



ENVIRONMENTAL PRODUCT DECLARATION IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Concrete Manholes (Perfect)
Marshalls Plc



EPD HUB, HUB- 0546

Publishing date 30 June 2023, last updated on 13 July 2023, valid until 30 June 2028.

GENERAL INFORMATION

MANUFACTURER

Manufacturer VP-001	Marshalls Plc
Address VP-002	Landscape House, Premier Way, Elland HX5 9HT, England, UK
Contact details VP-003	epd@marshalls.co.uk
Website	www.marshalls.co.uk

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022 EN 16757 Product Category Rules for concrete and concrete elements
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-B1, and modules C1-C4, D
EPD author VP-004	C Griffiths, R Dorrington, S Lang - Marshalls PLC
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification
EPD verifier VP-055	Elma Avdyli, EPD Hub

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name VP-007	Marshalls Perfect Manholes
Additional labels	N/A
Product reference	N/A
Place of production VP-008	Mells
Period for data VP-013	2022
Averaging in EPD VP-024-C	No averaging
Variation in GWP-fossil for A1-A3 VP-025-C	%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1200mm x 1m Sealed Manhole Ring
Declared unit mass	1300 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	2,03E2
GWP-total, A1-A3 (kgCO ₂ e)	2,06E2
Secondary material, inputs (%)	0.107
Secondary material, outputs (%)	0.0
Total energy use, A1-A3 (kWh)	333.0
Total water use, A1-A3 (m ³ e)	4,4E0

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Marshalls is the UK's largest manufacturer and supplier of building and hard landscaping products, including paving blocks and flags, kerbs, drainage channels, bricks, roof tiles, street furniture and natural stone paving. It provides products for both commercial and domestic markets.

PRODUCT DESCRIPTION

The product is a perfect concrete manhole. These ring-shaped precast units are stacked on top of each other to create an access chamber that can be accessed by a person. They are used to inspect and / or maintain drainage and / or sewerage systems, usually at the intersection of a number of inlet and outlet pipes. These units are referred to as perfect because they're specifically cast to customer requirements with inlet and outlet holes in exactly the right place.

Manholes are manufactured to BSEN 1917 & BS 5911-3. Full details of the test methods and minimum performance criteria can be found in the standards. This document is for a 1200mm x 1m chamber ring. A conversion table for different sized units is featured further on in this document.

Further information can be found at www.marshalls.co.uk.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	N/A	N/A
Minerals	100	EU
Fossil materials	N/A	N/A
Bio-based materials	N/A	N/A

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	-

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit VP-011	1200mm x 1m Sealed Manhole Ring
Mass per declared unit VP-012	1300 kg
Functional unit	1200mm x 1m Sealed Manhole Ring with useful service life of 100 years
Reference service life	100 years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage								End of life stage				Beyond the system boundaries	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	x	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

Perfect Concrete Manholes are manufactured using a wet cast. The specified blend of aggregates, binder material, water and admixtures is dispensed from hoppers into a mixer. A cleaned mould is loaded with steel reinforcement bars and a polystyrene former as appropriate. The self-compacting concrete mixture is then loaded

into a hopper, from which it is then belt-fed into a mould. The mould is then lifted, leaving the product behind. The product is lifted onto a forming plate to ensure it keeps in shape and the loaded forming plate is moved to the curing section of the shed. Forming plates are stored in the chamber until it achieves strength. Once sufficiently cured, product is moved to a storage site and stacked.

Any water lost during manufacture is recycled - collected and reintroduced to the mix. Material waste during manufacture is negligible.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

A4: During the time period measured, manufacture of perfect manholes took place at one UK site: Mells. Transport to site or yard is undertaken by articulated lorries with Euro 6 engines. We have calculated that the average journey undertaken by these products from manufacturing site to installation site during the time period allocated was 188km.

A5: Installation will be by crane or other lifting plant.

PRODUCT USE AND MAINTENANCE (B1-B7)

B1: The carbonation (sequestration) value has been calculated as per methodology outlined in EN 16757:2022.

Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

C1: The demolition process consumes energy in the form of diesel fuel used by building machines. Energy consumption of a demolition process is on the average 10 kWh/m² (Bozdağ, Ö & Seçer, M. 2007). Basing on a Level(s) project, an average mass of a reinforced concrete building is about 1000 kg/m². Therefore, energy consumption demolition is assumed to be 10 kWh/1000 kg = 0,01 kWh/kg. The source of energy is diesel fuel used by work machines (C1).

C2: It is assumed that 7% of product is transported 50km to a waste processing site to be landfilled, and 93% of product is reused. This is evidenced on UK Governments Statistics on Construction Waste website: 7. Recovery rate from non-hazardous construction and demolition (C&D) waste - Table 8: England, 2010–2020: <https://www.gov.uk/government/statistics/uk-waste-data/uk-statistics-on-waste#recovery-rate-from-non-hazardous-construction-and-demolition-cd-waste>

C3: All material (whether used on site or treated at a waste processing facility) will be crushed.

C4: It is assumed that 7% of material will go to landfill.

D: Due to the recycling potential of concrete, it can be used as secondary raw material, which avoids the use of virgin raw materials. The 93% of concrete going to waste processing is converted into secondary raw materials after recycling. 70% of steel will be recycled, while 30% will go to landfill.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS VP-

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	Not applicable
Ancillary materials	Not applicable
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY VP

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	-

Primary data represents the Marshalls site at which perfect manholes are manufactured. All products covered by this EPD use the same mix design with minor differences to account for the moisture content of different materials. The data was used to calculate average impacts for the product.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	1,93E2	5,01E0	7,18E0	2,06E2	2,11E1	1,19E-1	-1,85E1	MND	MND	MND	MND	MND	MND	4,29E0	5,75E0	1,4E1	4,91E-1	-1,46E1
GWP – fossil	kg CO ₂ e	1,9E2	5,01E0	7,15E0	2,03E2	2,13E1	1,19E-1	-1,85E1	MND	MND	MND	MND	MND	MND	4,29E0	5,74E0	1,4E1	4,9E-1	-1,45E1
GWP – biogenic	kg CO ₂ e	2,94E0	3,64E-3	8,37E-3	2,96E0	1,61E-2	3,31E-5	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-1,11E-1
GWP – LULUC	kg CO ₂ e	3,35E-2	1,51E-3	2,02E-2	5,52E-2	6,69E-3	1,01E-5	0E0	MND	MND	MND	MND	MND	MND	3,62E-4	1,8E-3	1,07E-2	1,46E-4	-1,4E-2
Ozone depletion pot.	kg CFC ₁₁ e	6,89E-6	1,18E-6	3,11E-6	1,12E-5	5,23E-6	2,57E-8	0E0	MND	MND	MND	MND	MND	MND	9,25E-7	1,41E-6	2,48E-6	2,02E-7	-1,06E-6
Acidification potential	mol H ⁺ e	5,12E-1	2,1E-2	9,28E-2	6,26E-1	6,85E-2	1,24E-3	0E0	MND	MND	MND	MND	MND	MND	4,48E-2	1,85E-2	1,17E-1	4,65E-3	-8,76E-2
EP-freshwater ²⁾	kg Pe	2,52E-3	4,08E-5	5,56E-5	2,61E-3	1,81E-4	4,81E-7	0E0	MND	MND	MND	MND	MND	MND	1,73E-5	4,87E-5	2,69E-4	5,92E-6	-9,11E-4
EP-marine	kg Ne	1,37E-1	6,34E-3	3,53E-2	1,78E-1	1,5E-2	5,5E-4	0E0	MND	MND	MND	MND	MND	MND	1,98E-2	4,06E-3	4,44E-2	1,6E-3	-1,81E-2
EP-terrestrial	mol Ne	1,63E0	7E-2	3,87E-1	2,08E0	1,67E-1	6,03E-3	0E0	MND	MND	MND	MND	MND	MND	2,17E-1	4,52E-2	4,88E-1	1,76E-2	-2,31E-1
POCP (“smog”) ³⁾	kg NMVOCe	4,19E-1	2,25E-2	1,05E-1	5,47E-1	6,57E-2	1,66E-3	0E0	MND	MND	MND	MND	MND	MND	5,97E-2	1,77E-2	1,35E-1	5,12E-3	-6,9E-2
ADP-minerals & metals ⁴⁾	kg Sbe	8,42E-4	8,55E-5	4,68E-5	9,75E-4	3,79E-4	1,82E-7	0E0	MND	MND	MND	MND	MND	MND	6,54E-6	1,02E-4	7,41E-5	4,48E-6	-1,19E-3
ADP-fossil resources	MJ	8,24E2	7,79E1	1,99E2	1,1E3	3,46E2	1,64E0	0E0	MND	MND	MND	MND	MND	MND	5,9E1	9,33E1	2,02E2	1,37E1	-1,81E2
Water use ⁵⁾	m ³ e depr.	1,97E1	2,9E-1	3,74E-1	2,04E1	1,29E0	3,06E-3	0E0	MND	MND	MND	MND	MND	MND	1,1E-1	3,47E-1	2,77E0	6,33E-1	-2,01E1

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO₄e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy ³⁾	MJ	5,04E1	9,81E-1	3,6E1	8,74E1	4,35E0	8,86E-3	0E0	MND	MND	MND	MND	MND	MND	3,19E-1	1,17E0	6,65E0	1,11E-1	-1,59E1
Renew. PER as material	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	5,04E1	9,81E-1	3,6E1	8,74E1	4,35E0	8,86E-3	0E0	MND	MND	MND	MND	MND	MND	3,19E-1	1,17E0	6,65E0	1,11E-1	-1,59E1
Non-re. PER as energy	MJ	8,2E2	7,79E1	1,99E2	1,1E3	3,46E2	1,64E0	0E0	MND	MND	MND	MND	MND	MND	5,9E1	9,33E1	2,02E2	1,37E1	-1,81E2
Non-re. PER as material	MJ	3,18E0	0E0	0E0	3,18E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	-1,45E0	-1,09E-1	0E0
Total use of non-re. PER	MJ	8,24E2	7,79E1	1,99E2	1,1E3	3,46E2	1,64E0	0E0	MND	MND	MND	MND	MND	MND	5,9E1	9,33E1	2,01E2	1,36E1	-1,81E2

Secondary materials	kg	1,39E0	0E0	5,19E-3	1,4E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	1,75E0
Renew. secondary fuels	MJ	0E0	0E0	1,42E1	1,42E1	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m ³	4,37E0	1,62E-2	1,74E-2	4,4E0	7,2E-2	1,45E-4	0E0	MND	MND	MND	MND	MND	MND	5,21E-3	1,94E-2	7,05E-2	1,5E-2	-1,47E0

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	4,44E0	7,57E-2	1,04E-1	4,62E0	3,36E-1	1,76E-3	0E0	MND	MND	MND	MND	MND	MND	6,35E-2	9,06E-2	0E0	1,28E-2	-2,45E0
Non-hazardous waste	kg	1,09E2	8,38E0	2,48E0	1,2E2	3,71E1	1,88E-2	0E0	MND	MND	MND	MND	MND	MND	6,78E-1	1E1	0E0	9,3E1	-4,52E1
Radioactive waste	kg	4E-3	5,35E-4	1,43E-3	5,96E-3	2,37E-3	1,15E-5	0E0	MND	MND	MND	MND	MND	MND	4,13E-4	6,4E-4	0E0	9,06E-5	-6,74E-4

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	1,89E2	4,97E0	7,08E0	2,01E2	2,11E1	1,18E-1	-1,85E1	MND	MND	MND	MND	MND	MND	4,25E0	5,69E0	1,38E1	4,81E-1	-1,41E1
Ozone depletion Pot.	kg CFC-11e	5,87E-6	9,36E-7	2,47E-6	9,27E-6	4,15E-6	2,03E-8	0E0	MND	MND	MND	MND	MND	MND	7,32E-7	1,12E-6	1,98E-6	1,6E-7	-9,59E-7
Acidification	kg SO ₂ e	3,64E-1	1,02E-2	6,86E-2	4,42E-1	4,52E-2	1,76E-4	0E0	MND	MND	MND	MND	MND	MND	6,33E-3	1,22E-2	1,42E-1	1,94E-3	-5,84E-2
Eutrophication	kg PO ₄ ³ e	1,15E-1	2,06E-3	1,43E-2	1,32E-1	9,13E-3	3,1E-5	0E0	MND	MND	MND	MND	MND	MND	1,11E-3	2,46E-3	1,26E-2	3,75E-4	-3,39E-2
POCP ("smog")	kg C ₂ H ₄ e	1,65E-2	6,46E-4	2,24E-3	1,94E-2	2,6E-3	1,81E-5	0E0	MND	MND	MND	MND	MND	MND	6,51E-4	7,02E-4	2,37E-3	1,42E-4	-6,19E-3
ADP-elements	kg Sbe	8,42E-4	8,55E-5	4,68E-5	9,75E-4	3,79E-4	1,82E-7	0E0	MND	MND	MND	MND	MND	MND	6,54E-6	1,02E-4	7,41E-5	4,48E-6	-1,19E-3
ADP-fossil	MJ	8,24E2	7,79E1	1,99E2	1,1E3	3,46E2	1,64E0	0E0	MND	MND	MND	MND	MND	MND	5,9E1	9,33E1	2,02E2	1,37E1	-1,81E2

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliance with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Elma Avdyli, as an authorized verifier acting for EPD Hub Limited
Updated 13.07.2023



CONVERSION TABLE FOR ALTERNATIVE PROFILES

The correlation between the material and energy inputs to calculate A1-A3 numbers is linear.

Therefore, to calculate A1-A3 (GWP Total & GWP Fossil) values for profiles and / or sizes, apply the following percentages to the A1-A3 number shown within this document:

Product profile	A1- A3		
	Conversion factor	kg CO ₂ e - fossil	kg CO ₂ e - total
1200 X 0.25M	-75.0%	51.53	52.29
1200 X 0.50M	-50.0%	101.50	103.00
1200 X 0.75M	-25.0%	152.25	154.50
1200 X 1.00M	0.0%	203.00	206.00
1200 X 1.25M	25.0%	253.75	257.50
1200 X 1.50M	50.0%	304.50	309.00
1500 X 0.50M	-33.8%	134.29	136.28
1500 X 0.75M	2.3%	207.68	210.75
1500 X 1.00M	33.1%	270.15	274.14
1800 X 0.50M	-20.8%	160.84	163.22
1800 X 0.75M	19.2%	242.04	245.62
1800 X 1.00M	58.5%	321.68	326.43