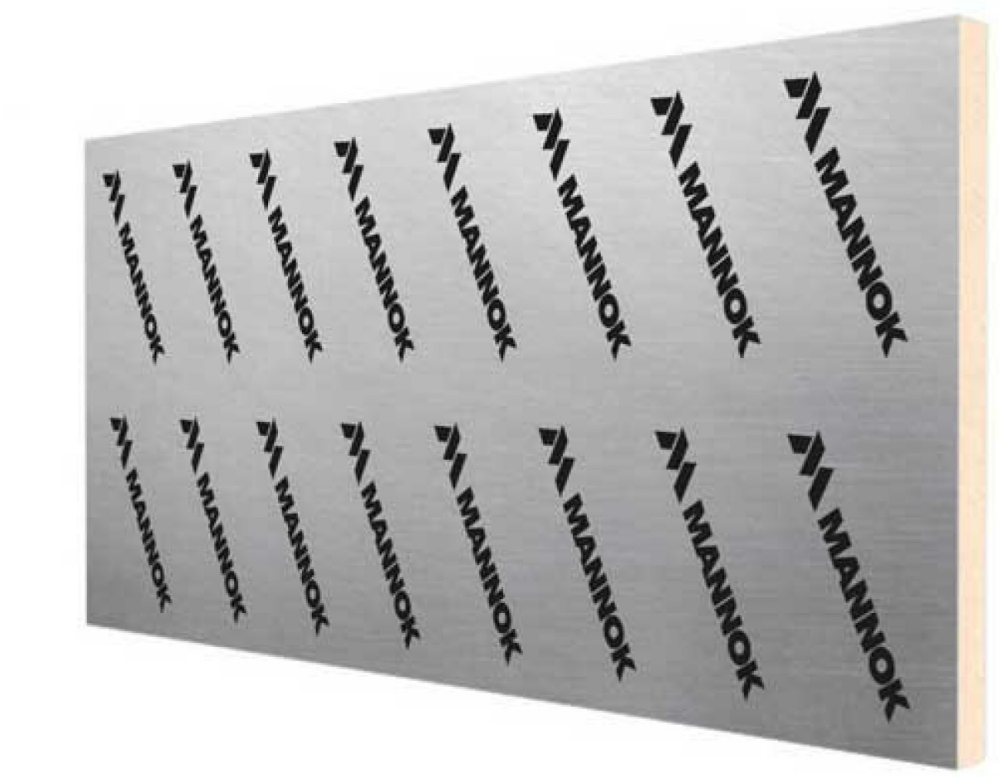
ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN15804+A2

Mannok Therm Insulated Foil-faced board MF/MR/MW 100mm



Owner of the declaration:
Mannok Insulation Ltd

Product:
Mannok Therm Insulated Foil-faced board MF/MR/MW 100mm

Declared unit:
1 m2

This declaration is based on Product Category Rules:
EN 15804:2012+A2:2019, EPD Ireland PCR Part A, Version 2.1, 2022
I.S. EN 16783:2017 Thermal insulation products

Program operator:
EPD Ireland - Irish Green Building Council

Declaration number:
EPDIE-24-161

Issue date:
30.10.2024

Valid to:
29.10.2029

General information

Product

Mannok Therm Insulated Foil-faced board MF/MR/MW 100mm

Owner of the declaration:

Mannok Insulation Ltd
Contact person: Paul Burns
Phone: +353 (0)499525613
e-mail: paul.burns@mannokbuild.com

Program operator:

EPD Ireland - Irish Green Building Council
19 Mountjoy Square, Dublin D01 E8P5
Phone: +353 (01) 6815862
web: https://www.igbc.ie/epd-home/

Manufacturer:

Mannok Insulation Ltd

Declaration number:

EPDIE-24-161

Place of production:

Mannok Insulation Ltd
Rakeelan
H14 k765 Ballyconnell, Ireland

This declaration is based on Product Category Rules:

EN 15804:2012+A2:2019, EPD Ireland PCR Part A, Version 2.1, 2022
I.S. EN 16783:2017 Thermal insulation products

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. The EPD Program operator shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Type of EPD

Specific product EPD

Issue date:

30.10.2024

Declared unit:

1 m2 Mannok Therm Insulated Foil-faced board MF/MR/MW 100mm

Valid to:

29.10.2029

Scope of the EPD:

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

Year of study:

Functional unit:

1 m2 of Mannok PIR 100mm Foil R-value = 4.5 m2.K/W

Comparability:

Environmental Product Declarations from different programmes may not be directly comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See clause 5.3 of EN 15804:2012+A2:2019

LCA consultant or person responsible for LCA:
EcoReview, Peter Seymour

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

Approved:

SIGNATURE OF PROGRAMME OPERATOR

Third party verifier:
Stephen Forson

Pat Barry, CEO - Irish Green Building Council

Product

Product description:

Manufacturing Process: The bulk raw chemicals (polyol & MDI) are mixed with catalysts and additives before being metered onto a moving conveyor onto a bottom layer of facer. The chemical mix then starts to rise, due to the effects of the blowing agent, to produce the foam. The foam continues to rise until it contacts the top layer of facer material as it enters the double-belt laminator, where it is then cured at high temperature to produce the rigid, thermoset foam board. The board exits the lamination oven and then cut to size, and then sent to a cooling zone to cool down. Final trimming of edges then takes place, and then the board is ready for dispatch to the market. Off-cuts from the cutting and trimming are compressed on-site, and sent to landfill.

The board consist of 77% to 82% MDI and polyol, with 23% to 18% minor constituents, such as flame retardant, silicone, amine and trimer catalysts. these percentages vary depending on the particular intended application of the PIR board. A foil facing is applied to both faces of the PIR board, which also includes Kraft paper.

the PIR 100mm Foil board is used as insulation in floors, roofs and walls.

Product specification:

The PIR board is manufactured in accordance with IS EN 13165:2012 Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) products.Specification.

Technical data:

Weight per m2: 3.51 kg
Density: 35.1 kg/m3
R-value: 4.55 m2K/W

Market/Geographical Area:

The geographic area for which the EPD is representative is Europe.

Reference service life, product

N/A

Reference service life, building or construction works

When correctly installed, Mannok PIR Insulation boards have a service life comparable to that of the building.

LCA: Calculation rules

Declared unit:

1 m2 Mannok Therm Insulated Foil-faced board MF/MR/MW 100mm

kg per Declared unit 3.51

Cut-off criteria:

All relevant inputs and outputs - like emissions, energy and materials - have been taken into account in this LCA, and in accordance with EN15804+A2:2019. The study covers at least 95% of the materials and energy per module and at least 99% of the total use of materials and energy of each unit process. Long term emissions have been excluded from the study.

Allocation:

The measurement of environmental impacts in this EPD uses the LCIA methodologies recommended for PEF 3.1. In this EPD, the waste processes are allocated in the relevant module. In the case of the use of secondary materials or energy recovered from secondary fuels, the system boundary between the system under study and the previous system (providing the secondary materials) is set where outputs of the previous system, e.g. materials, products, building elements or energy, reach the end-of-waste state. The modularity and the polluter payer principles have been followed.

Data quality:

Geographical representativeness: Data is from the geographic area under study. The production location is in the Republic of Ireland, and the markets are in the Republic of Ireland, Northern Ireland and Great Britain. Energies supplied, manufacturing and waste disposal processes, and end-of-life scenario reference records are fully representative for the geographic location of the production and market use of the PIR insulation products. Thus geographical representativeness is: “very good”.

Technical representativeness: Data is from the processes and products under study. Processes and energies used in the process have been modelled exactly as described by Mannok, and are based directly on the production data supplied by Mannok Insulation, in relation to processes, fuels used, emissions and wastes generated, and without any significant need for improvement. Thus technical representativeness is considered to be “very good”.

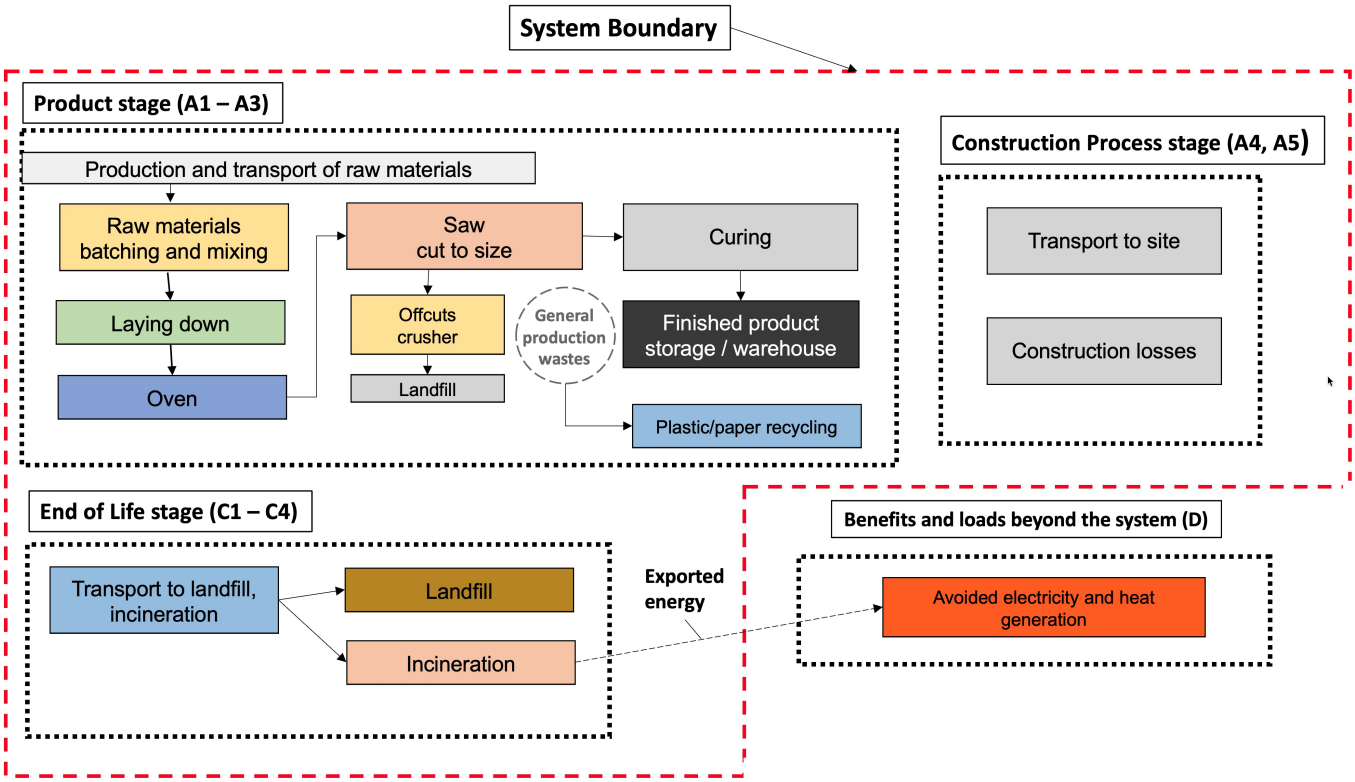
Time representativeness: The reference production year is 2023. Ecoinvent version 3.9.1 was issued in April 2022, and its data reflects the time period 2015 to 2020. The other dataset used, for MDI, is from Plastics Europe and was issued in 2019. Similarly its date reflects preceding years, which would be older than 3 years from the year of production. Thus it is assumed that the representativeness of the data is between 3 – 6 years older than the year of production. Thus time representativeness is considered to be: “fair”.

Scope and type of EPD (X = Module declared; ND = Module not declared)

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	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

System boundary:

This LCA covers the Product (A1, A2 and A3), Transport to site (A4), Construction Process (A5), End of Life (C1 to C4) and Benefits/loads beyond the system boundary (D) Stages, as indicated above. This is termed: "Cradle to gate with options, modules C1 to C4, and module D". Specific details of the Product Stage (A1 to A3) are illustrated in the flow diagram below.



Additional technical information:

Electricity modelling

This LCA assumes that the reference for electricity used for 2023 is the average mix for Ireland. The CO2 intensity of the electricity is 0.388 kg CO2 eq per kWH.

LCA: Scenarios and additional technical information

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

A4. Transport to customer
The A4 scenario used in this EPD is based on the insulation being manufactured in Co. Cavan, Ireland, and transported to a customer in the UK, 371 km by road and 202 km by sea.

The density of the transported goods is 35.1 kg/m3.

A5. Installation
Installation losses are 5%.

C. End of Life Scenarios
It is assumed that the end of life scenarios for the Mannok EPS boards are:
• 30% of boards got to incineration
• 70% of boards go to landfill

C1. De-construction demolition
It is assumed that the insulation is removed with minimal energy, and thus zero energy or materials are used in C1.

C2. Transport
In the transport phase C2, it is assumed it is assumed that these materials travel 50km to landfill and 150 km to incineration.

C3. Waste processing
30% goes to incineration.

C4. Disposal
70% of the PIR insulation goes to landfill.

D. Reuse, Recovery, Recycling potential
Module D calculations and assumptions are specific to the UK. It is assumed that of the mass of the incinerated material some 40% is converted to energy, and that the efficiency of the incineration in converting NCV to energy is 70%. Of this energy, 82% becomes electricity, and 12% becomes heat. The benefit beyond the system covers (1) avoided electricity production and (2) avoided heat generation.

Biogenic Carbon
Biogenic carbon is contained in Kraft paper in the facing material.

Database used: Ecoinvent v 3.9.1

LCA tool used: Ecochain Helix v 4.3.1

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	9.74E+00	5.21E-02	2.99E-01	3.24E-01	5.43E-01	0.00E+00	7.21E-02	2.87E+00	3.73E-01	-7.12E-01
	GWP-fossil	kg CO_2 -eq	9.71E+00	5.20E-02	2.95E-01	3.24E-01	5.41E-01	0.00E+00	7.20E-02	2.87E+00	3.73E-01	-7.05E-01
	GWP-biogenic	kg CO_2 -eq	-1.13E-01	3.78E-05	3.84E-03	2.28E-04	1.89E-03	0.00E+00	7.14E-05	4.45E-02	1.03E-01	-6.95E-03
	GWP-luluc	kg CO_2 -eq	1.29E-03	2.86E-05	2.31E-04	1.74E-04	9.41E-05	0.00E+00	3.49E-05	3.21E-05	2.68E-05	-6.72E-04
	ODP	kg CFC11 -eq	4.25E-05	1.03E-09	1.39E-08	6.34E-09	2.06E-06	0.00E+00	1.53E-09	4.56E-09	7.26E-10	-4.28E-08
	AP	mol H+ -eq	3.20E-02	4.38E-04	1.16E-03	2.97E-03	1.72E-03	0.00E+00	1.53E-04	2.44E-03	2.37E-04	-1.53E-03
	EP-FreshWater	kg P -eq	4.48E-04	3.63E-07	2.27E-06	2.20E-06	2.22E-05	0.00E+00	5.70E-07	1.55E-06	5.75E-07	-4.07E-06
	EP-Marine	kg N -eq	8.03E-03	1.09E-04	3.59E-04	7.48E-04	6.33E-04	0.00E+00	3.78E-05	1.37E-03	1.45E-04	-3.02E-04
	EP-Terrestial	mol N -eq	7.27E-02	1.19E-03	3.86E-03	8.20E-03	4.03E-03	0.00E+00	3.93E-04	1.31E-02	9.02E-04	-3.42E-03
	POCP	kg NMVOC -eq	2.45E-02	3.96E-04	1.22E-03	2.65E-03	1.40E-03	0.00E+00	2.38E-04	3.21E-03	1.20E-01	-1.17E-03
	ADP-minerals&metals[1]	kg Sb-eq	7.02E-06	1.39E-07	2.13E-06	8.39E-07	5.62E-07	0.00E+00	2.30E-07	2.53E-07	6.94E-08	-2.41E-06
	ADP-fossil[1]	MJ	2.07E+02	6.98E-01	4.11E+00	4.33E+00	1.08E+01	0.00E+00	9.97E-01	1.52E+00	6.88E-01	-1.02E+01
	WDP[1]	m^3	6.42E+00	2.61E-03	2.98E-02	1.59E-02	3.17E-01	0.00E+00	4.12E-03	1.72E-01	2.80E-02	-9.92E-02

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	7.92E-07	3.23E-09	2.01E-08	1.98E-08	4.22E-08	0.00E+00	5.21E-09	8.09E-09	4.84E-09	-6.49E-09
	IRP[2]	kgBq U235 -eq	2.41E+00	3.10E-04	6.04E-03	1.88E-03	1.18E-01	0.00E+00	5.05E-04	5.64E-04	4.44E-04	-2.39E-03
	ETP-fw[1]	CTUe	5.33E+02	6.67E-01	2.96E+00	4.12E+00	2.69E+01	0.00E+00	9.72E-01	7.87E+00	6.40E+01	-3.49E+00
	HTP-c[1]	CTUh	3.94E-09	2.30E-11	9.80E-11	1.41E-10	2.13E-10	0.00E+00	3.20E-11	2.73E-10	2.10E-11	-1.36E-10
	HTP-nc[1]	CTUh	1.78E-07	5.70E-10	3.42E-09	3.48E-09	9.29E-09	0.00E+00	9.01E-10	1.00E-08	5.85E-10	-3.16E-09
	SQP[1]	dimensionless	2.21E+01	3.47E-01	7.04E-01	2.10E+00	1.49E+00	0.00E+00	6.06E-01	2.35E-01	1.51E+00	-1.35E+00

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	1.11E+01	9.71E-03	9.45E-01	5.88E-02	5.92E-01	0.00E+00	1.57E-02	3.23E-02	1.55E-02	-2.87E+00
	PERM	MJ	1.26E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.26E+00	0.00E+00
	PERT	MJ	1.11E+01	9.71E-03	9.45E-01	5.88E-02	5.92E-01	0.00E+00	1.57E-02	3.23E-02	1.55E-02	-2.87E+00
	PENRE	MJ	1.16E+02	7.42E-01	4.41E+00	4.61E+00	1.12E+01	0.00E+00	1.06E+00	1.67E+00	7.32E-01	-1.10E+01
	PENRM	MJ	9.81E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-9.81E+01	0.00E+00
	PENRT	MJ	2.14E+02	7.42E-01	4.41E+00	4.61E+00	1.12E+01	0.00E+00	1.06E+00	1.67E+00	7.32E-01	-1.10E+01
	SM	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
	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	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	0.00E+00
	FW	m^3	2.54E+00	8.45E-05	5.34E-04	5.15E-04	1.23E-01	0.00E+00	1.34E-04	5.23E-03	6.71E-04	-1.59E-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	5.83E-05	4.23E-06	1.80E-05	2.62E-05	6.99E-06	0.00E+00	6.34E-06	7.31E-06	3.30E-06	-2.05E-04
	NHWD	kg	6.14E-01	2.78E-02	1.11E-01	1.68E-01	2.25E-01	0.00E+00	4.95E-02	0.00E+00	2.57E+00	-2.53E-02
	RWD	kg	2.26E-05	1.98E-07	2.82E-06	1.19E-06	1.44E-06	0.00E+00	3.28E-07	3.70E-07	2.73E-07	-1.34E-06

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	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
	MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E+00	0.00E+00	0.00E+00
	EEE	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	7.30E+00
	EET	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	6.00E+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	4.00E-02
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

Dangerous substances

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the limit for registration with the European Chemicals Agency.

Mandatory additional information on release of dangerous substances to indoor air, soil and water.

Bibliography

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10. https://eplca.jrc.ec.europa.eu/LCDN/developerEF.html

EPD IRELAND	**Program operator and publisher** EPD Ireland - Irish Green Building Council 19 Mountjoy Square, Dublin D01 E8P5	Phone: +353 (01) 6815862 e-mail: epd@igbc.ie web: https://www.igbc.ie/epd-home/
MANNOK	**Owner of the declaration:** Mannok Insulation Ltd Rakeelan, H14 k765 Ballyconnell	Phone: +353 (0)499525613 e-mail: paul.burns@mannokbuild.com web: www.mannokbuild.com
EcoReview	**Author of the Life Cycle Assessment** EcoReview Ireland ,	Phone: +353 87 258 9783 e-mail: pseymour@ecoreview.ie web: ecoreview.ie
LCA.no	**Developer of PDF generator** LCA.no AS Dokka 6A, 1671 Kråkerøy	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
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