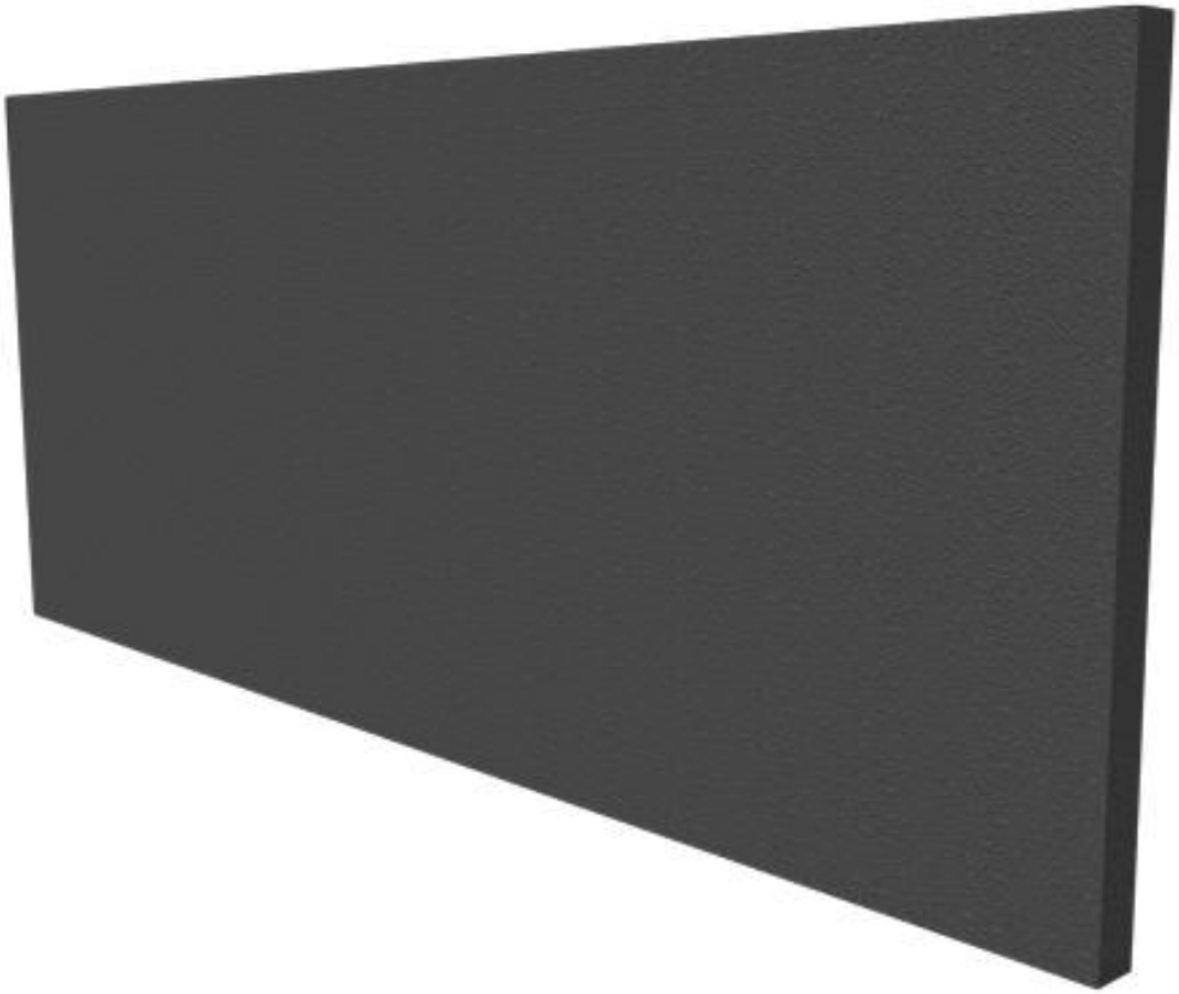
ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN15804+A2

Mannok EPS Pearl 100



Owner of the declaration:
Mannok EPS Insulation a Division of Mannok Cement Ltd

Product:
Mannok EPS Pearl 100

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-24-154

Issue date:
26.09.2024

Valid to:
25.09.2029

General information

Product

Mannok EPS Pearl 100

Owner of the declaration:

Mannok EPS Insulation a Division of Mannok Cement Ltd
Contact person:
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e-mail: info@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 EPS Insulation a Division of Mannok Cement Ltd

Declaration number:

EPDIE-24-154

Place of production:

Mannok EPS Insulation a Division of Mannok Cement Ltd
Rathcronan Granard
Co. Longford, 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:

26.09.2024

Declared unit:

1 m2 Mannok EPS Pearl 100

Valid to:

25.09.2029

Scope of the EPD:

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

Year of study:

Functional unit:

1 m2 of EPS Pearl 100 R-value 3.23 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:
Marcel Gómez Ferrer, Marcel Gómez Consultoria Ambiental

Pat Barry, CEO - Irish Green Building Council

Product

Product description:

The insulation is made entirely from expandable polystyrene (EPS) beads. The only raw materials for the product are expandable polystyrene beads, white or grey in colour. The products are used as insulation in buildings. Further product information can be obtained at: https://mannokbuild.com/eps-insulation/

Product specification:

The EPS board is manufactured in accordance with IS EN 13163:2012+A2:2016.

Technical data:

Weight per m2: 1.80 kg
Density: 18 kg/m3
R-value: 3.23 m2K/W
Colour: grey/silver

Market/Geographical Area:

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

Reference service life, product

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

Reference service life, building or construction works

N/A.

LCA: Calculation rules

Declared unit:

1 m2 Mannok EPS Pearl 100

kg per Declared unit 1.8

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: Very good. Data is from the area under study (Europe), where all the raw materials come from western Europe.

Technical representativeness: Good. Data is from the processes and products under study. The same state of technology that is used by Mannok is that defined in the goal and scope. For the plastic beads raw material, there are two sources of LCA data (1) is from the industry-specific dataset, supplied by Plastics Europe, which is greater than 2 years from the date of production, and is representative of the industry, (2) is from one of the four specific manufacturers.

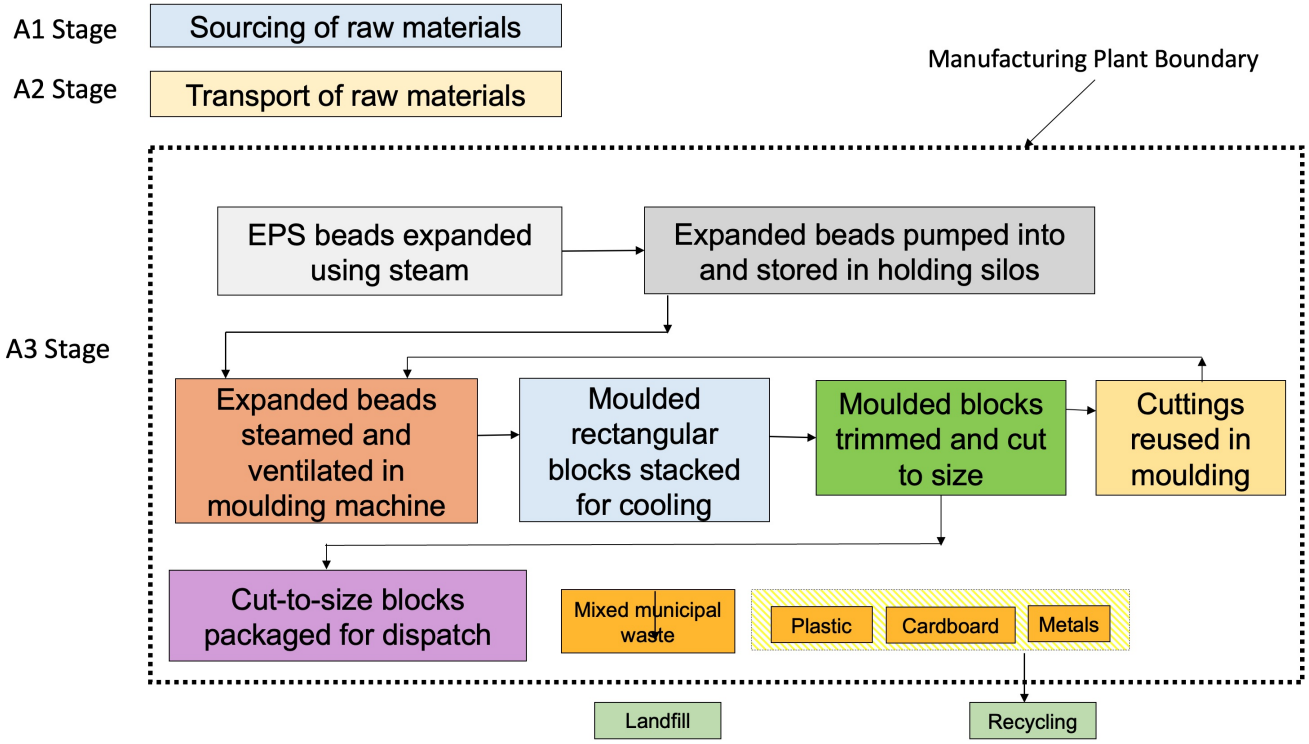
Time representativeness: Good.

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?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
The fuel mix for the electricity supplied is 22,7% natural gas, and 77,3% renewable (onshore wind). The CO2 intensities of these two types are: Natural gas 0,66 kg CO2 per kWh, and Renewable (onshore wind) 0,033 kg CO2 per kWh, (values from Ecoinvent v 3.8 values, market for electricity, wind (onshore)/natural gas, low voltage | Cutoff, U - RoW). Thus the electricity used has a mean CO2 (GWPt) per kWh value of 0,174 kg CO2 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. Longford, Ireland, and transported 200km to the customer. This is according to the default scenario for insulation in the EPD Ireland Product Category Rules. The density of the transported goods is 14.5 kg/m3.

A5. Installation
Installation losses are 1%. As this value is small, it is not modelled in this LCA.

C. End of Life Scenarios
It is assumed that the end of life scenarios for the Mannok EPS boards are:

- 92% of boards got to incineration
- 7% of boards go to recycling/re-use
- 1% 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, as per default values in the Product Category Rules PCR for EPD Ireland.

C3. Waste processing
7% of the EPS insulation is recycled, and 92% is incinerated. In the incineration scenario, it is assumed that the Thermal Efficiency of the Waste-to-Energy incineration is 25%. As the thermal efficiency of the Waste-to-Energy facility is less than 60%, the incineration process is considered a disposal process, and the impacts are assigned to C4 (disposal).

C4. Disposal
See above, where it is noted that the incineration is allocated to the C4 (disposal) stage.

D. Reuse ? Recovery ? Recycling potential
The benefit beyond the system is assumed to cover (1) avoided electricity production (from incineration of 92% of the EPD boards), and (2) avoided production of EPS beads, from the re-use of 7% of the EPS as loose beads, thus avoiding production of EPS beds. .

Biogenic Carbon
There is no biogenic carbon in the materials, processes or packaging.

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	4.77E+00	6.83E-04	1.97E+00	6.83E-01	6.74E-02	0.00E+00	1.90E-02	4.89E-02	5.27E+00	-2.36E+00
	GWP-fossil	kg CO_2 -eq	4.77E+00	6.82E-04	1.96E+00	6.82E-01	6.74E-02	0.00E+00	1.90E-02	4.90E-02	5.27E+00	-2.32E+00
	GWP-biogenic	kg CO_2 -eq	1.46E-02	6.77E-07	1.02E-02	6.77E-04	2.48E-04	0.00E+00	1.88E-05	-1.02E-04	1.53E-04	-3.99E-02
	GWP-luluc	kg CO_2 -eq	8.00E-04	3.31E-07	2.38E-04	3.31E-04	1.04E-05	0.00E+00	9.19E-06	3.15E-05	1.52E-05	-2.21E-03
	ODP	kg CFC11 -eq	4.91E-09	1.40E-11	3.13E-08	1.45E-08	3.62E-10	0.00E+00	4.02E-10	4.54E-10	1.41E-09	-1.27E-07
	AP	mol H+ -eq	8.47E-03	1.45E-06	1.67E-02	1.45E-03	2.52E-04	0.00E+00	4.04E-05	1.26E-04	6.56E-04	-7.09E-03
	EP-FreshWater	kg P -eq	4.78E-05	5.40E-09	8.55E-06	5.40E-06	5.64E-07	0.00E+00	1.50E-07	8.16E-07	6.59E-07	-1.94E-05
	EP-Marine	kg N -eq	2.05E-03	3.58E-07	7.63E-03	3.58E-04	9.68E-05	0.00E+00	9.94E-06	3.72E-05	3.12E-04	-1.17E-03
	EP-Terrestial	mol N -eq	2.24E-02	3.73E-06	8.29E-02	3.73E-03	1.05E-03	0.00E+00	1.04E-04	4.01E-04	3.34E-03	-1.34E-02
	POCP	kg NMVOC -eq	8.29E-03	2.26E-06	8.48E-02	2.26E-03	9.31E-04	0.00E+00	6.27E-05	1.51E-04	8.32E-04	-4.29E-03
	ADP-minerals&metals[1]	kg Sb-eq	1.81E-06	2.17E-09	4.13E-06	2.17E-06	5.94E-08	0.00E+00	6.04E-08	1.68E-07	1.04E-07	-2.10E-05
	ADP-fossil[1]	MJ	1.45E+02	9.45E-03	2.54E+01	9.45E+00	1.70E+00	0.00E+00	2.62E-01	4.72E-01	4.78E-01	-4.01E+01
	WDP[1]	m^3	2.51E-01	3.90E-05	2.94E-01	3.90E-02	5.46E-03	0.00E+00	1.08E-03	5.97E-03	3.57E-02	-3.33E-01

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	6.47E-08	4.90E-11	4.57E-07	4.94E-08	5.22E-09	0.00E+00	1.37E-09	2.68E-09	3.18E-09	-3.22E-08
	IRP[2]	kgBq U235 -eq	1.00E-01	4.79E-06	5.48E-03	4.79E-03	1.05E-03	0.00E+00	1.33E-04	5.95E-04	2.33E-04	-1.31E-01
	ETP-fw[1]	CTUe	7.49E+01	9.21E-03	2.33E+01	9.21E+00	9.83E-01	0.00E+00	2.56E-01	5.44E-01	2.72E+01	-4.51E+01
	HTP-c[1]	CTUh	1.63E-09	0.00E+00	6.89E-10	3.04E-10	2.30E-11	0.00E+00	8.00E-12	4.80E-11	3.41E-10	-7.81E-10
	HTP-nc[1]	CTUh	7.82E-08	9.00E-12	1.61E-08	8.54E-09	9.43E-10	0.00E+00	2.37E-10	5.72E-10	1.34E-08	-2.98E-08
	SQP[1]	dimensionless	3.56E+00	5.74E-03	2.09E+00	5.74E+00	5.65E-02	0.00E+00	1.60E-01	3.50E-01	1.43E-01	-5.81E+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	1.91E+00	1.48E-04	2.80E+00	1.48E-01	4.71E-02	0.00E+00	4.12E-03	2.37E-02	1.22E-02	-9.79E+00
	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	1.91E+00	1.48E-04	2.80E+00	1.48E-01	4.71E-02	0.00E+00	4.12E-03	2.37E-02	1.22E-02	-9.79E+00
	PENRE	MJ	6.57E+01	1.00E-02	2.71E+01	1.00E+01	9.28E-01	0.00E+00	2.79E-01	5.03E-01	5.20E-01	-4.24E+01
	PENRM	MJ	7.92E+01	0.00E+00	0.00E+00	0.00E+00	7.92E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	PENRT	MJ	1.45E+02	1.00E-02	2.71E+01	1.00E+01	1.72E+00	0.00E+00	2.79E-01	5.03E-01	5.20E-01	-4.24E+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	1.59E-02	1.27E-06	7.32E-03	1.27E-03	2.32E-04	0.00E+00	3.52E-05	1.67E-04	1.28E-03	-1.75E-01

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	4.36E-06	6.01E-08	1.67E-04	6.01E-05	1.71E-06	0.00E+00	1.67E-06	1.68E-06	3.31E-06	-1.15E-04
	NHWD	kg	3.03E-02	4.69E-04	7.53E-02	4.69E-01	1.06E-03	0.00E+00	1.30E-02	2.36E-02	5.41E-02	-1.35E-01
	RWD	kg	5.78E-04	3.11E-09	3.04E-06	3.11E-06	5.81E-06	0.00E+00	8.63E-08	4.39E-07	1.52E-07	-2.72E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-01	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	1.66E+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	0.00E+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	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

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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[13] LCA report on Mannok EPS insulation. EcoReview Ireland, 2024.

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