ENVIRONMENTAL PRODUCT DECLARATION

PP Futura Manhole

In accordance with: ISO 14025:2006, EN 15804:2012+A2:2019/AC:2021

Products included in the EPD:

PP Futura Manhole

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

EPD of a single product from a manufacturer/service provider

EPD Owner
Inter Construction

Programme
International EPD System
www.environdec.com

Programme operator
EPD International AB

Registration number
EPD-IES-0028499:001

Approval date
2026-03-25

Validity date
2031-03-25

EPD INTERNATIONAL EPD SYSTEM

ECO PLATFORM EPD VERIFIED

INTER CONSTRUCTION

GENERAL INFORMATION

Programme information

Programme	International EPD System
Address	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website	www.environdec.com
E-mail	support@environdec.com

Product category rules

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)	
Product Category Rules (PCR)	2019:14 Construction products (EN 15804+A2) (version 2.0.1) 2.0.1
PCR review was conducted by	The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/support.

Verification

LCA accountability	Ana Tanevska, tanevskaanna@gmail.com, Inter Construction
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via	☑ EPD verification through an individual EPD verification ☐ EPD verification through EPD Process Certification* ☐ EPD verification through a fully pre-verified tool
Third-party verifier	Silvia Vilčeková (SILCERT, Ltd.)
Approved by	International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier	☑ Yes ☐ No

*EPD Process Certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on www.environdec.com.

Ownership and limitations on use of EPD

Limitations

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

Ownership

The EPD Owner has the sole ownership, liability, and responsibility for the EPD.

INFORMATION ABOUT EPD OWNER

EPD Owner	Inter Construction
Contact person name	Aleksandra Karaivanova
Contact person e-mail	aleksandra.k@inter-construction.com.mk
Organisation address	North Macedonia Gevgelija 1483 Industriska Zona br.2 Prdejci, Gevgelija

Description of the organisation of the EPD Owner

Inter Construction is a leading construction and industrial company in North Macedonia, specializing in the development, manufacturing, and installation of advanced building and infrastructure systems. Established with a focus on innovation and quality, Inter Construction has expanded its portfolio to include civil engineering, infrastructure projects, and high-performance polymer-based construction solutions. The company produces a wide range of products, polyethylene (PE) and polypropylene (PP) manholes, pipes and other industrial products from its diverse portfolio. The company serves both public utilities and private industrial clients, delivering reliable, durable, and sustainable products. With a commitment to international standards and continuous growth, Inter Construction is recognized as a trusted partner in the region, contributing to modern, efficient, and environmentally responsible construction practices.

PRODUCT INFORMATION

Product name	PP Futura Manhole
Product identification	Manhole
Product description	Futura Manholes are advanced, high-performance underground chambers and manholes designed for modern wastewater, sewerage, and drainage systems. Manufactured from high-quality polypropylene (PP) Futura Manholes are made in compliance with the requirements of the following European standards EN 13598-1 (Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 1: Specifications for ancillary fittings and shallow chambers) and EN 13598-2 (Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 2: Specifications for manholes and inspection chambers) and are engineered for durability, environmental resistance, and long-term service life). Futura manholes provide controlled access points for inspection, maintenance, and connection of pipe networks, with excellent chemical resistance, mechanical strength, and temperature stability. Their modular design including base, raised sections, cones, and seals ensures ease of handling and installation while minimizing installation time and costs. Lightweight robust, these manholes exhibit waterproof performance, optimized flow characteristics, and resistance to external loads, making them suitable for municipal and industrial sewer systems, stormwater networks, and other infrastructure applications. Futura Manholes are produced under rigorous quality and environmental standards and constructed with recyclable materials that support sustainable infrastructure development.
Product information from external sources	www.inter-construction.com.mk
Technical purpose of product	The role of the manhole is to control the right working of sewer systems. It provides access points of inspection, maintenance and cleaning.
Manufacturing or service provision description	Manholes are produced using sophisticated process of production - injection technology. This process ensures strong product perfectly shaped for underground use.
Material properties	Volumetric mass density: 905 kg/m^3
Manufacturing site	Gevgelija North Macedonia Gevgelija 1480 Industriska Zona no.2, Prdejci, Gevgelija
UN CPC code	36950. Builders' ware of plastics n.e.c.
Geographical scope(s)	Global, Republic of North Macedonia, Europe
Geographical scope description	Modules A1 and A2 – Global Modules A3 – North Macedonia Modules C1-C4 & D – Europe

PRODUCT IMAGES

CONTENT DECLARATION

Hazardous and toxic substances	The product does not contain any substances from the SVHC candidate list in concentrations exceeding 0.1% of its weight.

PRODUCT CONTENT

Content name	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material[1], kg C/declared unit
PP	0.94	0	0	0
Masterbatch	0.01	0	0	0
EPDM	0.05	0	0	0
Total	**1**	**0**	**0**	**0**
Note 1	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2			

LCA INFORMATION

EPD based on declared or functional unit	Declared unit
Declared unit and reference flow	Product Mass: 1 kg
Conversion factor to mass	1
Are infrastructure or capital goods included in any upstream, core or downstream processes?	☐ Yes ☑ No
Data sources used for this EPD	ecoinvent database (general) ecoinvent 3.11 database Other database ecoinvent 3.12 database
LCA Software	OpenLCA OpenLCA 2.5.0
Version of the EN 15804 reference package	EF Reference Package 3.1
Characterisation methods	Environmental Footprint (EF) 3.1
Technology description including background system	PP Futura Manhole is designed for underground sewer systems. It is produced from polypropylene granules which provide chemical resistance and structural durability. The Injection molding technology where melted PP is injected into high - precision molds is optimized for energy efficiency at facility and produces no material waste, as all industrial scraps are granulated and reused internally. The background system is modeled using the ecoinvent 3.12 database. The EoL stage follows a mixed scenario based on european statistics from Plastics Europe 2024.
Scrap (recycled material) inputs contribution level	Less than 10% of the GWP-GHG results in modules A1-A3 come from scrap inputs

Data quality assessment

Description of data quality assessment and reference years	The share of primary data is calculated based on the contribution to GWP-GHG results for modules A1–A3 in accordance with EN 15804+A2. Site-specific data are applied for the manufacturing processes (e.g. electricity consumption), while upstream processes such as raw material production are modelled using generic datasets (ecoinvent 3.12). Transport processes are conservatively considered to consist of 50% primary and 50% secondary data. Due to the dominant contribution of raw material production to the overall environmental impact of polypropylene products, the impact-weighted share of primary data is comparatively low.

DATA QUALITY ASSESSMENT

Process name	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Manufacturing	Primary	Production Facility	2025	Specific	4%
Raw Materials	Secondary	ecoinvent 3.12 database	2024	Generic	
Transport	Secondary (50% primary considered)	ecoinvent 3.12 database	2024	Generic	4.4%
Total share of primary data, of GWP-GHG results for A1-A3					**8.4%**
Note	The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.				

ELECTRICITY USED IN THE MANUFACTURING PROCESS IN A3 (A5 FOR SERVICES)

Type of electricity mix	Residual electricity mix on the market	
Energy sources	Hydro	14%
	Wind	1%
	Solar	10%
	Biomass	0%
	Geothermal	0%
	Waste	0%
	Nuclear	0%
	Natural gas	15%

	Coal	60%
	Oil	0%
	Peat	0%
	Other	0%
Climate impact (GWP-GHG):	0.5 kg CO_2 eq./kWh	

Method used to calculate residual electricity mix	The residual electricity mix was calculated based on the 2025 energy balance data provided by the State Statistical Office of North Macedonia. The calculation follows the requirements of PCR 2019:14 version 2.0.1. In the absence of a specific 'Residual Mix' certificate from the national regulator, the national consumption mix was used as a conservative proxy for the market residual mix.

SYSTEM BOUNDARY

Description of the System boundary	a) Cradle to gate with modules C1-C4 and module D (A1-A3 + C + D).
Excluded modules	Yes, there is an excluded module, or there are excluded modules
Justification for omission of modules	Modules related to use stage B1 – B7 and installation A4 – A5 are marked as ND (Not declared) because the applicable PCR classify these life stages as optional.

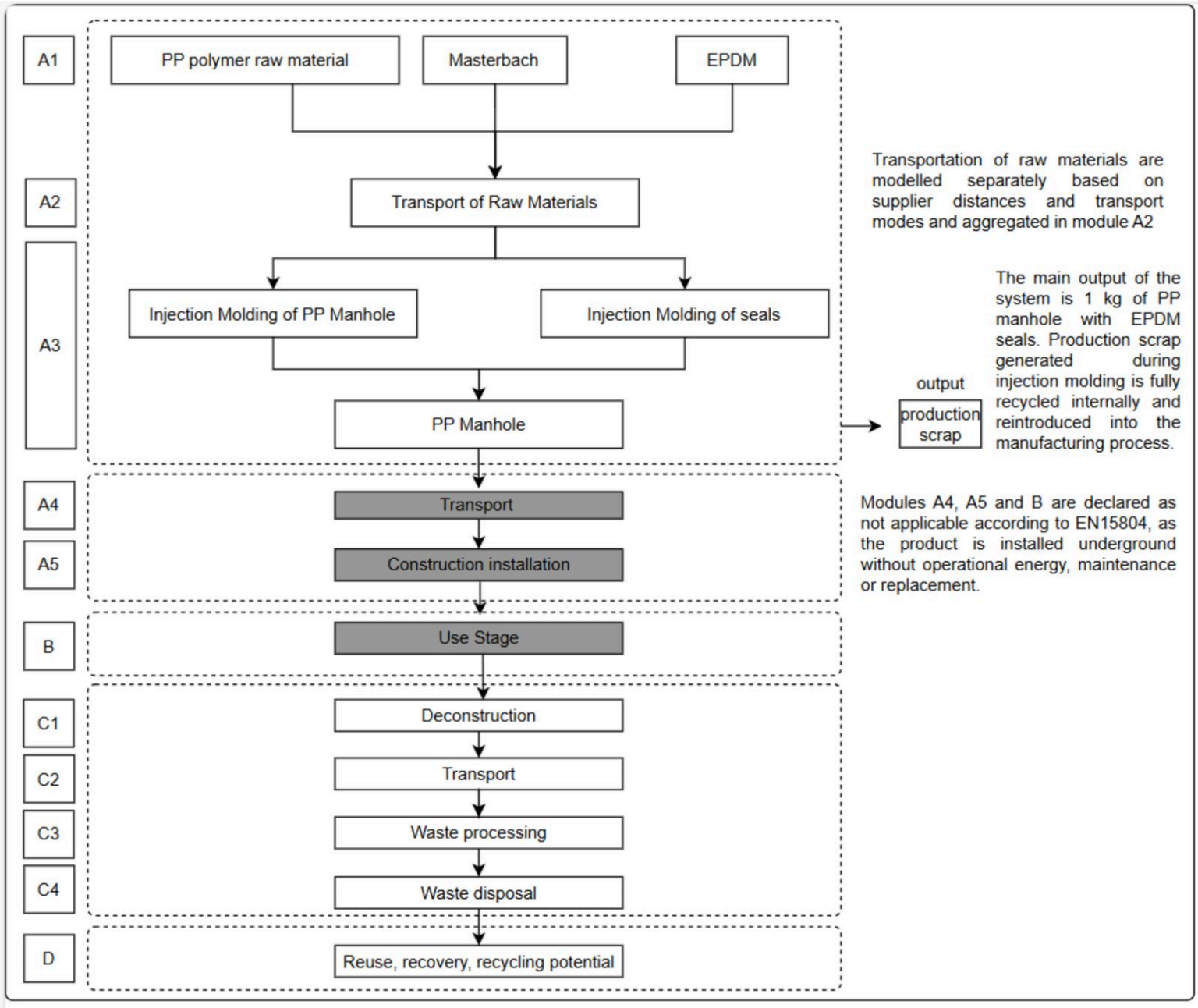
	Product stage			**Construction process stage**		**Use stage**							**End of life stage**				**Beyond product life cycle**
	Raw material supply	Transport	Manufacturing	Transport to site	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	Global	Global	Republic of North Macedonia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Europe	Europe	Europe	Europe	Europe
Share of specific data	8.4%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disclaimer	The share of specific/primary data and both variations (products and sites) refer to GWP-GHG results only.																

Description of the process flow diagram(s)

Allocation:
Electricity, water and auxiliary materials were allocated to the declared unit based on annual production data using mass-based allocation.

Cut-off criteria:
Capital goods such as production machinery, tools and knives, internal transport equipment were excluded from the system boundary due to lack of specific data and their negligible contribution to the overall environmental impacts. The applied cut-off criteria are in accordance with EN15804+A2, ensuring that at least 95% of the total mass and energy flows relevant to the declared product are included in the LCA.

Process flow diagram(s) related images



DEFAULT SCENARIO

Name of the default scenario	End-of-Life scenario for PP Futura Manholes
Description of the default scenario	This scenario covers complete end-of-life cycle of the product including the removal, transportation and its final destination through a combination of recycling, incineration with energy recovery and landfill.

Module C: End-of-life

Explanatory name of the default scenario in module C	Waste Treatment
Description of the default scenario in module C	At the end of service life the manhole is removed from the ground using standard excavation machinery and collected as mixed plastic construction waste (Module C1). The waste is transported 50 km by lorry to a waste treatment facility (Module C2). In the treatment facility the plastic components are mechanically sorted and shredded. A share is directed to mechanical recycling, while the remaining material is treated via municipal waste incineration with energy recovery or disposed to landfill (Module C3–C4). The distribution of waste routes follows average European plastic waste management statistics (Plastics Europe, 2024): 17.4% recycling, 52.2% incineration with energy recovery and 30.4% landfill. These shares are applied to the declared unit and correspond to the modelled end-of-life datasets. The European scenario is considered representative since the product is intended for international markets and no specific national statistics for plastic construction waste management are available. Benefits beyond the system boundary from material recycling and energy recovery are reported in Module D.

Module C information	Value	Unit
Collected as mixed construction waste	1	kg
Material for recycling	0.17	kg
Material for energy recovery	0.52	kg
Non - hazardous waste to landfill	0.31	kg
Transportation to waste treatment	50	km

Module D: Beyond product life cycle

Explanatory name of the default scenario in module D	Recovery and Recycling
Description of the default scenario in module D	The plastic saved through recycling, replaces the need for new, raw plastic production. The energy produced from burning the waste replaces electricity from the local grid and heat from natural gas. These avoided impacts are credited to the product resulting in the negative values shown in the results.

Module D information	Value	Unit
Avoided PP	0.14	kg
Avoided Electricity	4.34	MJ
Avoided Thermal energy	8.68	MJ

ADDITIONAL SCENARIO 1

Name of the additional scenario	Additional End-of-Life scenario: 100% Landfill Scenario
Description of the additional scenario	In the 100% Landfill scenario, the PP Futura manholes are disposed of in municipal solid waste facilities with zero material or energy recovery. The inert polypropylene remains physically stable, permanently exiting the product loop and necessitating virgin feedstock for future production.

Module C: End-of-life

Description of the additional scenario in module C	The product is collected as mixed construction waste at the end of its service life and transported to a municipal solid waste facility. 100% of the PP Futura material is disposed of in a landfill without further processing.

Module D: Beyond product life cycle

Description of the additional scenario in module D	Because the material is entirely landfilled, there is no material recovery, secondary product generation, or energy recovery. Therefore, no benefits or loads beyond the system boundary are declared for this scenario.

ADDITIONAL SCENARIO 2

Name of the additional scenario	Additional End-of-Life Scenario: 100% Recycling Scenario
Description of the additional scenario	In the 100% Recycling scenario, the PP Futura manholes are collected at the end of their service life and mechanically reprocessed. The recovered polypropylene is converted into secondary granulate, keeping the material within the product loop and avoiding the extraction and production of primary virgin feedstock.

Module C: End-of-life

Description of the additional scenario in module C	The product is collected separately at the end of its service life and transported to a specialized recycling facility. 100% of the PP Futura material undergoes mechanical shredding and reprocessing to produce secondary polypropylene granulate.

Module D: Beyond product life cycle

Description of the additional scenario in module D	The secondary polypropylene granulate recovered from the product successfully substitutes the production of primary (virgin) fossil-based polypropylene feedstock, providing material recovery benefits.

ADDITIONAL SCENARIO 3

Name of the additional scenario	Additional end-of-life scenario: 100% Incineration scenario
Description of the additional scenario	In the 100% Incineration scenario, the PP Futura manholes are routed to a waste-to-energy plant at the end of their service life. The polypropylene is combusted to generate thermal and electrical energy, recovering energy value from the polymer while the physical material permanently exits the product loop.

Module C: End-of-life

Description of the additional scenario in module C	The product is collected at the end of its service life and transported to a municipal waste incineration plant. 100% of the PP Futura material is incinerated in a facility equipped with energy recovery technology.

Module D: Beyond product life cycle

Description of the additional scenario in module D	The incineration of the polypropylene material generates thermal and electrical energy. This exported energy provides benefits by substituting the equivalent production of thermal energy and electricity from the regional grid.

ENVIRONMENTAL PERFORMANCE

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Mandatory environmental performance indicators according to EN 15804

Impact category	Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change - total	GWP-total	kg CO_2 eq.	2.70E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.90E-4	1.60E-2	1.60E-2	1.80E-3	-5.00E-1
Climate change - fossil	GWP-fossil	kg CO_2 eq.	2.70E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.90E-4	1.60E-2	1.60E-2	1.80E-3	-4.90E-1
Climate change - biogenic	GWP-biogenic	kg CO_2 eq.	0.00E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Climate change - land use and land-use change	GWP-luluc	kg CO_2 eq.	1.20E-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.90E-8	4.00E-6	4.00E-6	7.30E-7	-4.20E-4
Ozone depletion	ODP	kg CFC-11 eq.	1.40E-7	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.90E-12	3.40E-10	3.40E-10	2.40E-11	-2.50E-8
Acidification	AP	mol H^+ eq.	8.80E-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.70E-6	7.50E-5	7.50E-5	1.50E-5	-1.60E-3
Eutrophication aquatic freshwater	EP-freshwater	kg P eq.	6.30E-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.10E-9	9.50E-7	9.50E-7	2.00E-7	-1.50E-4
Eutrophication aquatic marine	EP-marine	kg N eq.	2.20E-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.00E-7	3.10E-5	3.10E-5	6.30E-6	-3.40E-4
Eutrophication terrestrial	EP-terrestrial	mol N eq.	2.20E-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.80E-6	3.30E-4	3.30E-4	6.90E-5	-3.30E-3
Photochemical ozone formation	POCP	kg NMVOC eq.	1.50E-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.60E-6	1.20E-4	1.20E-4	2.10E-5	-2.40E-3
Depletion of abiotic resources - minerals and metals	ADP-minerals&metals[1]	kg Sb eq.	1.50E-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.10E-11	4.30E-8	4.30E-8	8.40E-10	-3.40E-6
Depletion of abiotic resources - fossil fuels	ADP-fossil[1]	MJ, net calorific value	8.00E+1	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.50E-3	2.20E-1	2.20E-1	2.30E-2	-1.50E+1
Water use	WDP[1]	m^3 world eq. deprived	6.20E-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.20E-6	9.80E-4	9.80E-4	1.20E-4	-1.40E-1
Acronyms	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																
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).																
Disclaimer 1	The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator																

Additional mandatory environmental performance indicators

Impact category	Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change - GWP-GHG	GWP-GHG[1]	kg CO_2 eq.	2.70E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.90E-4	1.60E-2	1.60E-2	1.80E-3	-4.90E-1
Acronyms	GWP-GHG = Global warming potential greenhouse gas.																
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).																
Disclaimer 1	The GWP-GHG indicator is termed GWP-IOBC/GHG in the ILCD+EPD+ data format. The indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.																

Additional voluntary environmental performance indicators according to EN 15804

Impact category	Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter emissions	PM	Disease incidence	8.00E-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.90E-11	1.90E-9	1.90E-9	3.80E-10	-9.20E-9
Ionizing radiation - human health	IRP[1]	kBq U235 eq.	1.70E-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.00E-6	2.50E-4	2.50E-4	4.50E-5	-7.50E-2
Eco-toxicity - freshwater	ETP-fw[2]	CTUe	9.80E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.50E-4	3.20E-2	3.20E-2	2.70E-3	-1.80E+0
Human toxicity - cancer effects	HTP-c[2]	CTUh	5.50E-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.80E-14	2.20E-12	2.20E-12	1.90E-13	-1.10E-10
Human toxicity - non-cancer effects	HTP-nc[2]	CTUh	1.90E-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.30E-13	1.00E-10	1.00E-10	4.50E-12	-4.00E-9
Land-use related impacts/soil quality	SQP[2]	Dimensionless	8.70E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.70E-4	8.90E-2	8.90E-2	5.50E-2	-1.30E+0
Acronyms	PM = Potential incidence of disease due to particulate matter emissions; IRP = Potential human exposure efficiency relative to U235; ETP-fw = Potential comparative toxic unit for ecosystems; HTP-c = Potential comparative toxic unit for humans; HTP-nc = Potential comparative toxic unit for humans; SQP = Potential soil quality index.																
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).																
Disclaimer 1	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.																
Disclaimer 2	The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.																

Resource use indicators according to EN 15804

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ, net calorific value	1.90E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.60E-5	3.40E-3	3.40E-3	6.40E-4	-8.40E-1
PERM	MJ, net calorific value	0.00E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ, net calorific value	1.90E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.60E-5	3.40E-3	3.40E-3	6.40E-4	-8.40E-1
PENRE	MJ, net calorific value	8.00E+1	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.50E-3	2.20E-1	2.20E-1	2.30E-2	-1.50E+1
PENRM	MJ, net calorific value	0.00E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ, net calorific value	8.00E+1	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.50E-3	2.20E-1	2.20E-1	2.30E-2	-1.50E+1
SM	kg	9.90E-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.40E-6	2.10E-4	2.10E-4	1.90E-5	-4.10E-2
RSF	MJ, net calorific value	4.90E-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.40E-7	5.40E-5	5.40E-5	5.60E-6	-2.20E-2
NRSF	MJ, net calorific value	0.00E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m^3	1.40E-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.50E-7	2.30E-5	2.30E-5	2.80E-6	-3.30E-3
Acronyms	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.															
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).															

Waste indicators according to EN 15804

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	4.30E-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.10E-6	1.10E-3	1.10E-3	1.00E-4	-1.00E-1
NHWD	kg	2.10E+1	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.00E-5	1.30E-2	1.30E-2	1.00E-3	-4.00E+0
RWD	kg	4.20E-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.40E-10	6.10E-8	6.10E-8	1.10E-8	-1.90E-5
Acronyms	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed.															
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).															

Output flow indicators according to EN 15804

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	kg	0.00E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	kg	0.00E+0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	kg	9.50E-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.20E-6	1.90E-4	1.90E-4	1.70E-5	-4.00E-2
EEE	MJ, net calorific value	2.90E-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.20E-7	4.20E-5	4.20E-5	5.10E-6	-1.40E-2
EET	MJ, net calorific value	1.30E-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.50E-8	2.00E-4	2.00E-4	6.00E-7	-1.40E-3
Acronyms	CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.															
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).															

Results for additional scenarios for modules A4-C4

Additional scenario	Additional End-of-Life scenario: 100% Landfill Scenario
Description of the scenario/method	This additional scenario differs from the main environmental performance results by isolating a 100% landfill end-of-life assumption. Instead of using a mixed disposal route, it models the impacts of sending all PP Futura manholes directly to municipal solid waste facilities in Module C, with zero material or energy recovery.

Impact category	Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential - total (GWP-total)	GWP - total	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	5.30E-2	0.00E+0
Global warming potential - fossil fuels (GWP-fossil)	GWP - fossil	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	5.30E-2	0.00E+0
Global warming potential - biogenic (GWP-biogenic)	GWP - biogenic	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0
Global warming potential - land use and land use change (GWP-luluc)	GWP - luluc	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	1.30E-5	0.00E+0
Depletion potential of the stratospheric ozone layer (ODP)	ODP	kg CFC-11 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	1.10E-9	0.00E+0
Acidification potential, accumulated exceedance (AP)	AP	mol H+ eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	2.50E-4	0.00E+0
Eutrophication potential - freshwater (EP-freshwater)	EP - freshwater	kg P eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	3.10E-6	0.00E+0
Eutrophication potential - marine (EP-marine)	EP - marine	kg N eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	1.00E-4	0.00E+0
Eutrophication potential - terrestrial (EP-terrestrial)	EP - terrestrial	mol N eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	1.10E-3	0.00E+0
Photochemical ozone creation potential (POCP)	POCP	kg NMVOC eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	3.80E-4	0.00E+0
Abiotic depletion potential - non-fossil resources (ADPE)	ADPE	kg Sb eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	1.40E-7	0.00E+0
Abiotic depletion potential - fossil resources (ADPF)	ADPF	MJ, net calorific value	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	7.30E-1	0.00E+0
Water (user) deprivation potential (WDP)	WDP	m3 world eq. deprived	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	3.20E-3	0.00E+0
Acronyms																	
Disclaimers																	
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).																

Results for additional scenarios for modules A4-C4

Additional scenario	Additional End-of-Life Scenario: 100% Recycling Scenario
Description of the scenario/method	In the 100% Recycling scenario, the PP Futura manholes are collected at the end of their service life and mechanically reprocessed. The recovered polypropylene is converted into secondary granulate, keeping the material within the product loop and avoiding the extraction and production of primary virgin feedstock.

Impact category	Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential - total (GWP-total)	GWP - total	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.30E-2	0.00E+0	-4.30E+0
Global warming potential - fossil fuels (GWP-fossil)	GWP - fossil	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.30E-2	0.00E+0	-4.30E+0
Global warming potential - biogenic (GWP-biogenic)	GWP - biogenic	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0
Global warming potential - land use and land use change (GWP-luluc)	GWP - luluc	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.30E-5	0.00E+0	-1.00E-3
Depletion potential of the stratospheric ozone layer (ODP)	ODP	kg CFC-11 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.90E-9	0.00E+0	-8.40E-8
Acidification potential, accumulated exceedance (AP)	AP	mol H+ eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.30E-4	0.00E+0	-1.30E-2
Eutrophication potential - freshwater (EP-freshwater)	EP - freshwater	kg P eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.50E-6	0.00E+0	-8.20E-4
Eutrophication potential - marine (EP-marine)	EP - marine	kg N eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.80E-4	0.00E+0	-2.70E-3
Eutrophication potential - terrestrial (EP-terrestrial)	EP - terrestrial	mol N eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.90E-3	0.00E+0	-2.80E-2
Photochemical ozone creation potential (POCP)	POCP	kg NMVOC eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.70E-4	0.00E+0	-1.50E-2
Abiotic depletion potential - non-fossil resources (ADPE)	ADPE	kg Sb eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.50E-7	0.00E+0	-2.10E-5
Abiotic depletion potential - fossil resources (ADPF)	ADPF	MJ, net calorific value	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.30E+0	0.00E+0	-8.50E+1
Water (user) deprivation potential (WDP)	WDP	m3 world eq. deprived	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.60E-3	0.00E+0	-7.40E-1
Acronyms																	
Disclaimers																	
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).																

Results for additional scenarios for modules A4-C4

Additional scenario	Additional end-of-life scenario: 100% Incineration scenario
Description of the scenario/method	In the 100% Incineration scenario, the PP Futura manholes are routed to a waste-to-energy plant at the end of their service life. The polypropylene is combusted to generate thermal and electrical energy, recovering energy value from the polymer while the physical material permanently exits the product loop.

Impact category	Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential - total (GWP-total)	GWP - total	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.10E-2	0.00E+0	-7.40E-1
Global warming potential - fossil fuels (GWP-fossil)	GWP - fossil	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.10E-2	0.00E+0	-7.40E-1
Global warming potential - biogenic (GWP-biogenic)	GWP - biogenic	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00E+0	0.00E+0	0.00E+0
Global warming potential - land use and land use change (GWP-luluc)	GWP - luluc	kg CO2 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.70E-6	0.00E+0	-5.50E-4
Depletion potential of the stratospheric ozone layer (ODP)	ODP	kg CFC-11 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.40E-10	0.00E+0	-4.50E-8
Acidification potential, accumulated exceedance (AP)	AP	mol H+ eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.40E-4	0.00E+0	-3.10E-3

Eutrophication potential - freshwater (EP-freshwater)	EP - freshwater	kg P eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.80E-6	0.00E+0	-2.40E-4
Eutrophication potential - marine (EP-marine)	EP - marine	kg N eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.90E-5	0.00E+0	-5.60E-4
Eutrophication potential - terrestrial (EP-terrestrial)	EP - terrestrial	mol N eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.40E-4	0.00E+0	-5.90E-3
Photochemical ozone creation potential (POCP)	POCP	kg NMVOC eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.20E-4	0.00E+0	-2.40E-3
Abiotic depletion potential - non-fossil resources (ADPE)	ADPE	kg Sb eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.30E-8	0.00E+0	-2.60E-5
Abiotic depletion potential - fossil resources (ADPF)	ADPF	MJ, net calorific value	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.30E-1	0.00E+0	-1.10E+1
Water (user) deprivation potential (WDP)	WDP	m3 world eq. deprived	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.90E-3	0.00E+0	-5.70E-1
Acronyms																	
Disclaimers																	
General disclaimer	The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3/A1-A5 for services).																

ADDITIONAL ENVIRONMENTAL INFORMATION

Inter Construction is strongly committed to sustainable production and a circular economy approach. The company always tries to work on minimizing its effects on the environment by reducing its use of energy and water and by increasing efficiency on all its production lines. Modern production methods, such as effective scheduling and monitoring and controlling machines by using legitimate software, help to use a maximum amount of energy and produce high-quality products.

The polypropylene (PP) manholes produced by Inter Construction are made with a focus on durability, long-life and recyclability. All throughout their production process, Inter Construction maintains a focus on minimizing their wastes while any generated during production is repurposed by them or given to partners for recycling. In such a manner, all materials are utilized to their fullest potential, thereby maintaining principles associated with achieving a circular economy.

At the end of a product life cycle, PP components can be recycled in a clean, efficient process that will be able to reuse them for something new, such as manholes or other plastic components, thereby having a positive impact on the environment through a circular process that Inter Construction emphasizes through its products and strategies.

ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

This EPD does not declare additional social or economic information.

ABBREVIATIONS

Abbreviation

General Abbreviations

EN - European Norm (Standard)

EF - Environmental Footprint

GPI - General Programme Instructions

CEN - European Committee for Standardization

CPC - Central product classification

SVHC - Substances of Very High Concern

ND - Not Declared

PP - Polypropylene

EPD - Environmental Product Declaration

PCR - Product Category Rules

ISO - International Organization for Standardization

LCA - Life Cycle Assessment

EPDM - Ethylene Propylene Diene Monomer

GWP - Climate change

GWP – luluc - land use and land use change

ODP - Ozone depletion

AP - Acidification

EP - Eutrophication

POCP - Photochemical ozone formation

ADPE - Abiotic resource use, minerals & metals

APDF - Abiotic resource use, fossils

WDP - Water use

PM - Particulate matter formation

IRP - Ionising radiation: human health

ETP – fw - Exotoxicity freshwater

HTP – c - Human toxicity: carcinogenic

HTP – nc - Human toxicity: non carcinogenic

SQP - Land use

Life – Cycle Stages

A1 - Raw Material supply

A2 - Transport

A3 - Manufacturing

A4 - Transport

A5 - Construction installation

B1 - Use

B2 - Maintenance

B3 - Repair

B4 - Replacement

B5 - Refurbishment

B6 - Operational Energy Use

B7 - Operational Water Use

C1 - Deconstruction, demolition

C2 - Transport

C3 - Waste processing

C4 - Disposal

D - Reuse, recovery, recycling potential

Other

NM - North Macedonia

EU - Europe

GLO - Global

REFERENCES

ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations

ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework

ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines

PCR 2019:14 Construction Products, Version 2.0.1 (Valid until 2030-04-07)

General Programme Instructions of the International EPD System, Version 5.0.1

EN 15804+A2:2019 – Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

Plastics Europe 2024

VERSION HISTORY

Version 001, 2026-03-25

- Original version of the EPD