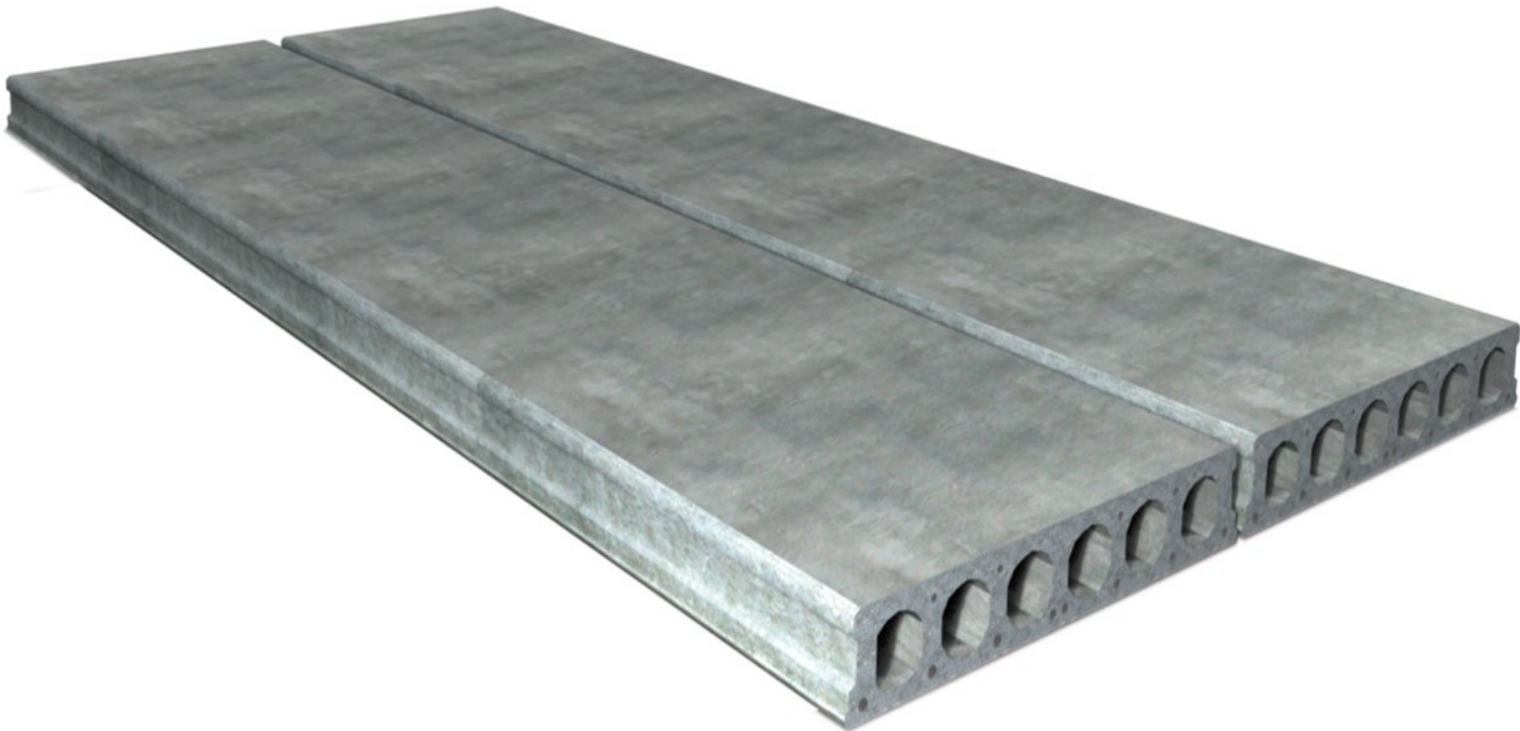


ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN15804+A2

Mannok Hollowcore 320



Owner of the declaration:

Mannok Hollowcore

Product:

Mannok Hollowcore 320

Declared unit:

1 m

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 16757:2022, PCR for concrete and concrete elements.

Program operator:

EPD Ireland - Irish Green Building Council

Declaration number:

EPDIE-25-213

Issue date:

02.09.2025

Valid to:

01.09.2030

General information

Product

Mannok Hollowcore 320

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/>

Declaration number:

EPDIE-25-213

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 16757:2022, PCR for concrete and concrete elements.

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

Declared unit:

1 m Mannok Hollowcore 320

Scope of the EPD:

A1-A3, A4, A5, B1, C1, C2, C3, C4, D

Functional unit:

1m length of 1.2m wide Hollowcore 320mm slab

Verification:

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

Third party verifier:

Marcel Gómez Ferrer, Marcel Gómez Consultoria Ambiental

Owner of the declaration:

Mannok Hollowcore
Contact person: Thomas Coyle
Phone: 00 44 6774 8866
e-mail: info@mannokbuild.com

Manufacturer:

Mannok Hollowcore

Place of production:

Mannok Hollowcore
198 Derrylin Road
Derrylin, Enniskillen, Co. Fermanagh BT92 9GP, Northern Ireland

Issue date:

02.09.2025

Valid to:

01.09.2030

Year of study:

2024

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

Approved:

SIGNATURE OF PROGRAMME OPERATOR



Pat Barry, CEO - Irish Green Building Council

Product

Product description:

The Mannok Hollowcore precast concrete flooring units are precision-engineered, prestressed slabs designed for efficient load-bearing in various construction projects. Manufactured to BS EN 1168 standards, these units offer rapid installation, excellent fire resistance, and reduced construction times. The hollow cores decrease weight and material usage while maintaining structural integrity, making them ideal for residential, commercial, and industrial applications. Available in depths from 150 mm to 400 mm, they provide a versatile and sustainable flooring solution.

Product specification:

The Hollowcore Flooring by Mannok Ltd is a precast concrete product designed for building structures. It conforms to EN1168:2005+A3:2011 and BS EN14843:2007 standards. Geometrical data, fire resistance, sound insulation, and durability are per design specifications. They are certified under System 2+, and factory production control is verified by Construction Products Certification (0086).

Technical data:

Compressive strength: 50 N/mm²

Steel tensile yield strength: 1,860 N/mm²

Thickness: 320mm

Width: 1.2 m

Length: as required by customer.

Weight per linear metre: 426 kg

Market/Geographical Area:

Republic of Ireland, Great Britain, Western Europe

Reference service life, product

60 years

Reference service life, building or construction works

N/A

LCA: Calculation rules

Declared unit:

1 m Mannok Hollowcore 320

kg per Declared unit 426

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 3.0. 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: The processes used in the production of the precast products are geographically representative, insofar as the production location lies within the region for which the relevant Ecoinvent (version 3.9.1) environmental records have been selected. In addition, the modelling of the cement is carried out using the LCA from the actual cement supplier, being Mannok Cement Ireland, and the actual steel strand supplier.

The geographical representativeness is thus assumed to be 'very good'.

Technical representativeness: 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, in relation to processes, fuels used, emissions and wastes generated, and without any significant need for improvement.

The technical representativeness is thus assumed to be 'very good'.

Time representativeness: In this LCA the data relating to the manufacturing of the precast products, and the data relating to the background processes for environmental impacts are recent (<2 years). The records for the supplier of CEM II/A-L cement (Mannok Cement, Ireland) are from the LCA for Mannok Cement, for the production year of 2023. It is manufacturer-specific, and product specific. The record for the steel strands is from the specific EPD for steel strands manufactured in 2021. The EPD was issued on 22/09/2022. It is manufacturer-specific, and product specific.

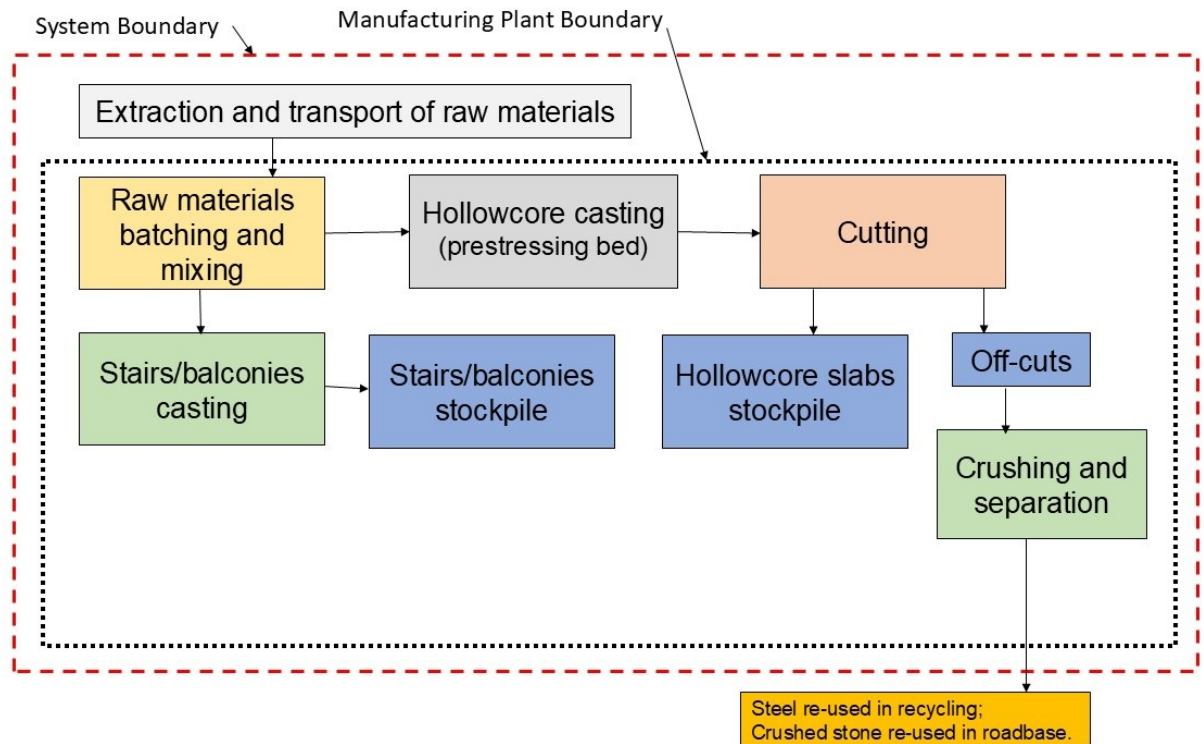
The time representativeness is thus assumed to be 'very good'.

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

System boundary:

This EPD covers cradle to gate with options, modules C1–C4, and module D. The options include A4, A5 (construction installation stage) and B (User stage). In the B stages B1 (Use) covers carbonation during the life of the concrete



Additional technical information:

Electricity modelling

The fuel mix for the electricity supplied is 11.9% natural gas, and 88.1% renewable (onshore wind). The CO2 intensities of these two types are:

Natural gas: 0.59 kg CO2 per kWh

Renewable (onshore wind): 0.033 kg CO2 per kWh.

These are from Ecoinvent v 3.9.1 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 0.1 kg CO2 per kWh.

LCA: Scenarios and additional technical information

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

A4. Transport to customer

The product and data used in this EPD are based on the product being manufactured in Co. Fermanagh, and transported to a customer/site on the Island of Ireland by a road distance of 100km. The capacity utilisation of road freight is 46%. The bulk density of the transported goods is 2,500 kg/m³.

A5. Installation

Installation energy used is that of the crane lifting the Hollowcore slab into place in the structure, using 0.6 litres of diesel per tonne of concrete element. It is assumed that there are no installation losses.

B. Use Stage

B1. Use

In the Use phase, it is assumed that carbonation occurs. Carbonation is calculated, using the Simplified Method in Appendix G of EN 16757:2002, to be 4.0 kg CO₂-eq per functional unit of 1m length Hollowcore of 1.2m width.

There are no direct use phase factors in modules B2 – B7.

C. End of Life Stage

C1. De-construction demolition

This stage covers disassembly of the element from the structure, demolition of the concrete element and crushing the demolished concrete on site. Diesel is used for these three processes and is calculated to be 2.8 litres per tonne of concrete element.

C2. Transport

Transport of waste materials from site to recycling processing is assumed to be 50km.

C3. Waste processing

Waste processing is the treatment at the waste recycling plant of the waste concrete that has been demolished and crushed on site, and treatment of the waste steel for steel recycling.

C4. Disposal

It is assumed that no disposal of materials occurs, and 100% of materials are recovered and recycled.

D. Reuse, Recovery, Recycling potential

Beyond the system, after the precast concrete products has passed beyond the end-of-waste stage, it is assumed that 100% of the aggregates replace the production of primary aggregates, and 3% of the steel replaces the production of virgin steel (as 97% of the steel in the reinforcement is already recycled). The quantities are: 323.3 kg primary aggregate replaced and 0.18 kg primary steel replaced, per FU.

Biogenic Carbon











There is no Biogenic Carbon in the product.

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-A3	A4	A5	B1	C1	C2	C3	C4	D	
 GWP-total	kg CO ₂ -eq	6.93E+01	8.09E+00	9.35E-01	-4.00E+00	4.37E+00	4.04E+00	2.00E+00	0.00E+00	-2.12E+00	
 GWP-fossil	kg CO ₂ -eq	6.91E+01	8.08E+00	9.35E-01	-4.00E+00	4.36E+00	4.04E+00	2.00E+00	0.00E+00	-2.12E+00	
 GWP-biogenic	kg CO ₂ -eq	1.69E-01	8.01E-03	2.44E-04	0.00E+00	1.14E-03	4.00E-03	5.22E-04	0.00E+00	2.44E-03	
 GWP-luluc	kg CO ₂ -eq	6.37E-02	3.92E-03	1.03E-04	0.00E+00	4.82E-04	1.96E-03	2.21E-04	0.00E+00	-7.90E-04	
 ODP	kg CFC11 -eq	1.18E-06	1.71E-07	1.45E-08	0.00E+00	6.78E-08	8.57E-08	3.11E-08	0.00E+00	-3.57E-08	
 AP	mol H+ -eq	2.32E-01	1.72E-02	8.46E-03	0.00E+00	3.95E-02	8.60E-03	1.81E-02	0.00E+00	-2.31E-02	
 EP-FreshWater	kg P -eq	2.81E-03	6.39E-05	3.30E-06	0.00E+00	1.54E-05	3.20E-05	7.06E-06	0.00E+00	-6.36E-05	
 EP-Marine	kg N -eq	6.24E-02	4.24E-03	3.92E-03	0.00E+00	1.83E-02	2.12E-03	8.39E-03	0.00E+00	-7.61E-03	
 EP-Terrestrial	mol N -eq	7.13E-01	4.41E-02	4.26E-02	0.00E+00	1.99E-01	2.21E-02	9.13E-02	0.00E+00	-1.04E-01	
 POCP	kg NMVOC -eq	1.92E-01	2.67E-02	1.26E-02	0.00E+00	5.89E-02	1.34E-02	2.70E-02	0.00E+00	-2.63E-02	
 ADP-minerals&metals ¹	kg Sb-eq	1.06E-04	2.57E-05	3.19E-07	0.00E+00	1.49E-06	1.29E-05	6.83E-07	0.00E+00	-3.34E-06	
 ADP-fossil ¹	MJ	3.68E+02	1.12E+02	1.20E+01	0.00E+00	5.58E+01	5.59E+01	2.56E+01	0.00E+00	-2.28E+01	
 WDP ¹	m ³	1.35E+01	4.62E-01	2.60E-02	0.00E+00	1.21E-01	2.31E-01	5.57E-02	0.00E+00	-1.34E+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 on environmental impacts








Additional environmental impact indicators											
Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D	
 PM	Disease incidence	1.77E-06	5.84E-07	2.36E-07	0.00E+00	1.10E-06	2.92E-07	3.14E-06	0.00E+00	-3.71E-07	
 IRP ²	kgBq U235 -eq	1.03E+00	5.66E-02	2.44E-03	0.00E+00	1.14E-02	2.83E-02	5.24E-03	0.00E+00	-1.90E-02	
 ETP-fw ¹	CTUe	1.02E+03	1.09E+02	1.02E+01	0.00E+00	4.77E+01	5.45E+01	2.19E+01	0.00E+00	-8.02E+02	
 HTP-c ¹	CTUh	3.08E-08	3.60E-09	2.80E-10	0.00E+00	1.31E-09	1.80E-09	6.00E-10	0.00E+00	-6.96E-09	
 HTP-nc ¹	CTUh	3.51E-07	1.01E-07	6.16E-09	0.00E+00	2.88E-08	5.05E-08	1.32E-08	0.00E+00	-4.10E-08	
 SQP ¹	dimensionless	1.51E+02	6.80E+01	8.17E-01	0.00E+00	3.81E+00	3.40E+01	1.75E+00	0.00E+00	-3.94E+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)

¹Reading example: 9.0 E-03 = 9.0*10⁻³ = 0.009"

²INA 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-A3	A4	A5	B1	C1	C2	C3	C4	D	
 PERE	MJ	5.58E+01	1.76E+00	6.80E-02	0.00E+00	3.17E-01	8.79E-01	1.46E-01	0.00E+00	-1.17E+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	
 PERT	MJ	5.58E+01	1.76E+00	6.80E-02	0.00E+00	3.17E-01	8.79E-01	1.46E-01	0.00E+00	-1.17E+00	
 PENRE	MJ	4.28E+02	1.19E+02	1.27E+01	0.00E+00	5.93E+01	5.94E+01	2.72E+01	0.00E+00	-2.41E+01	
 PENRM	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	
 PENRT	MJ	4.28E+02	1.19E+02	1.27E+01	0.00E+00	5.93E+01	5.94E+01	2.72E+01	0.00E+00	-2.41E+01	
 SM	kg	6.37E+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	
 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	
 FW	m ³	3.27E-01	1.50E-02	8.41E-04	0.00E+00	3.92E-03	7.50E-03	1.80E-03	0.00E+00	-3.23E-02	

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-A3	A4	A5	B1	C1	C2	C3	C4	D	
	HWD	kg	1.03E-03	7.11E-04	8.05E-05	0.00E+00	3.76E-04	3.56E-04	1.72E-04	0.00E+00	-1.79E-04
	NHWD	kg	4.66E+01	5.55E+00	1.71E-02	0.00E+00	7.98E-02	2.78E+00	3.66E-02	0.00E+00	-2.36E-01
	RWD	kg	8.31E-04	3.68E-05	1.31E-06	0.00E+00	6.11E-06	1.84E-05	2.81E-06	0.00E+00	-1.31E-05

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

*Reading example: 9.0 E-03 = $9.0 \times 10^{-3} = 0.009$

*INA Indicator Not Assessed

End of life - Output flow											
Indicator	Unit	A1-A3	A4	A5	B1	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
	MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.29E+02	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	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
	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

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 = $9.0 \times 10^{-3} = 0.009$

*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

[1] I.S. EN 15804:2012+A2:2019/AC :2021, 'Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', EN 15804:2012+A2:2019/AC :2021.

[2] Ecochain 4.3.1, 2025, web: <http://app.Ecochain.com>.

[3] Product Category Rules: Part A, Implementation and use of EN 15804:2012+A2:2019 and CEN TR 16970:2016 in Ireland for the development of Environmental Product Declarations; Version 2.1, issue date: 05.03.2022, published by the EPD Ireland Programme operator (Irish Green Building Council).






[4] IS-EN-16757 Sustainability of construction works. Environmental product declarations. Product Category Rules for concrete and concrete elements.

[5] ISO 14040: Environmental management - Life cycle assessment – Principles and Framework, International Organization for Standardization, ISO14040:2006.

[6] ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines, International Organization for Standardization, ISO14044:2006.

[7] ISO 14025: Environmental labels and declarations -Type III environmental declarations -Principles and procedures, International Organization for Standardization, ISO14025:2006.

[8] LCA report to Mannok Hollowcore, Report according to EN-15804:2012+A2:2019/AC:2021, EcoReview Ireland, 2025.

	<p>Program operator and publisher EPD Ireland - Irish Green Building Council 19 Mountjoy Square, Dublin D01 E8P5</p>	<p>Phone: +353 (01) 6815862 e-mail: epd@igbc.ie web: https://www.igbc.ie/epd-home/</p>
	<p>Owner of the declaration: Mannok Hollowcore 198 Derrylin Road, Derrylin, Enniskillen, Co. Fermanagh BT92 9GP, Northern Ireland</p>	<p>Phone: 00 44 6774 8866 e-mail: info@mannokbuild.com web: https://mannokbuild.com/precast/hollowcore-flooring/</p>
	<p>Author of the Life Cycle Assessment EcoReview Ireland Kilkenny City, Co. Kilkenny, Ireland</p>	<p>Phone: +353 87 258 9783 e-mail: pseymour@ecoreview.ie web: www.ecoreview.ie</p>
	<p>Developer of PDF generator LCA.no AS Dokka 6A, 1671 Kråkerøy, Norway</p>	<p>Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no</p>
	<p>ECO Platform ECO Portal</p>	<p>web: www.eco-platform.org web: ECO Portal</p>