

# Environmental Product Declaration



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

## Ductile & Grey Iron Manhole Cover



from  
**R.B.Agarwalla & Co.**

Programme:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
Licensee:	EPD India
EPD registration number:	EPD-IES-0016083
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*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](http://www.environdec.com)*



## General information

### Programme information

<b>Programme:</b>	The International EPD® System, Indian Regional Hub	
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden	EPD India, a licensee of the International EPD® System 422, Midas, Sahar Plaza Mumbai, India- 400059
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a> , <a href="http://www.envirodecindia.com">www.envirodecindia.com</a>	
<b>E-mail:</b>	<a href="mailto:info@environdec.com">info@environdec.com</a> , <a href="mailto:info@envirodecindia.com">info@envirodecindia.com</a>	

<b>Accountabilities for PCR, LCA and independent, third-party verification</b>
<b>Product Category Rules (PCR)</b>
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules: PCR 2019:14. Construction Products, Version 1.3.2 Published on 2023.12.08. Based on CEN standard EN 15804. CEN standard EN 15804 serve as the core PCR. UN CPC code 412.
PCR review was conducted by: The Technical Committee of the International EPD System. See <a href="http://www.environdec.com">www.environdec.com</a> for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat <a href="http://www.environdec.com/contact">www.environdec.com/contact</a> .
<b>Life Cycle Assessment (LCA)</b>
LCA accountability: R.B.Agarwalla & Co.
LCA and EPD developer: Dr. Rajesh Kumar Singh Thinkstep Sustainability Solutions Pvt. Ltd., a Sphera Company
<b>Third-party verification</b>
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by individual verifier
Third party verifier: Prabodha Acharya, Independent verifier, Mumbai, India.
Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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

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 characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

## Company information

Owner of the EPD: R.B.Agarwalla & Co.

Contact: Navneet Agarwal [mr1.rbae@rbagarwalla.com]

### Description of the organization:

RB Agarwalla & Company is a world leader in design, manufacture and sales of products that are primarily used for water, sewer, drainage, telecommunications, streets and highways and utility networks worldwide. At RBA a team of technical advisors are permanently on hand; ready to fulfill the needs of specifiers, installers and stockists. As an integral part of its continuing improvement policy and long-term commitment to growth, RBA has been and continues to attract the best brains in the industry. They provide the depth of knowledge, expertise and experience that has led to the current leading range of quality products.

Product-related or management system-related certifications: The R.B.Agarwalla & Co facilities are ISO 9001,14001 and 45001 certified.

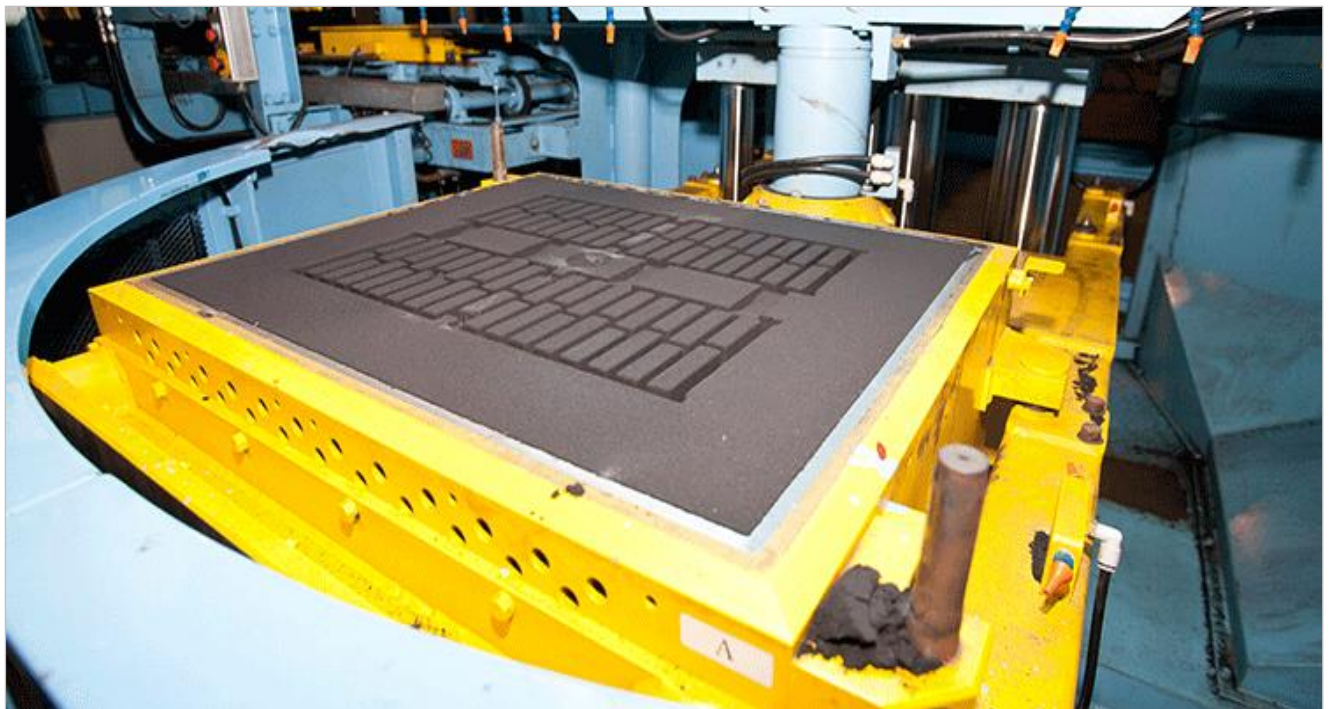
### Name and location of production site(s):

R.B. Agarwalla & Co.

Site 1- RBA Exports Pvt. Ltd.

Plot 56-61, EPIP SIPCOT Industrial estate,  
Gummidipoondi, Thiruvallur :601201, India.

Phone: +91 9940965298

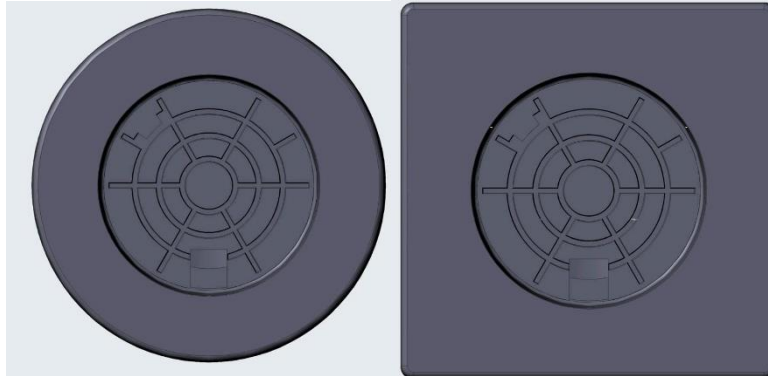


## Product information

Product name: Ductile and grey iron manhole cover.

Product identification: Ductile and grey iron manhole cover.

Product description: The product included in the EPD is manhole cover. The manhole cover is a framed removable lid lodged over manholes. The manhole covers are made from the ductile and grey iron cast iron via the sand-casting process.



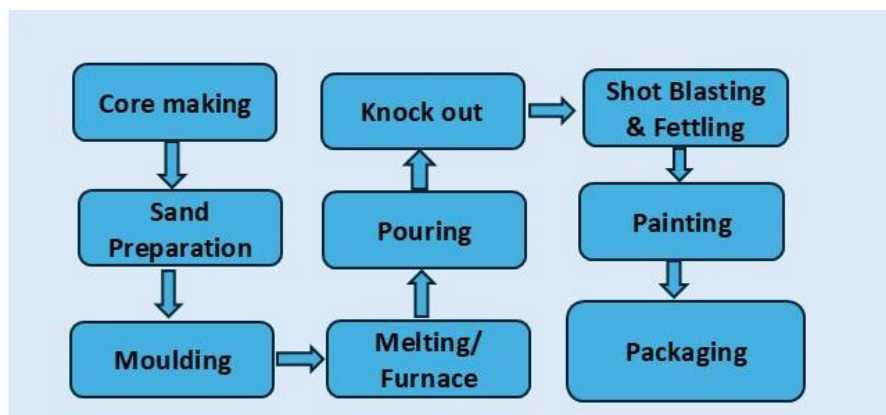
UN CPC code: 412

Geographical scope: Global

The technical specifications of the ductile and grey iron manhole cover, have been mentioned down below:

Description	Technical Specification (Standard)
Product Standard	EN124-2-2015
Mechanical and Chemical Specification	EN GJS 1563 (Ductile Iron Casting) & ASTM A536 EN GJL 1561 (Grey Iron Casting) & ASTM A48

Manufacturing process:



The manhole cover is usually made using the casting process, typically sand-casting techniques. Materials required for manufacturing are mold and molten metals, which are cast to manufacture manhole covers metal and other materials are melted in the furnace process, and a mold of sand is prepared; From furnace process, the final molten metal is casted into the mold of the required product and shape. After casting the product is sent for shot blasting to smoothen the manhole cover surface and painted to achieve the final quality of the product. After finishing, the products are packaged and transported for commercial use.

Applications:

- Manhole cover: Utility, municipal & industrial usage

## LCA information

Declared unit: 1 kg of ductile and grey iron manhole cover.

Reference service life: Not Applicable.

Time representativeness: The collection of foreground data refers to April 2023 to March 2024.

Database(s) and LCA software used:

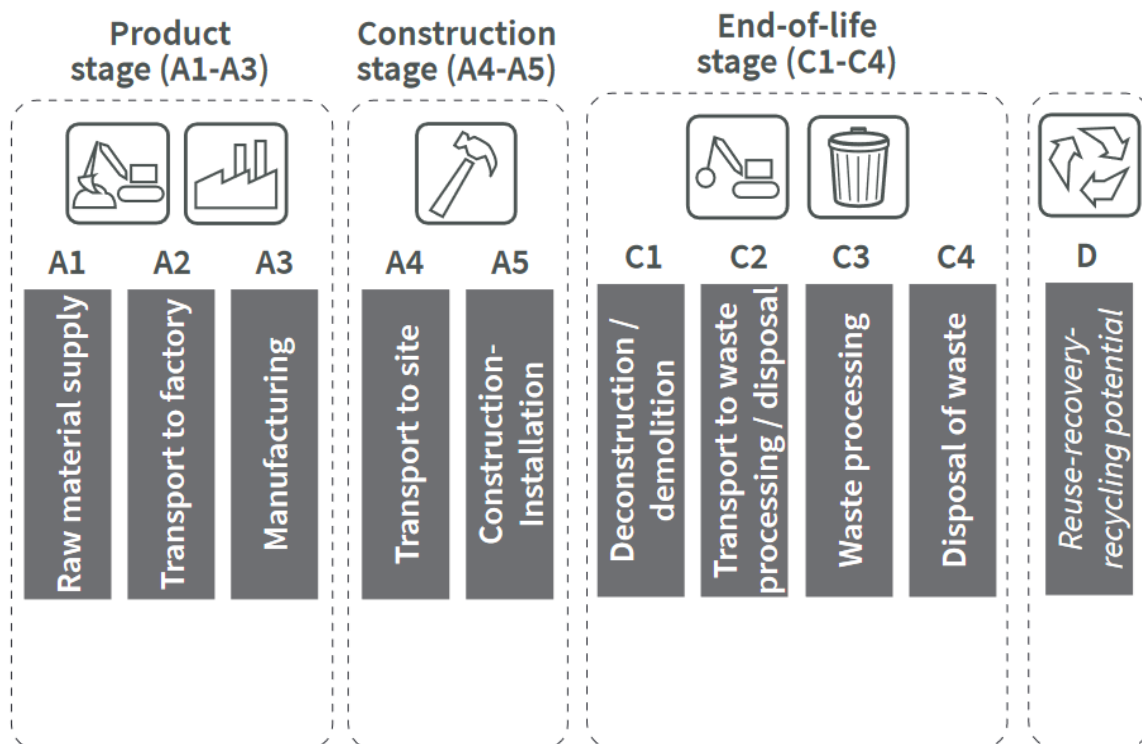
The background data has been taken from the latest available Sphera Managed LCA Content 2024.1

Description of system boundaries:

The system boundary: It includes cradle to gate stage with additional modules A1-A3, A5, C1–C4, and module D.

Reference package used:

EN 15804 reference package based on EF 3.1.



- **Module A1 to A3:**

The product stage includes provision of all materials, products and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage. The electricity for the manufacturing process has been sourced from Indian electricity grid mix and renewable sources (wind). The GHG-GWP impact for electricity used for manufacturing is 0.483 kg CO<sub>2</sub> eq./kWh.

- **Module A5:**

The installation stage includes the treatment of packaging materials used. The plastic used in packaging is landfilled, the wooden pallets & wooden box are incinerated, whereas the steel strap and MS iron crate are recycled and landfilled accordingly.



- *Module C1 to C4:*

Within this EPD, the modules C1-C4 are included. These modules consider the transportation of the dismantled components to their End of Life (EoL) destination (C2), There is no waste processing here in module C3. While the disposal is considered in C4. Generally, 88% of the steel product is considered for recycling and 12% is landfilled. Net scrap approach has been applied and the benefit from metal recycling has been accounted in the module D

- *Module D:*

Module D includes all the declared benefits and loads from net flows leaving the product system that have not been allocated as co-products and that have passed the end-of-waste state in the form of reuse, recovery and/or recycling potentials.

Data quality assessment and declaration:

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Manufacturing of Product	Collected data	EPD owner	2023	Primary data	1%
Generation of electricity used in manufacturing	Database	Sphera MLC 2024.1	2023	Primary data	43%
Transport of raw materials to the manufacturing site	Database	Sphera MLC 2024.1	2022	Primary data	1%
Production of packaging	Database	Sphera MLC 2024.1	2023	Primary data	4%
<b>Total share of primary data, of GWP-GHG results for A1-A3</b>					<b>49%</b>

Note: The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that does not capture all relevant aspects of data quality. The indicator is not comparable across product categories

Cut-off criteria:

The environmental impact of the product studied has been assessed by considering all significant processes, materials, and emissions. Excluded flows are assumed to have a negligible impact, contributing less than 5% to the cumulative impact assessment categories. The production of capital equipment, facilities, and infrastructure required for manufacture has not been considered.

Data quality and sources:

Data quality is compliant with ISO 14025:2006. All primary data were collected for march. All background data come from the Sphera Managed LCA Content 2024.1 databases.

Allocation:

This study employs mass allocation to address the production of the main product and its co-products. The flow of materials and energy and the associated release of substances and energy into the environment is related exclusively to the ductile & grey iron manhole cover produced. The mass allocation (molten metal & slag) has been applied in the furnace process. Any allocation performed in the background processes is according to the PCR.

## Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results)

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	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	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	IN			-	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	49%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

(X- declared modules and ND- Module not declared)

## Content information

Product components	Weight, %	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Manhole cover (kg)	1		
Iron	92 -94	75%	0
C	3.40-3.90	-	0
Si	2.40-3.10	-	0
Mn	0.55 Max.	-	0
P	0.12 Max.	-	0
S	0.020 Max.	-	0
Cr	0.10 Max.	-	0
Cu	0.40 Max.	-	0
Mg	0.025-0.055	-	0
<b>TOTAL</b>	<b>100%</b>	<b>75%</b>	<b>0</b>
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
MS Iron crate & iron rod	2.27E-02	2.27%	-
Wooden pallet & top	4.17E-02	4.17%	1.67E-02
Wooden box	1.51E-02	1.51%	6.04E-03
Strech film	5.85E-04	0.06%	-
Steel strap	9.57E-04	0.10%	-
<b>TOTAL</b>	<b>8.11E-02</b>	<b>8.11%</b>	<b>2.27E-02</b>

Products do not contain any substances that can be included in “Candidate List of Substances of Very High Concern for Authorization” and raw materials used are not part of the EU REACH regulation

## Results of the environmental performance indicators

The environmental performance of the functional unit of 1 kg of ductile and grey iron manhole cover reported below using the parameters and units as specified in PCR 2019:14 v1.3.2.

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. The scenarios included are currently in use and are representative of one of the most probable alternatives.

### Mandatory impact category indicators according to EN 15804+A2:2019

Environmental Impacts for 1 kg of ductile & grey iron manhole cover								
Impact indicators	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq.	1.73E+00	1.20E-03	0.00E+00	5.10E-03	0.00E+00	1.80E-03	-9.32E-02
GWP-biogenic	kg CO <sub>2</sub> eq.	-7.27E-02	6.66E-02	0.00E+00	3.30E-06	0.00E+00	6.08E-03	3.25E-04
GWP-luluc	kg CO <sub>2</sub> eq.	1.52E-03	6.65E-07	0.00E+00	1.15E-07	0.00E+00	1.08E-05	-4.03E-05
GWP-total	kg CO <sub>2</sub> eq.	1.66E+00	6.78E-02	0.00E+00	5.11E-03	0.00E+00	7.89E-03	-9.29E-02
ODP	kg CFC-11 eq.	6.00E-12	7.59E-15	0.00E+00	9.65E-17	0.00E+00	4.84E-15	-3.52E-14
AP	Mole of H <sup>+</sup> eq.	1.35E-02	1.14E-05	0.00E+00	2.84E-05	0.00E+00	1.28E-05	-5.12E-04
EP-freshwater	kg P eq.	7.62E-06	9.66E-09	0.00E+00	7.77E-10	0.00E+00	4.08E-09	-3.17E-08
EP-marine	kg N eq.	1.88E-03	3.34E-06	0.00E+00	1.38E-05	0.00E+00	3.28E-06	-7.33E-05
EP-terrestrial	Mole of N eq.	2.04E-02	4.77E-05	0.00E+00	1.51E-04	0.00E+00	3.62E-05	-7.61E-04
POCP	kg NMVOC eq.	5.78E-03	9.20E-06	0.00E+00	2.77E-05	0.00E+00	1.00E-05	-2.44E-04
ADP-minerals & metals*	kg Sb eq.	2.35E-07	8.11E-11	0.00E+00	5.99E-11	0.00E+00	1.16E-10	-3.06E-07
ADP-fossil*	MJ	2.23E+01	1.72E-02	0.00E+00	6.65E-02	0.00E+00	2.37E-02	1.01E+00
WDP	m <sup>3</sup> world equiv.	1.62E+01	7.47E-03	0.00E+00	6.23E-06	0.00E+00	2.06E-04	-6.79E-03
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							



### Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-GHG	kg CO <sub>2</sub> eq.	1.73E+00	1.19E-03	0.00E+00	5.07E-03	0.00E+00	1.79E-03	-9.28E-02

\*Disclaimer: 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. We discourage the use of the results of modules A1-A3 without considering the results of module C.

### Resource use indicators according to EN 15804+A2:2019

Resource Use for 1 kg of ductile & grey iron manhole cover								
Impact indicators	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	1.09E+01	1.03E+00	0.00E+00	1.37E-04	0.00E+00	4.13E-03	-4.90E-02
PERM	MJ	1.02E+00	-1.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.19E+01	4.74E-03	0.00E+00	1.37E-04	0.00E+00	4.13E-03	-4.90E-02
PENRE	MJ	2.23E+01	4.11E-02	0.00E+00	6.65E-02	0.00E+00	2.37E-02	-1.01E+00
PENRM	MJ	2.40E-02	-2.40E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	2.23E+01	1.72E-02	0.00E+00	6.65E-02	0.00E+00	2.37E-02	-1.01E+00
SM	kg	7.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	5.51E-01	1.76E-04	0.00E+00	1.92E-07	0.00E+00	6.28E-06	-5.55E-03
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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

### Output flows & Waste Indicators according to EN 15804+A2:2019

Waste Flow for 1 kg of ductile & grey iron manhole cover								
Impact indicators	Unit	A1-A3	A5	C1	C2	C3	C4	D
HWD	kg	5.77E-08	9.83E-12	0.00E+00	8.45E-13	0.00E+00	5.90E-12	-4.11E-09
NHWD	kg	1.91E-01	1.92E-03	0.00E+00	1.02E-06	0.00E+00	1.20E-01	6.32E-03
RWD	kg	5.18E-04	8.96E-07	0.00E+00	8.33E-09	0.00E+00	2.48E-07	-3.67E-06
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.80E-01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	9.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	1.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acronyms	HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, CRU = Components for re-use, MFR = Components for re-use, MER = Materials for Recycling, EEE = Exported electrical energy, EET = Exported thermal energy.							

### Additional environmental performance indicators according to EN 15804+A2:2019

Additional Environmental Impacts for 1 kg of ductile & grey iron manhole cover								
Impact indicators	Unit	A1-A3	A5	C1	C2	C3	C4	D
Particulate matter	Disease incidences	2.25E-07	7.72E-11	0.00E+00	1.21E-10	0.00E+00	1.60E-10	-7.26E-09
Ionising radiation, human health	kBq U235 eq.	7.18E-02	1.42E-04	0.00E+00	7.53E-07	0.00E+00	2.87E-05	8.61E-04
Ecotoxicity, freshwater	CTUe	1.06E+01	7.65E-03	0.00E+00	3.00E-02	0.00E+00	1.58E-02	-2.60E-01
Human toxicity, cancer	CTUh	5.98E-10	7.26E-13	0.00E+00	4.74E-13	0.00E+00	3.22E-13	1.56E-11
Human toxicity, non-cancer	CTUh	1.24E-08	3.80E-11	0.00E+00	9.87E-12	0.00E+00	1.25E-11	-9.77E-11
Land Use	Pt	1.58E+01	5.30E-03	0.00E+00	7.93E-05	0.00E+00	6.52E-03	-6.04E-02

## References

- General Programme Instructions of the International EPD® System. Version 4.0.
- PCR 2019:14. Construction Products, Version 1.3.2
- Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data; CEN/TR 15941:2010
- EN 15804: EN 15804:2012+A2:2019: Sustainability of construction works -Environmental Product Declarations - Core rules for the product category of construction products.
- EN ISO 14025: EN ISO 14025:2011-10 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- EN ISO 14040: EN ISO 14040:2009-11 Environmental management - Life cycle assessment - Principles and framework
- EN ISO 14044: EN ISO 14044:2006-10 Environmental management - Life cycle assessment - Requirements and guidelines.
- LCA FE: LCA FE Software System and Database for Life Cycle Engineering, Sphera Solution Inc, 2024 (<https://sphera.com/solutions/product-stewardship/life-cycle-assessment-software-and-data/managed-lca-content/>)

