



## ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804 + A1 Owner of the  
Declaration – Mannok

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Declaration number: EPDIE-20-20  
Issue date 12th March 2020  
Valid to 12th March 2025



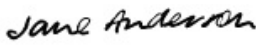
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EPD Programme - EPD Ireland  
Programme Operator - Irish Green Building Council  
[www.epdireland.org](http://www.epdireland.org)

### Mannok Hollowcore Slabs

HOLLOWCORE 150  
HOLLOWCORE 150HD  
HOLLOWCORE 200  
HOLLOWCORE 250  
HOLLOWCORE 320  
HOLLOWCORE 400

## 1. General information

PROGRAMME OPERATOR	OWNER OF DECLARATION
Irish Green Building Council, 19 Mountjoy Square, Dublin D01 E8P5.	Mannok, 187 Ballyconnell Road, Derrylin, Co. Fermanagh, BT92 9GP.
DECLARATION NUMBER	PRODUCTION SITE
EPDIE-20-20	Mannok Hollowcore, Gortmullan, Co. Fermanagh, Northern Ireland.
ECOPLATFORM EPD	DECLARED UNIT
Yes	1m length of the 1.2m wide Hollowcore flooring slabs
APPLICABLE PRODUCT CATEGORY RULES	DECLARED PRODUCT
EN 15804:2012+A1:2013, EPD Ireland PCR Part A; I.S. EN 16757:2017 Sustainability of Construction Works - Environmental Product Declarations - Product Category Rules for Concrete and Concrete Elements	Mannok Hollowcore concrete floor slabs (thicknesses 150, 150 high density, 200, 250, 320, 400mm)
DATE OF ISSUE	SCOPE OF EPD
12.03.2020 Reissue: 05.02.2021 Change in EPD owner name, logo and branding from Quinn Building Products to Mannok.	Manufacturer specific product
DATE OF EXPIRY	LCA CONSULTANT OR PERSON RESPONSIBLE FOR LCA
12.03.2025	EcoReview, Kilkenny, Co. Kilkenny, Ireland, +353 87 258 9783 / +31 646 264 9327 info@ecoreview.ie / www.ecoreview.eu
TYPE OF EPD: SINGLE OR MULTI PRODUCT	LCA SOFTWARE AND DEVELOPER IF APPLICABLE
Multi Product	Ecochain
PRODUCT CLASSIFICATION OR NACE CODE	NAME AND VERSION OF INVENTORY USED
23.61 : Manufacture of concrete products for construction purposes	Ecoinvent version 3.4
COMPARABILITY	
Environmental Product Declarations from different programmes may not be directly comparable if not compliant with EN 15804:2012+A1:2013. 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+2012+A1:2013	
The CEN Norm /EN 15804 serves as the core PCR	
Independent verification of the declaration according to ISO 14025	
Internally <input type="checkbox"/> Externally <input checked="" type="checkbox"/>	
SIGNATURE OF PROGRAMME OPERATOR	SIGNATURE VERIFIER
Pat Barry - CEO - Irish Green Building Council  	Jane Anderson, ConstructionLCA Ltd 

## 2. Scope and Type of EPD

This is a Cradle to Gate EPD. The Modules that are declared are shown in the table below.

PRODUCT STAGE			CONSTRUCTION ON PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X - Module declared.

MND - Module not declared.

### 3. Detailed product description

This LCA presents the results relating to a 1m length of 1.2m wide section of Mannok’s Hollowcore prestressed flooring.

The products are made in thicknesses varying from 150mm deep to 400mm deep, designated as follows:

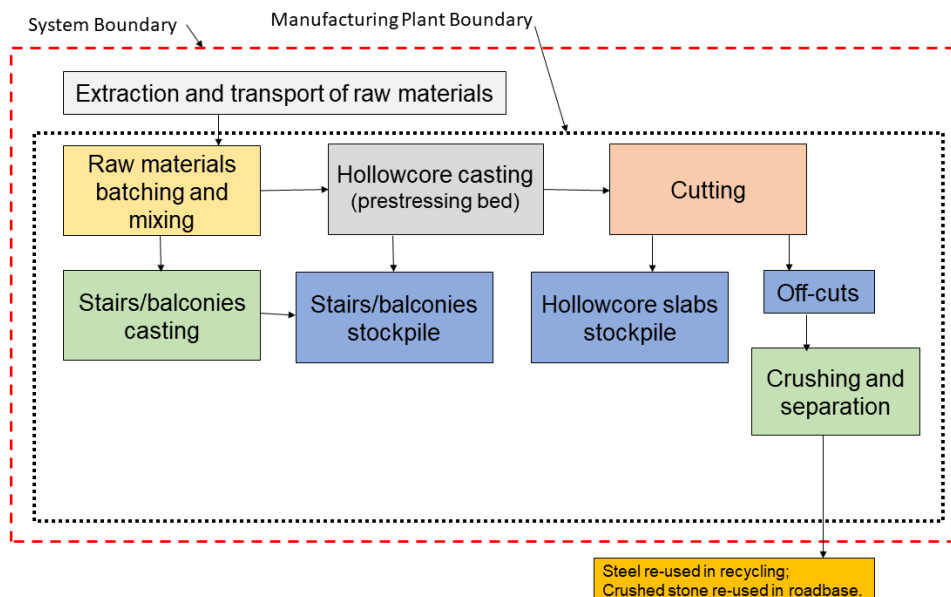
- [Hollowcore 150](#)
- [Hollowcore 150HD](#)
- [Hollowcore 200](#)
- [Hollowcore 250](#)
- [Hollowcore 320](#)
- [Hollowcore 400](#)

The constituent raw materials of all of the products comprise sands, aggregate, cement, and prestressing steel strands.

The precast products are manufactured in Derrylin Fermanagh, Northern Ireland. All concrete is batched in a 1.5m<sup>3</sup> planetary mixer batching plant. Concrete is then placed on 1.2m wide heated formwork beds to make the hollowcore sections, and then prestressed as the concrete is poured and cured. The heated beds are heated by steam generated by LPG-fired boilers. After sufficient heating and curing the floor sections are cut into pre-determined lengths according to market requirements. Diesel-powered cutters are used to cut the hollowcore floor sections.

Off-cuts of the hollowcore slabs are also produced, for trimming and cutting to order sizes. These are crushed on site, and the steel strands are separated from the crushed concrete. The steel is sent off-site for recycling. The crushed concrete is used off-site in roadbase construction. The materials and energy associated with the off-cuts are fully allocated to the hollowcore slabs sold to the market. Compositions per declared unit of the Hollowcore Slabs have been adjusted (uplifted by 1.7%) to include for the materials that are in the off-cuts.

The floor slabs are manufactured to EN 1168:2005+A3:2011 Precast concrete products, hollow-core slabs.



Manufacturing processes flowchart

## 4.1 LCA results - HOLLOWCORE 150

### Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
GWP	[kg CO2-Eq.]	51.804	0.337	7.25	59.392	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
ODP	[kg CFC11-Eq.]	2.67E-06	6.05E-08	1.15E-06	3.88E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO2-Eq.]	1.52E-01	2.21E-03	2.27E-02	1.76E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO4) -Eq.]	1.89E-02	2.19E-04	4.04E-03	2.31E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	1.77E-02	9.09E-05	3.16E-03	2.09E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	9.02E-02	2.43E-03	6.94E-03	9.96E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	3.06E+02	5.28E+00	9.61E+01	4.07E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed.

## 4.1 LCA results - HOLLOWCORE 150

### Resource use per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	1.29E+01	8.47E-02	2.91E+00	1.59E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	1.29E+01	8.47E-02	2.91E+00	1.59E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	3.07E+02	5.43E+00	1.02E+02	4.14E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	3.07E+02	5.43E+00	1.02E+02	4.14E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	1.93E-01	3.04E-04	8.38E-03	2.02E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water. INA = Indicator not assessed. MND = Module not declared.

SM, RFS and NRSF are not calculated by the EcoChain software.

## 4.1 LCA results - HOLLOWCORE 150

### Output flows and waste categories per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
HWD	[kg]	1.00E-03	3.77E-05	6.82E-04	1.72E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	3.36E+01	1.96E-01	1.75E-01	3.40E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	4.10E-04	3.47E-05	6.31E-04	1.08E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

## 4.2 LCA results - HOLLOWCORE 150HD

### Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO2-Eq.]	62.784	0.353	9.139	72.276	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP	[kg CFC11-Eq.]	3.23E-06	6.34E-08	1.45E-06	4.74E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO2-Eq.]	1.81E-01	2.25E-03	2.86E-02	2.12E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO4) -Eq.]	2.23E-02	2.24E-04	5.09E-03	2.76E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	1.93E-02	9.33E-05	3.98E-03	2.34E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	1.13E-01	2.54E-03	8.75E-03	1.24E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	3.54E+02	5.53E+00	1.21E+02	4.81E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed.



## 4.2 LCA results - HOLLOWCORE 150HD

### Resource use per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	1.50E+01	8.82E-02	3.66E+00	1.87E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	1.50E+01	8.82E-02	3.66E+00	1.87E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	3.60E+02	5.68E+00	1.28E+02	4.94E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	3.60E+02	5.68E+00	1.28E+02	4.94E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	2.29E-01	3.17E-04	1.06E-02	2.40E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water. INA = Indicator not assessed. MND = Module not declared.

SM, RFS and NRSF are not calculated by the EcoChain software.

## 4.2 LCA results - HOLLOWCORE 150HD

### Output flows and waste categories per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
HWD	[kg]	1.06E-03	3.95E-05	8.60E-04	1.96E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
NHWD	[kg]	4.16E+01	2.07E-01	2.20E-01	4.20E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	4.67E-04	3.63E-05	7.95E-04	1.30E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

## 4.3 LCA results - HOLLOWCORE 200

### Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO2-Eq.]	58.388	0.325	8.521	67.234	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP	[kg CFC11-Eq.]	3.00E-06	5.83E-08	1.35E-06	4.41E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO2-Eq.]	1.68E-01	2.06E-03	2.67E-02	1.97E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO4) -Eq.]	2.07E-02	2.05E-04	4.74E-03	2.56E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	1.78E-02	8.57E-05	3.71E-03	2.16E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	1.05E-01	2.33E-03	8.16E-03	1.16E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	3.29E+02	5.09E+00	1.13E+02	4.47E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed.

## 4.3 LCA results - HOLLOWCORE 200

### Resource use per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
PERE	[MJ]	1.39E+01	8.12E-02	3.42E+00	1.74E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
PERM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	1.39E+01	8.12E-02	3.42E+00	1.74E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	3.34E+02	5.22E+00	1.20E+02	4.59E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	3.34E+02	5.22E+00	1.20E+02	4.59E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	2.13E-01	2.91E-04	9.85E-03	2.23E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water. INA = Indicator not assessed. MND = Module not declared.

SM, RFS and NRSF are not calculated by the EcoChain software.

### 4.3 LCA results - HOLLOWCORE 200

#### Output flows and waste categories per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	9.79E-04	3.64E-05	8.02E-04	1.82E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	3.87E+01	1.91E-01	2.05E-01	3.91E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	4.33E-04	3.34E-05	7.42E-04	1.21E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

## 4.4 LCA results - HOLLOWCORE 250

### Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
GWP	[kg CO <sub>2</sub> -Eq.]	82.074	0.526	10.158	92.757	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
ODP	[kg CFC11-Eq.]	4.21E-06	9.42E-08	1.61E-06	5.92E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO <sub>2</sub> -Eq.]	2.38E-01	3.48E-03	3.18E-02	2.73E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO <sub>4</sub> ) -Eq.]	2.96E-02	3.44E-04	5.65E-03	3.56E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	2.78E-02	1.43E-04	4.42E-03	3.24E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	1.41E-01	3.78E-03	9.73E-03	1.55E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	4.79E+02	8.23E+00	1.35E+02	6.22E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed.

## 4.4 LCA results - HOLLOWCORE 250

### Resource use per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	2.00E+01	1.32E-01	4.07E+00	2.42E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	2.00E+01	1.32E-01	4.07E+00	2.42E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	4.80E+02	8.45E+00	1.43E+02	6.31E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	4.80E+02	8.45E+00	1.43E+02	6.31E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	2.82E-01	4.73E-04	1.17E-02	2.94E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water. INA = Indicator not assessed. MND = Module not declared.

SM, RFS and NRSF are not calculated by the EcoChain software.

## 4.4 LCA results - HOLLOWCORE 250

### Output flows and waste categories per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
HWD	[kg]	1.53E-03	5.87E-05	9.56E-04	2.55E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	5.35E+01	3.04E-01	2.45E-01	5.41E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	6.16E-04	5.40E-05	8.84E-04	1.55E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.



## 4.5 LCA results - HOLLOWCORE 320

### Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO2-Eq.]	102.813	0.558	9.027	112.398	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP	[kg CFC11-Eq.]	5.25E-06	1.00E-07	1.43E-06	6.79E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO2-Eq.]	2.93E-01	3.59E-03	2.82E-02	3.25E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO4) -Eq.]	3.60E-02	3.57E-04	5.02E-03	4.14E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	3.11E-02	1.49E-04	3.93E-03	3.52E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	1.83E-01	4.01E-03	8.64E-03	1.96E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	5.71E+02	8.74E+00	1.20E+02	6.99E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed.

## 4.5 LCA results - HOLLOWCORE 320

### Resource use per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	2.38E+01	1.40E-01	3.62E+00	2.76E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	2.38E+01	1.40E-01	3.62E+00	2.76E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	5.81E+02	8.97E+00	1.27E+02	7.17E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	5.81E+02	8.97E+00	1.27E+02	7.17E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	3.42E-01	5.01E-04	1.04E-02	3.53E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water. INA = Indicator not assessed. MND = Module not declared.

SM, RFS and NRSF are not calculated by the EcoChain software.

## 4.5 LCA results - HOLLOWCORE 320

### Output flows and waste categories per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
HWD	[kg]	1.65E-03	6.24E-05	8.49E-04	2.56E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	6.87E+01	3.26E-01	2.17E-01	6.92E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	7.17E-04	5.74E-05	7.86E-04	1.56E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

## 4.6 LCA results - HOLLOWCORE 400

### Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
GWP	[kg CO2-Eq.]	117.518	0.673	15.457	133.648	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
ODP	[kg CFC11-Eq.]	6.01E-06	1.21E-07	2.46E-06	8.59E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO2-Eq.]	3.37E-01	4.37E-03	4.84E-02	3.90E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO4) -Eq.]	4.15E-02	4.34E-04	8.60E-03	5.05E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	3.69E-02	1.81E-04	6.73E-03	4.38E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	2.07E-01	4.84E-03	1.48E-02	2.27E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	6.63E+02	1.05E+01	2.05E+02	8.78E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed.

## 4.6 LCA results - HOLLOWCORE 400

### Resource use per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	2.77E+01	1.69E-01	6.20E+00	3.40E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	2.77E+01	1.69E-01	6.20E+00	3.40E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	6.71E+02	1.08E+01	2.17E+02	8.99E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	6.71E+02	1.08E+01	2.17E+02	8.99E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	3.95E-01	6.05E-04	1.79E-02	4.14E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water. INA = Indicator not assessed. MND = Module not declared.

SM, RFS and NRSF are not calculated by the EcoChain software.

## 4.6 LCA results - HOLLOWCORE 400

### Output flows and waste categories per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	1.98E-03	7.53E-05	1.45E-03	3.51E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	7.79E+01	3.92E-01	3.72E-01	7.87E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	8.39E-04	6.92E-05	1.35E-03	2.25E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0	0	0	0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

## 5.1 LCA results - Additional Impact Indicators - HOLLOWCORE 150

Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	1.34E+01	1.54E-01	2.02E+00	1.56E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	1.09E-01	4.16E-03	3.93E-02	1.53E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	1.76E+03	6.68E+01	2.04E+02	2.03E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.07E-01	7.28E-04	2.22E-02	1.30E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

## 5.2 LCA results - Additional Impact Indicators - HOLLOWCORE 150HD

Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	1.40E+01	1.61E-01	2.55E+00	1.68E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	1.20E-01	4.36E-03	4.96E-02	1.74E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	2.16E+03	6.96E+01	2.57E+02	2.48E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.20E-01	7.62E-04	2.80E-02	1.48E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.



### 5.3 LCA results - Additional Impact Indicators - HOLLOWCORE 200

Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	1.29E+01	1.48E-01	2.38E+00	1.54E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	1.11E-01	4.01E-03	4.62E-02	1.61E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	2.01E+03	6.40E+01	2.39E+02	2.31E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.11E-01	7.01E-04	2.61E-02	1.37E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

## 5.4 LCA results - Additional Impact Indicators - HOLLOWCORE 250

Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	2.10E+01	2.41E-01	2.84E+00	2.41E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	1.68E-01	6.48E-03	5.51E-02	2.30E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	2.44E+03	1.04E+02	2.85E+02	2.83E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.68E-01	1.13E-03	3.11E-02	2.01E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

## 5.5 LCA results - Additional Impact Indicators - HOLLOWCORE 320

Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	2.23E+01	2.55E-01	2.52E+00	2.51E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	1.88E-01	6.89E-03	4.90E-02	2.44E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	3.08E+03	1.10E+02	2.54E+02	3.44E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.93E-01	1.20E-03	2.77E-02	2.22E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

## 5.6 LCA results - Additional Impact Indicators - HOLLOWCORE 400

Environmental impact per 1m length of 1.2m wide slab

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	2.69E+01	3.07E-01	4.31E+00	3.15E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	2.23E-01	8.30E-03	8.38E-02	3.15E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	3.51E+03	1.33E+02	4.34E+02	4.08E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	2.27E-01	1.45E-03	4.74E-02	2.76E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

## 6. Additional LCI Indicators

N/A

## 7. Calculation rules

### Methodology and reproducibility

The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented in the LCA report. In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated which can be accessed via the EcoChain tool. This data portfolio contains a summary of all the data used in this LCA, and correspondingly, in the Mannok Hollowcore EcoChain account.

### Data quality

Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

### Data collection period

The dataset is representative for the production processes used in 2018.

## 8. Scenarios and additional technical information

### A1. Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the Mannok Hollowcore manufacturing process, as well as waste processing up to the end-of waste state.

### A2. Transport of raw materials to manufacturer

This includes the transport distance of the raw materials to the manufacturing facility via road, boat and/or train.

### A3. Manufacturing

This module covers the manufacturing of Mannok Hollowcore and includes all processes linked to production such as mixing, placing and internal transport. Use of electricity, fuels and auxiliary materials in production is taken into account as well.



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

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 threshold with the European Chemicals Agency.

## 10. Other optional additional environmental information

N/A

## 11. References

EPD Ireland Product Category Rules: PART A Implementation and use of IS 15804:2012 and CEN TR 16970 in Ireland for the development of Environmental Product Declarations, 29.06.2018 - [www.epdireland.org](http://www.epdireland.org)