

Environmental Product Declaration

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

HYNDS PIPE SYSTEMS

Hyspec Precast Concrete Manhole Risers

EPD of multiple products, based on a representative product. The products covered in the EPD are listed on page 18.



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www.environdec.com

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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

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ABOUT US

Founded in 1973 by John and Léonie Hynds, the privately owned Hynds Group of Companies is New Zealand's premier product supplier for the management of water and water-based waste in the civil and rural infrastructure markets.

Hynds Pipe Systems Limited is the largest operating company within the Hynds Group, and is split into two operating divisions: Manufacturing and Sales & Distribution.

Hynds Concrete Manufacturing operates six factory sites across New Zealand, operating independently audited ISO9001 quality, ISO45001 health and safety, and ISO14001 environmental management systems (see hynds.co.nz/about-us/ for certificates).

Hynds operates a sales & distribution network of 36 branches and 3 distribution centres throughout New Zealand supplying over 40 000 product types for drainage, watermain, environmental, industrial process and rural applications.

The Hynds' fleet of 70 delivery trucks ensure reliable stock availability and delivery to all corners of the country.

From its early inception five decades ago, Hynds has been focused on delivering positive change with industry-leading, sustainable solutions. The manufacture of products to support stormwater and wastewater treatment, and ultimately to protect the environment, remains at the heart of our product innovation today.



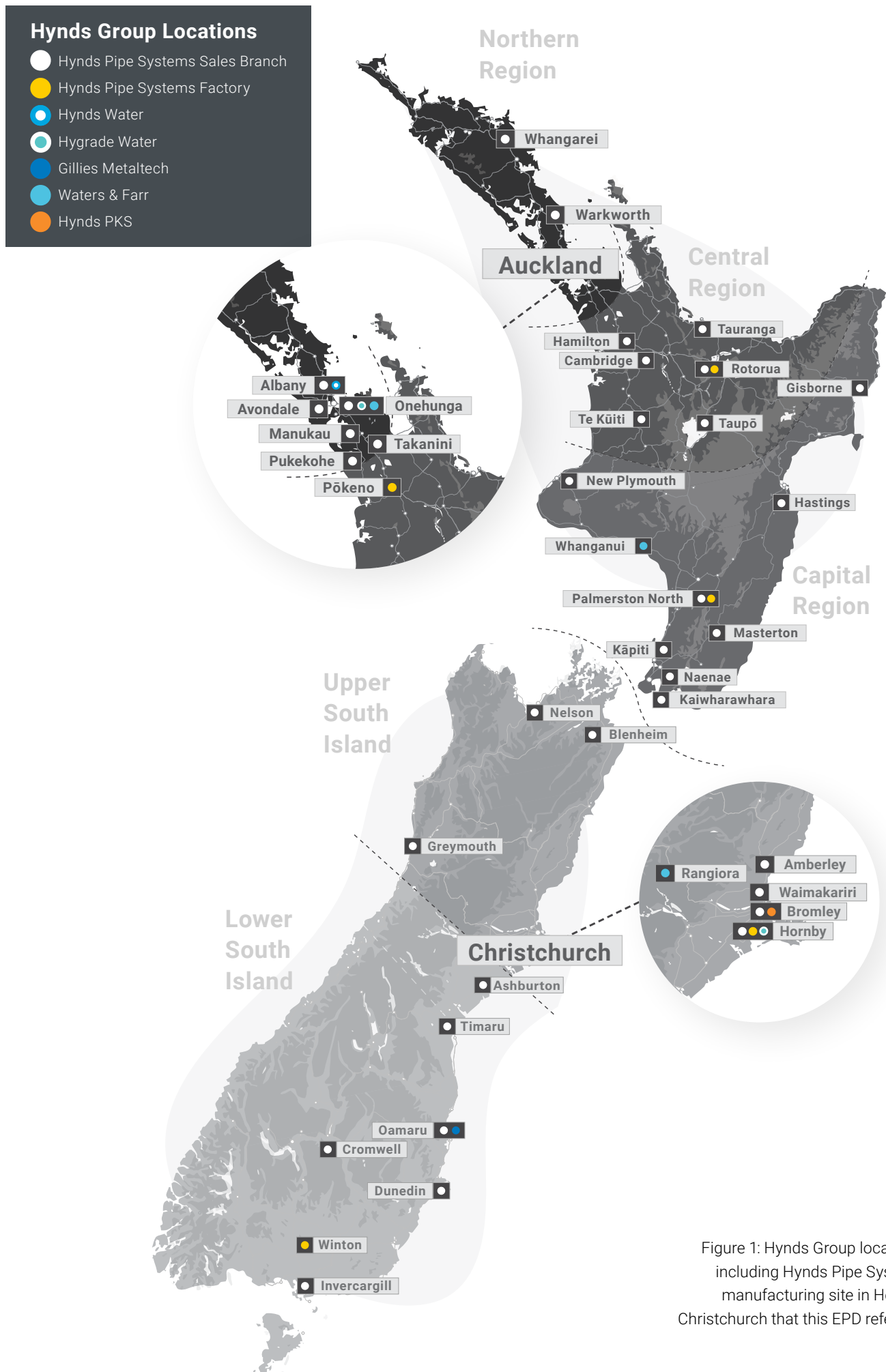


Figure 1: Hynds Group locations, including Hynds Pipe Systems manufacturing site in Hornby, Christchurch that this EPD refers to.

HYNDS SUSTAINABILITY

Our business was built around finding sustainable solutions to support the three waters (*drinking water, wastewater and stormwater infrastructure services*) and ultimately keeping our country's waterways clean and our communities safe – both for today and for future generations.

Hynds has adopted a sustainability framework which focuses on three strategic pillars; the planet (our natural environment), people (our people but also our wider communities and stakeholders) and products (innovating and building resilience into what we do to meet the needs of future generations).

Addressing the effects of climate change is a huge challenge that we all face. Hynds believes that addressing climate change will make us better off and is committed to New Zealand's transition to a low-emissions economy. Hynds has committed to a 42% reduction in Scope 1 (direct) and Scope 2 (indirect) carbon emissions by 2032.

To support our customer's sustainability goals, Hynds now offers a lower carbon product range, HyndsLC®. The new HyndsLC® range assists our customers in meeting their sustainability requirements without compromising on quality and durability.

For more information on Hynds sustainability framework and HyndsLC® range, visit

hynds.co.nz/sustainability/

or email sustainability@hynds.co.nz.

HYNDS[®]LC
Our low carbon future



PRODUCT INFORMATION

Products Covered by EPD

This EPD covers the Hyspec Precast Concrete Manhole Risers manufactured at Hynds precast concrete manufacturing plant in Hornby, Christchurch. The full range of products covered by this EPD are given in the Product Mass Table (Table 16).

The Hyspec Precast Concrete Manhole Risers range is generally only supplied to South Island projects.

Product Description

As the leading manufacturer of reinforced concrete pipe in New Zealand, Hynds' manhole risers are available in a wide range of diameters, wall thicknesses and heights.

Hynds Reinforced Concrete Manhole Risers are manufactured using high strength concrete (50 MPa or greater), hard drawn steel wire. The concrete consists of coarse and fine aggregates, cement and chemical admixtures.

Reinforced Concrete Manholes are primarily used for access manholes, drop manholes, pipeline junctions, pipeline direction changes and catchment inlet structures for both stormwater and wastewater applications.

Declared Unit

The declared unit for the EPD is one kg of reinforced concrete manhole risers. A conversion table is provided with product weights for all products covered by this EPD, as required (see Table 16).

Design Standard

Hynds' Standard range of Risers are designed to the CPAA Guidance Note (NZ) – Loads on Circular Precast Concrete Manholes and Access Chambers and are manufactured to the material and geometric requirements of AS/NZS 4058:2007.

The Standard ranges of Hynds Reinforced Concrete manhole risers have a specified intended service life of 100 years when correctly installed in a non-aggressive environment.

Packaging

The product is transported without packaging.

Dangerous Substances

All products covered by this study as supplied are non-hazardous, and do not contain any substances of very high concern as defined by European REACH regulation in concentrations >0.1% (m/m). Precast concrete products and pipes are classified as non-dangerous goods according to the Land Transport Rule: Dangerous Goods 2005. Provide this reference here (ECHA, 2022)

When concrete products are cut, sawn, abraded or crushed, dust is created which contains crystalline silica, some of which may be respirable (particles small enough to go into the deep parts of the lung when breathed in), and which is hazardous. Exposure through inhalation should be avoided. Dust from these products is classified as Hazardous under the Hazardous Substances and New Organisms Act 1996 (HSNO Act) and is subject to Workplace Exposure Standards (WorkSafe NZ WES-BEI indices Edition 13, April 2022).

Table 1: Industry classification

Product	Classification	Code	Category
Product name/type	UN CPC Ver.2	3755	Prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone
	ANZSIC 2006	2034	Concrete Product Manufacturing

Content Declaration

Table 2: Composition of Hyspec Precast Concrete Hyspec Precast Concrete Manhole Risers (per 1 kg)

Product components	Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit
Aggregate	0.521 (0.516 - 0.521)	0	0	0
Fine sand	0.260 (0.258 - 0.260)	0	0	0
GP Cement	0.161 (0.160 - 0.161)	0	0	0
Plasticiser	0.00160 (0.00159 - 0.00160)	0	0	0
Water	0.0377 (0.0374 - 0.0377)	0	0	0
Wire	0.0183 (0.0183 - 0.0280)	0	0	0
Total	1	0	0	0

*Individual masses may not sum to total due to rounding. See Table 16 for mass conversion factors.

No products declared within this EPD contain substances exceeding the limits for registration according to the European Chemicals Agency's "Candidate List of Substances of Very High Concern for authorisation" (European Union, 2024). Reinforced concrete manhole risers are not classified as dangerous goods according to the Land Transport Rule: Dangerous Goods 2005.

Table 3: Composition of packaging (per 1 kg product)

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg of product
Product's packaging	0	0	0
Total	0	0	0

Manufacturing Process

Hynds Hyspec Precast Concrete Manhole Risers are manufactured at Hynds precast concrete manufacturing site in Hornby, Christchurch, using spun pipe technology.

The Hyspec® Manhole System is manufactured using the spun and wetcast method. Manhole risers 1050 – 1800mm diameter are manufactured using the centrifugal spinning

method and flanged bases are wet cast in high specification steel moulds. Manholes risers larger than 1800mm diameter are typically wetcast. High strength concrete and increased cover to reinforcing steel are used for enhanced durability. Manholes are cured inside steel moulds in controlled conditions. This eliminates relaxation stresses within the uncured manholes and ensures the integrity and durability of the manhole structure.



HYNDS PROCESS

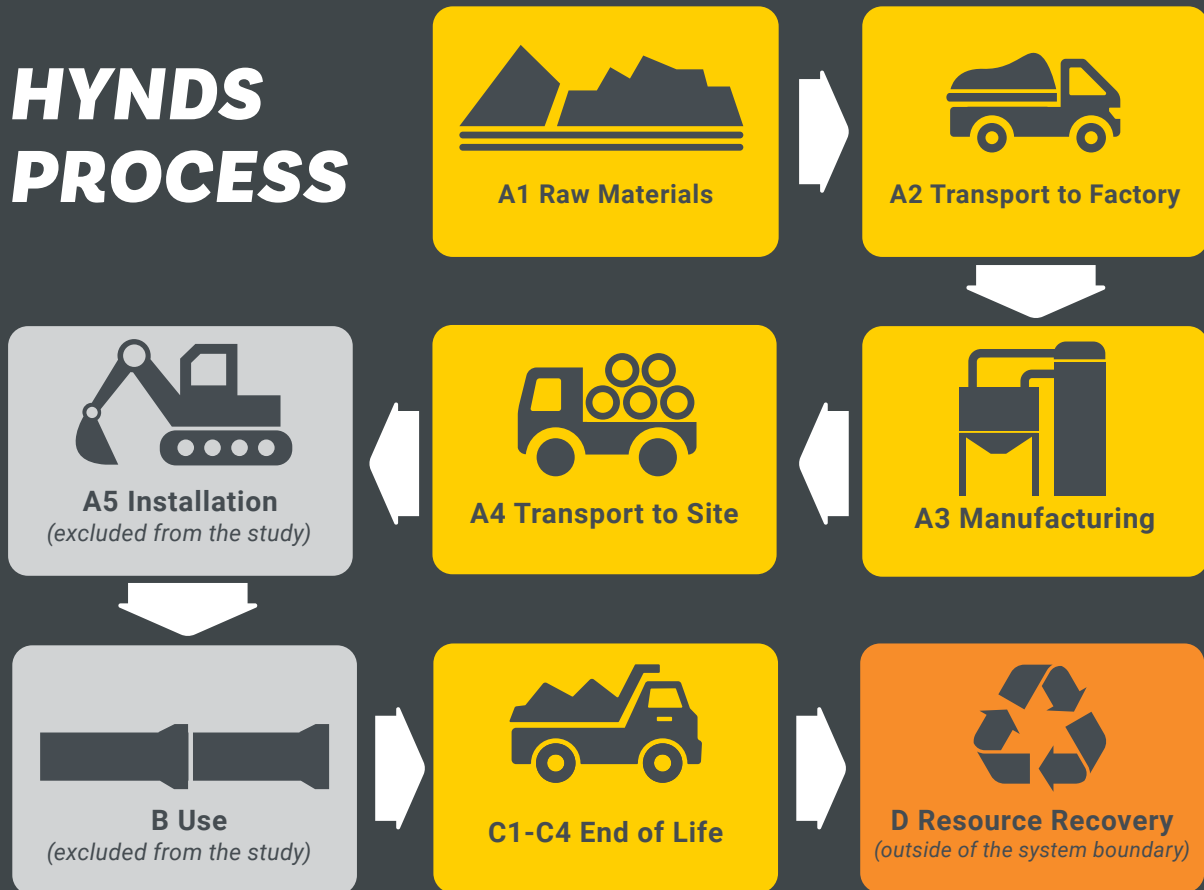


Diagram of Hynds process

System boundaries

As shown in the table below, this EPD has a scope of cradle-to-gate with options, modules C1-C4, module D and with additional modules (type b). The additional module is A4.

Table 4: Modules included in the scope of the EPD

	Product stage			Construction process stage		Use stage							End of life stage				Recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	NZ	NZ	-	-	-	-	-	-	-	-	NZ	NZ	NZ	NZ	NZ
Share of specific data	89%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation: product groups	11%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation: sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = included in the EPD; ND = Module not declared

*Share of specific data is calculated based on the GWP-GHG results and A1-A3 processes. Energy data (e.g. electricity, LPG) and material data pertaining to primary resource inputs (e.g. concrete, slag, GGBFS, steel) is specific, however data pertaining to the consumables used in manufacturing are not specific. This is consistent across both manufacturing sites.

Production (Modules A1-A3)

The production stage includes the environmental impacts associated with raw materials extraction and processing of inputs, transport to, between and within the manufacturing site, and manufacturing of average product at the exit gate of the manufacturing site. CO₂ absorption effects due to concrete carbonation during the products' life cycle are not taken into account in any of the declared modules.

Transport to site (Module A4)

The average transport distance from Hynds Christchurch manufacturing site to customer sites is 100 km.

End of Life (Modules C1-C4)

When infrastructure reaches the end of its functional life, it is typically demolished and disposed of making way for new infrastructure. Manhole risers are a special case since they are typically buried and are often simply abandoned. Other options are for the manhole risers to be exhumed and sent for recycling or exhumed and sent to landfill.

Scenarios shall be realistic and representative of one of the most probable alternatives and shall not include processes or procedures that are not in current use, or which have not been demonstrated to be practical.

This study assumes that the most likely scenario is that the manhole risers will be abandoned. It is not economically feasible to remove and recover manhole risers at the end of their service life. According to Hynds, decommissioned manhole risers are usually left in ground. No additional processes are included at end-of-life to model the decommissioning of a manhole riser.

Recovery and Recycling potential (Module D)

Module D declares a potential credit or burden for the net scrap associated with a recycled product. As the manhole riser is modelled as abandoned in the ground there is no credit for concrete or steel recycled. Default factors from PEF R2 values are therefore not used and are replaced with 0 (European Commission, 2020).

Table 5: End of life scenario and processes, per declared unit (1 kg)

Scenario / Module	Parameter	Left in ground
Deconstruction (C1)	Process and assumptions	n/a
	kg collected	0
Transport (C2)	Process and assumptions	n/a
	kg transported	0
Waste processing (C3)	Process and assumptions	n/a
	kg for re-use	0
	kg for recycling	0
Disposal (C4)	Process and assumptions	n/a
	kg disposed	0

Life Cycle Inventory (LCI) Data and Assumptions

Primary data was used for all manufacturing operations up to the factory gate, including upstream data for general purpose (GP) cement. Primary data were collected based on output data from Hynds systems during July 2023 – June 2024, excluding the sourcing of steel reinforcing wire and mesh which uses 2023 calendar year data.

Background datasets were obtained from Environmental Product Declarations (EPD) specific to suppliers in the case of steel and cement (EPD details omitted because of confidentiality), and EPDs covering similar products i.e. admixtures. All other materials were from the ecoinvent database 3.11 (Wernet, 2016). The reference year for most datasets range from 2019-2024.

Steam curing using natural gas as an energy input, takes place based on the need to turn around a product to fulfill an order. Records associated with steam curing use on a product by product basis is not available. Therefore, natural gas use has been allocated according to the mass of the concrete.

Electricity

Purchased electricity accounts for 100% of electricity use at Pokeno. It has been modelled using the residual electricity mix of the market.

The composition of the residual electricity grid mix of New Zealand is modelled in LCA FE based on published data for the year 1 April 2021 – 31 March 2022 (BraveTrace, 2023). The New Zealand residual electricity mix is made up of hydro (56.6%), geothermal (19.7%) natural gas (12.5%), wind (6.55%), coal (4.25%), biomass (0.266%) and biogas (0.160%).

Onsite consumption (3.00%), and the low voltage (<1kV) grid's transmission and distribution losses (6.73%) are calculated based on data from the Ministry of Business, Innovation & Employment (MBIE, 2023). The emission factor for the New Zealand residual grid mix for the GWP-GHG indicator is 0.151 kg CO₂-eq./kWh (based on EF3.1).

Transport

Primary transport data was collected for most input materials to the product. The transport data included the transport modes and distances from suppliers. Transport distances were mapped against each line of Bill of Material (BOM) data and used to calculate upstream transport impacts.

All auxiliary materials and minor input materials were estimated to travel 24 km by truck and be shipped 10 622 km (from Shanghai).

Transport modes:

- Transport, freight, lorry 7.5-16 metric ton, EURO5.
- Transport, freight, sea, container ship.

Cut off criteria

thinkstep consistently exclude impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the foreground production process, ('capital goods') regardless of potential significance.

Infrastructure/capital goods are excluded from all MLC datasets. An important exception is the inclusion of capital goods for electricity generation, where the capital goods are very important for modelling of changes towards more renewable generation. Capital goods related to electricity generation are included in all MLC electricity datasets.

Note: The system boundaries on manufacturing of equipment and for employees are not regarded as limiting the scope of the inventory or as an incomplete inventory (i.e. a cut-off).

Cut-off criteria were applied to the following:

Cut-off was applied to the packaging of raw materials and the packaging materials which accompany the wooden dunnage (included) in minor quantities. Raw materials are delivered in bulk and represents a proportion below 1% of cumulative mass and environmental relevance of inputs to the product.

Allocation

It was not possible to discern the specific quantities of energy (natural gas, electricity, diesel), water, consumables, dunnage and wastes per product. Data was available at the site-wide level and is allocated to products.

Mass of concrete is used for allocation:

- Allocation of energy (natural gas, electricity and diesel) is based on mass of concrete per product as concrete production and movement is the main driver for on-site energy consumption.
- Water input is allocated based on mass of concrete as batching is the primary area of water use.
- Inputs and (outputs) such as consumables, dunnage and wastes (data collected at site-wide level) are allocated based on mass of concrete for consistency.

Waste generated by the site are not product specific and hence are allocated per product based on mass allocation (i.e. as a factor of specific product mass and total mass of products manufactured at the facility). Reinforcing steel wire and steel fibres including any steel scrap inputs is based on EPD data. The following allocation process occurred.

- Steel Supplier 1's reinforcing bar and wire co-product allocation is proportioned by physical mass according to EN15804 and ISO14044 guidance. Scrap steel input allocation is unclear and likely to have zero burden applied.
- Steel Supplier 2 did not require co-product allocation as data was provided for individual products. Scrap steel input was modelled with an environmental burden based on economic allocation.
- Steel fibre Supplier has a co-product allocation based on product mass basis (17% of total mass production in the manufacturer's facility). Scrap steel input allocation is unclear and likely to be zero burden.

Noting the above Steel Fibre Supplier and Steel Supplier 1 EPDs, PCR suggests that: "Some LCI databases include datasets that are described as being compliant with the allocation rules of EN 15804, but which have been modelled using cut-off allocation (i.e., waste allocation according to Section 4.5.2) for some production (A1-A3) scrap.... Such datasets can be used without adjustments, if the production scrap has no, negligible, or negative economic value (as co-product allocation then yields the same or nearly the same result as cut-off allocation, see Section 4.5.2) or if it can be justified that co-product allocation is not possible (if so, the use of cut-off allocation shall be declared in the EPD). Otherwise, such datasets shall be adjusted by manually adding an environmental burden in compliance with EN 15804 or as a conservative assumption" (section 4.5.5, (EPD International, 2024)).

In the case of Steel Supplier 1 and Steel Fibre Supplier EPDs (used as inputs for this study), any open scrap inputs into manufacturing remain unknown, and so have been treated as 'burden free.' This is not consistent with the PCR – however, adjusting Steel Supplier 1 and Steel Fibre Supplier EPDs is not possible. As per Section 4.5.2 of the PCR, if it can be justified that co-product allocation is not possible the use of cut-off allocation shall be declared in the EPD.

Explanation of Representative Products & Variation

This is an EPD of multiple products, based on a representative product. The representative product is closest to or matches the sales-weighted average GWP-GHG impacts of the product group. The variation between individual products in the group is up to 11% for modules A1-A3, for the GWP-GHG indicator



RESULTS

Assessment Indicators

The results tables describe the different environmental indicators for each product per declared unit, for each declared module. The EN 15804 reference package based on EF 3.1 has been used.

The first section of each table contains the environmental impact indicators, describing the potential environmental impacts of the product as shown in Table 11. The second section shows the resource indicators, describing the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water, as shown in Table 12. The final section of each table displays the waste and other outputs, as shown in Table 13.

The use of primary energy is separated into energy used as raw material and energy used as energy carrier as per option C in Annex 3 of the PCR (EPD International 2024).

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.

Energy indicators (MJ) are always given as net calorific value.

Table 6: Indicators for life cycle impact assessment

Impact category	Indicator	Unit
Climate change – total	GWP-total	kg CO ₂ -eq.
Climate change – fossil	GWP-fossil	kg CO ₂ -eq.
Climate change – biogenic	GWP-biogenic	kg CO ₂ -eq.
Climate change – land use and land use change	GWP-luluc	kg CO ₂ -eq.
Ozone depletion	ODP	kg CFC-11 eq.
Acidification	AP	Mole of H ⁺ eq.
Eutrophication aquatic freshwater	EP-freshwater	kgP eq.
Eutrophication aquatic marine	EP-marine	kgN eq.
Eutrophication terrestrial	EP-terrestrial	Mole of N eq.
Photochemical ozone formation	POCP	kgNMVOC eq.
Depletion of abiotic resources – minerals and metals ^{1,2}	ADP-m&m	kgSb eq.
Depletion of abiotic resources – fossil fuels ¹	ADP-fossil	MJ
Water use ¹	WDP	m ³ world equiv.

Table 7: Life cycle inventory indicators on use of resources

Indicator	Abbreviation	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ
Use of renewable primary energy resources used as raw materials	PERM	MJ
Total use of renewable primary energy resources	PERT	MJ
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ
Total use of non-renewable primary energy resources	PENRT	MJ
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ
Use of non-renewable secondary fuels	NRSF	MJ
Total use of net fresh water	FW	m ³

Table 8: Life cycle inventory indicators on waste categories and output flows

Indicator	Abbreviation	Unit
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Components for reuse	CRU	kg
Materials for energy recovery	MER	kg
Materials for recycling	MFR	kg
Exported electrical energy	EEE	MJ
Exported thermal energy	EET	MJ

Table 9: Biogenic carbon content indicators

Indicator	Abbreviation	Unit
Biogenic carbon content - product	BCC-prod	kg
Biogenic carbon content - packaging	BCC-pack	kg

Table 10: Additional Environmental Impact Indicators

Indicator	Abbreviation	Unit
Climate Change ³	GWP-GHG	kg CO ₂ -eq.
Particulate Matter emissions	PM	Disease incidences
Ionising Radiation – human health ⁴	IRP	kBq U235 eq.
Eco-toxicity (freshwater) ⁵	ETP-fw	CTUe
Human Toxicity, cancer ⁵	HTP-c	CTUh
Human Toxicity, non-cancer ⁵	HTP-nc	CTUh
Land use related impacts / soil quality ⁵	SQP	Dimensionless

¹The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

²The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/ infrastructure in generic datasets, in case infrastructure/ capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

³ This indicator should be identical to GWP-total except that the CF for biogenic CO₂ is set to zero. It has been included in the EPD following the PCR (EPD International, 2024). In this study, it is calculated by subtracting the value of Climate change – biogenic (GWP-biogenic) from the value of Climate change – total (GWP-total) since the ecoinvent Excel LCIA results do not include the indicator.

⁴ 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.

⁵The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator



Environmental performance per 1 kg of Hyspec Precast Concrete Manhole Risers

Table 11: Core environmental indicators

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D	A-C
GWP-total	kg CO ₂ -eq.	1.90E-01	2.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.09%
GWP-fossil	kg CO ₂ -eq.	1.90E-01	2.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.09%
GWP-biogenic	kg CO ₂ -eq.	2.83E-04	1.20E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.70%
GWP-luluc	kg CO ₂ -eq.	4.33E-05	1.11E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	26.6%
ODP	kg CFC11-eq.	3.76E-09	3.14E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32%
AP	Mole of H ⁺ eq.	1.08E-03	8.49E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	19.9%
EP-freshwater	kg P eq.	1.27E-04	2.78E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10%
EP-marine	kg N eq.	1.57E-04	2.64E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	24.1%
EP-terrestrial	Mole of N eq.	2.92E-03	2.87E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	13.7%
POCP	kg NMCOC eq.	5.01E-03	1.13E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44%
ADP-m&m	kg Sb-eq.	2.46E-07	8.59E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	20.0%
ADP-fossil	MJ	1.11E+00	3.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	21.4%
WDP	m ³ world eq.	1.10E+00	1.76E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.301%

Table 12: Resource use indicators

Environmental Impact	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	2.76E-01	5.08E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	2.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.76E-01	5.08E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRE	MJ	1.06E+00	3.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	2.01E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.08E+00	3.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	kg	6.63E-02	1.45E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	7.11E-03	1.77E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	6.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.32E-02	4.48E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

The results for A1-A3 should not be analysed without considering the impacts represented by module C

Table 13: Waste output flow indicators

Waste and output flows	Unit	A1-A3	A4	C1	C2	C3	C4	D
HWD	kg	1.71E-03	7.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	3.66E-02	1.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RWD	kg	2.74E-06	2.07E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	6.24E-05	3.95E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	2.40E-08	2.90E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	8.39E-05	2.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	4.73E-05	3.16E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 14: Additional indicators

Waste and output flows	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ -eq.	1.89E-01	2.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PM	Disease incidences	8.51E-09	1.73E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
IRP	kBq U235 eq.	7.74E-01	2.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETP-fw	CTUe	5.15E-01	6.93E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTPc	CTUh	2.82E-10	4.05E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTPnc	CTUh	9.82E-09	2.03E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SQP	Pt	5.72E-01	1.77E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 15: Biogenic carbon indicators

Indicators	Units	A1 - A3
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂

The results for A1-A3 should not be analysed without considering the impacts represented by module C.

WEIGHT CONVERSION TABLE

Table 16: Hyspec Precast Concrete Manhole Risers products covered by this EPD and their weights for conversion.

Product code	Product full name	Product mass (kg per 1 unit of pipe)	Representative product
R10500150	MH Riser Conc Ø1050 150mm	92	
R10500150TW	MH Riser Conc Ø1050 150mm Thick Wall	129	
R10500300	MH Riser Conc Ø1050 300mm	183	
R10500300NH	MH Riser Conc Ø1050 300mm No Holes	183	
R10500300TW	MH Riser Conc Ø1050 300mm Thick Wall	250	
R10500450	MH Riser Conc Ø1050 450mm	275	
R10500450NH	MH Riser Conc Ø1050 450mm No Holes	275	
R10500600	MH Riser Conc Ø1050 600mm	366	
R10500600NH	MH Riser Conc Ø1050 600mm No Holes	366	
R10500600TW	MH Riser Conc Ø1050 600mm Thick Wall	499	
R10500900	MH Riser Conc Ø1050 900mm	549	
R10500900NH	MH Riser Conc Ø1050 900mm No Holes	549	
R10500900TW	MH Riser Conc Ø1050 900mm Thick Wall	748	Yes
R10501200	MH Riser Conc Ø1050 1200mm	733	
R10501200NH	MH Riser Conc Ø1050 1200mm No Holes	733	
R10501200TW	MH Riser Conc Ø1050 1200mm Thick Wall	998	
R10501500	MH Riser Conc Ø1050 1500mm	916	
R10501500NH	MH Riser Conc Ø1050 1500mm No Holes	916	
R10501500TW	MH Riser Conc Ø1050 1500mm Thick Wall	1 247	
R10501800	MH Riser Conc Ø1050 1800mm	1 099	
R10501800NH	MH Riser Conc Ø1050 1800mm No Holes	1 099	
R10501800TW	MH Riser Conc Ø1050 1800mm Thick Wall	1 497	
R10502100	MH Riser Conc Ø1050 2100mm	1 282	
R10502100NH	MH Riser Conc Ø1050 2100mm No Holes	1 282	
R10502100TW	MH Riser Conc Ø1050 2100mm Thick Wall	1 746	
R10502400	MH Riser Conc Ø1050 2400mm	1 465	
R10502400NH	MH Riser Conc Ø1050 2400mm No Holes	1 465	
R10502400NHTW	MH Riser Conc Ø1050 2400mm Thick Wall No Holes	1 465	
R10502400TW	MH Riser Conc Ø1050 2400mm Thick Wall	1 465	

R12000300	MH Riser Conc Ø1200 300mm	228	
R12000300NH	MH Riser Conc Ø1200 300mm No Holes	228	
R12000450	MH Riser Conc Ø1200 450mm	341	
R12000450NH	MH Riser Conc Ø1200 450mm No Holes	341	
R12000600	MH Riser Conc Ø1200 600mm	455	
R12000600NH	MH Riser Conc Ø1200 600mm No Holes	455	
R12000900	MH Riser Conc Ø1200 900mm	683	
R12000900NH	MH Riser Conc Ø1200 900mm No Holes	683	
R12001200	MH Riser Conc Ø1200 1200mm	910	
R12001200NH	MH Riser Conc Ø1200 1200mm No Holes	910	
R12001500	MH Riser Conc Ø1200 1500mm	1 137	
R12001500NH	MH Riser Conc Ø1200 1500mm No Holes	1 137	
R12001800	MH Riser Conc Ø1200 1800mm	1 365	
R12001800NH	MH Riser Conc Ø1200 1800mm No Holes	1 365	
R12001800NHTW	MH Riser Conc Ø1200 1800mm Thick Wall No Holes	1 809	
R12002100	MH Riser Conc Ø1200 2100mm	1 592	
R12002100NH	MH Riser Conc Ø1200 2100mm No Holes	1 592	
R12002100TW	MH Riser Conc Ø1200 2100mm Thick Wall	2 419	
R12002400	MH Riser Conc Ø1200 2400mm	1 819	
R12002400NH	MH Riser Conc Ø1200 2400mm No Holes	1 819	
R12002400TW	MH Riser Conc Ø1200 2400mm Thick Wall	2 419	
R14000300	MH Riser Conc Ø1400 300mm	280	
R14000300NH	MH Riser Conc Ø1400 300mm No Holes	280	
R14000450	MH Riser Conc Ø1400 450mm	420	
R14000450NH	MH Riser Conc Ø1400 450mm No Holes	420	
R14000600	MH Riser Conc Ø1400 600mm	560	
R14000600NH	MH Riser Conc Ø1400 600mm No Holes	560	
R14000900	MH Riser Conc Ø1400 900mm	840	
R14000900NH	MH Riser Conc Ø1400 900mm No Holes	840	
R14001200	MH Riser Conc Ø1400 1200mm	1 120	
R14001200NH	MH Riser Conc Ø1400 1200mm No Holes	1 120	
R14001500	MH Riser Conc Ø1400 1500mm	1 400	
R14001500NH	MH Riser Conc Ø1400 1500mm No Holes	1 400	
R14001800	MH Riser Conc Ø1400 1800mm	1 680	

R14001800NH	MH Riser Conc Ø1400 1800mm No Holes	1 680	
R14002100	MH Riser Conc Ø1400 2100mm	1 959	
R14002100NH	MH Riser Conc Ø1400 2100mm No Holes	1 959	
R14002400	MH Riser Conc Ø1400 2400mm	2 239	
R14002400NH	MH Riser Conc Ø1400 2400mm No Holes	2 239	
R15000300	MH Riser Conc Ø1500 300mm	312	
R15000300NH	MH Riser Conc Ø1500 300mm No Holes	312	
R15000450	MH Riser Conc Ø1500 450mm	469	
R15000450NH	MH Riser Conc Ø1500 450mm No Holes	469	
R15000600	MH Riser Conc Ø1500 600mm	625	
R15000600NH	MH Riser Conc Ø1500 600mm No Holes	625	
R15000900	MH Riser Conc Ø1500 900mm	937	
R15000900NH	MH Riser Conc Ø1500 900mm No Holes	937	
R15001200	MH Riser Conc Ø1500 1200mm	1 249	
R15001200NH	MH Riser Conc Ø1500 1200mm No Holes	1 249	
R15001500	MH Riser Conc Ø1500 1500mm	1 561	
R15001500NH	MH Riser Conc Ø1500 1500mm No Holes	1 561	
R15001800	MH Riser Conc Ø1500 1800mm	1 873	
R15001800NH	MH Riser Conc Ø1500 1800mm No Holes	1 873	
R15002100	MH Riser Conc Ø1500 2100mm	2 185	
R15002100NH	MH Riser Conc Ø1500 2100mm No Holes	2 185	
R15002400	MH Riser Conc Ø1500 2400mm	2 497	
R15002400NH	MH Riser Conc Ø1500 2400mm No Holes	2 497	
R18000300	MH Riser Conc Ø1800 300mm	435	
R18000300NH	MH Riser Conc Ø1800 300mm No Holes	446	
R18000600	MH Riser Conc Ø1800 600mm	871	
R18000600NH	MH Riser Conc Ø1800 600mm No Holes	891	
R18000900	MH Riser Conc Ø1800 900mm	1 306	
R18000900NH	MH Riser Conc Ø1800 900mm No Holes	1 336	
R18001200	MH Riser Conc Ø1800 1200mm	1 741	
R18001200NH	MH Riser Conc Ø1800 1200mm No Holes	1 780	
R18001500	MH Riser Conc Ø1800 1500mm	2 176	
R18001500NH	MH Riser Conc Ø1800 1500mm No Holes	2 225	
R18001800	MH Riser Conc Ø1800 1800mm	2 670	

R18001800NH	MH Riser Conc Ø1800 1800mm No Holes	2 670	
R18001800TW	MH Riser Conc Ø1800 1800mm Thick Wall	3 363	
R18002100	MH Riser Conc Ø1800 2100mm	2 611	
R18002100NH	MH Riser Conc Ø1800 2100mm No Holes	3 115	
R18002100NHTW	MH Riser Conc Ø1800 2100mm Thick Wall No Holes	4 405	
R18002400	MH Riser Conc Ø1800 2400mm	3 481	
R18002400NH	MH Riser Conc Ø1800 2400mm No Holes	3 481	
R18002400NHETW	MH Riser Conc Ø1800 2400mm Thick Wall No Holes	5 665	
R18002400NHTW	MH Riser Conc Ø1800 2400mm Thick Wall No Holes	4 405	
R18002400TW	MH Riser Conc Ø1800 2400mm Thick Wall	4 484	
R20500300	MH Riser Conc Ø2050 300mm	544	
R20500300NH	MH Riser Conc Ø2050 300mm No Holes	544	
R20500600	MH Riser Conc Ø2050 600mm	1 088	
R20500600NH	MH Riser Conc Ø2050 600mm No Holes	1 088	
R20500900	MH Riser Conc Ø2050 900mm	1 632	
R20500900NH	MH Riser Conc Ø2050 900mm No Holes	1 632	
R20501200	MH Riser Conc Ø2050 1200mm	2 176	
R20501200NH	MH Riser Conc Ø2050 1200mm No Holes	2 176	
R20501500	MH Riser Conc Ø2050 1500mm	2 720	
R20501500NH	MH Riser Conc Ø2050 1500mm No Holes	2 720	
R20501800	MH Riser Conc Ø2050 1800mm	3 264	
R20501800NH	MH Riser Conc Ø2050 1800mm No Holes	3 264	
R20501800TW	MH Riser Conc Ø2050 1800mm Thick Wall	4 490	
R20502100	MH Riser Conc Ø2050 2100mm	3 807	
R20502100NH	MH Riser Conc Ø2050 2100mm No Holes	3 807	
R20502400	MH Riser Conc Ø2050 2400mm	4 351	
R20502400NH	MH Riser Conc Ø2050 2400mm No Holes	4 351	
R20502400NHTW	MH Riser Conc Ø2050 2400mm Thick Wall No Holes	5 988	
R23001.2	MH Riser Conc Ø2300 1200mm	3 300	
R23001.2NH	MH Riser Conc Ø2300 1200mm No Holes	3 300	
R23001.9	MH Riser Conc Ø2300 1900mm	5 226	
R23001.9NH	Riser MH 2300x1900mm No Holes	5 226	
R23002.4	MH Riser Conc Ø2300 2400mm	6 598	
R23002.4NH	MH Riser Conc Ø2300 2400mm No Holes	6 598	

R25500.5	MH Riser Conc Ø2550 500mm	1 627	
R25500.9	MH Riser Conc Ø2550 900mm	2 929	
R25501.5NH	MH Riser Conc Ø2550 1500mm No Holes	4 880	
R25501.9	MH Riser Conc Ø2550 1900mm	6 185	
R25502.0	MH Riser Conc Ø2550 2000mm	6 513	
R25502.4	MH Riser Conc Ø2550 2400mm	7 808	
R25502.4NH	MH Riser Conc Ø2550 2400mm No Holes	7 808	
RS09000250MC	MH Riser Conc 900x900x250mm Chch	398	
RS09000500MC	MH Riser Conc 900x900x500mm Chch	766	
RS09000750MC	MH Riser Conc 900x900x750mm Chch	1 137	
RS09001000MC	MH Riser Conc 900x900x1000mm Chch	1 532	
RS12000500	MH Riser Conc 1200x1200x500mm Chch	1 065	

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PCR review was conducted by:

The Technical Committee of the International EPD System.
See www.environdec.com for a list of members.

Chair:

The most recent review chair: Claudia Peña, PINDA LCT SpA.
The review panel may be contacted via the Secretariat:
www.environdec.com/contact

Independent third-party verification of the declaration and data, according to ISO 14025:

☒ EPD verification (by individual verifier)

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Procedure for follow-up of data during EPD validity involved third-party verifier

☐ Yes

☒ No

An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules).

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

HYNDS

A thick, bright yellow curved line that starts under the 'H' and sweeps upwards and to the right, ending under the 'S', resembling a stylized smile or a swoosh.