

Environmental Product Declaration



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

Cast Iron Pipe

From



Programme:	The International EPD® System, 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



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>PCR 2019:14 Construction products (EN 15804:A2) (1.3.4)</i>
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact
Life Cycle Assessment (LCA)
LCA accountability: <i>Tyréns Sverige AB</i>
Third-party verification
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: <i>Viktor Hakkarainen, CHM Analytics</i>  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 programs, 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: IBECO Ingenjörfirma F. Berglund & Co Aktiebolag

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Description of the organisation:

IBECO – your comprehensive supplier within civil & drainage, plumbing and water management. Well-functioning water and sewage systems require special products of the highest quality. Our wide product portfolio spans from the smallest pipe diameter, valves, pumps, butt welds to the largest stormwater pipes. Our products are often shipped the same day from our own warehouses, which are well distributed throughout Sweden.

IBECO is a distributor within civil & drainage, plumbing and water management. With more than 50 years of experience in our field, we have built up a solid network in all areas. We represent manufacturers within and outside Europe. Their combined range makes us a partner with both breadth and depth.

Name and location of production site(s):

Godsvägen 23, 784 72 Borlänge Sweden

Product information

Product name: Cast iron pipe

Product description: Cast iron pipes for use in the transportation of fresh water and disposal of wastewater (DN 80-1000).

UN CPC code: 41292

Geographical scope:

The EPD is representative for the Swedish market.

Module A1 and A2 Material from India

Module A3 production is located in India/Sweden

Module C and D scenarios are for Sweden

LCA information

Functional unit / declared unit: 1 kg pipe

Reference service life: Not declared

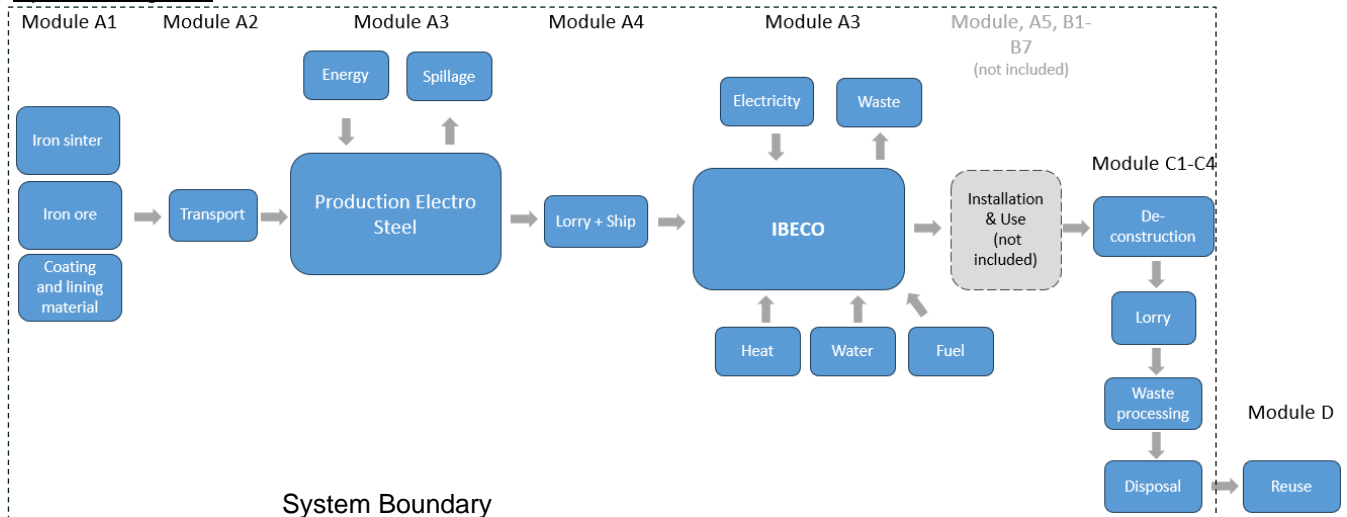
Time representativeness: The LCA is based on production data from 2022 and is deemed to be representative of an average year of production.

Database(s) and LCA software used: The LCA software is SimaPro Flow and the database is Ecoinvent 3.9.1. When modelling in Simapro, Ecoinvent data (updated December 2022) has been used for generic data.

Description of system boundaries:

Cradle to gate (A1-A3), transport (A4), end of life (C1–C4) and benefits beyond system boundary (D) (A1–A3 + A4 + C + D)

System diagram:



Production

All raw materials are processed at Electro Steels factory in India where the product is produced. The cast iron pipe is made in a blast furnace fueled with coke and coal. Iron sinter and iron ore is smelted in the furnace and the pipes are casted. The pipes are lined with cement on the inside and coated with a ZnAl coat on the outside together with a layer of epoxy. The product is transported by ship to England and from there transported by truck to IBECO's site in Borlänge where it is stored before it's going to the customer.

The infrastructure or capital goods used in the product system for underlying processes are included, as infrastructure or capital goods can NOT be excluded in SimaPro FLOW. Therefore results of the impact category abiotic depletion of minerals and metals, 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.

More information:

LCA practitioner: Moa Mellberg, Marcus Öhlén and Anna Pantze at Tyréns Sverige AB

The factory processes are allocated to the products using mass allocation. In this study, a cut-off criteria of 1% of the total energy use and 1% of the total material consumption is applied.

EN 15804 reference package based on EF 3.1 has been used

Electricity data

IBECO's site in Borlänge purchases electricity from renewables, covered by guarantees of origin from Borlänge energy. The energy mix purchased are 59.4% Hydro power, 37.4% bioenergy and 3.2% wind power. Infrastructure and net losses for high and medium net are included together with

transformation losses when going from high voltage to medium voltage. Climate impact for the green energy mix are 0,058 kg CO₂ eq. per kWh (GWP-100 IPCC2021). Apart from the coke and coal used in the mini blast furnace, Electro Steel uses energy from electricity and the climate impact for the energy mix is calculated to 1,33 kg CO₂ eq. per kWh. Grid mix is used due to negligible presence of renewables in the grid mix.

Estimates and assumptions

- The excavation of the worn-out pipes is allocated to the installation of the new pipe that replace it, C1.
- 95% of the steel is assumed to be recycled, C3
- 5% of the steel is assumed to go to landfill, C4
- The recycled steel is assumed to replace primary steel, D
- Truck transports is assumed to have EURO 5

Background data

The data quality of the background data is considered good. The assessment considers all available data from the production process, including all raw materials and auxiliary materials used as well as the energy consumption in relation to available Ecoinvent 3.9.1 datasets.

Data quality

When modeling in Simapro, Ecoinvent data (updated December 2022) has been used for generic data. The database is considered to be of high quality. Approximately 22% specific data in this EPD. Data is gathered from the actual manufacturing plant with product-specific materials, specific amounts, spillage (%), specific energy mix, specific transportation distances and transportation type.

The pipe is available in several dimensions, the quantity used in this study is per kg of pipe. The distribution of the constituent materials per kg of pipe is similar for all dimensions.

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	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	GLO	GLO	ND	ND	ND	ND	ND	ND	ND	ND	SE	SE	SE	SE	SE
Specific data used	22%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Weight biogenic carbon, kg C/declared unit
Steel	0.987	0.0 %	0.0 %
Cement lining	0.008	0.0 %	0.0 %
ZnAl coating	0.006	0.0 %	0.0 %
Epoxi	<0.001	0.0 %	0.0 %
TOTAL	1.0	0.0 %	0.0 %

Packaging materials	Weight. kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/declared unit
Wood	0.03	3.0%	0.02
Plastic	0.001	0.1%	0.0
TOTAL	0.031	3.1 %	0.02

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
not relevant	-	-	-

Environmental Information

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.

Potential environmental impact – mandatory indicators according to EN 15804

Results per kg								
Indicator	Unit	A1-A3**	A4	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	2.48E+00	6.49E-01	0.00E+00	9.24E-03	3.17E-02	2.93E-04	-1.18E+00
GWP-biogenic	kg CO ₂ eq.	2.13E-02	3.96E-04	0.00E+00	8.46E-06	3.26E-02	9.04E-07	0.00E+00
GWP-luluc	kg CO ₂ eq.	5.11E-03	3.63E-04	0.00E+00	4.56E-06	2.27E-05	5.82E-08	-2.76E-04
GWP-total	kg CO ₂ eq.	2.41E+00	6.49E-01	0.00E+00	9.24E-03	3.17E-02	2.93E-04	-1.18E+00
ODP	kg CFC 11 eq.	4.74E-08	1.29E-08	0.00E+00	2.01E-10	4.13E-10	1.03E-11	-2.87E-08
AP	mol H ⁺ eq.	1.83E-02	6.55E-03	0.00E+00	2.02E-05	1.46E-04	1.87E-06	-4.30E-03
EP-freshwater	kg P eq.	1.05E-03	3.94E-05	0.00E+00	6.57E-07	8.88E-06	1.38E-08	-4.79E-04
EP-marine	kg N eq.	2.89E-03	1.78E-03	0.00E+00	5.09E-06	6.90E-05	8.11E-07	-1.03E-03
EP-terrestrial	mol N eq.	3.04E-02	1.95E-02	0.00E+00	5.18E-05	4.61E-04	8.69E-06	-1.09E-02
POCP	kg NMVOC eq.	1.31E-02	6.06E-03	0.00E+00	3.13E-05	1.48E-04	3.49E-06	-6.27E-03
ADP-minerals&metals*	kg Sb eq.	1.27E-05	1.71E-06	0.00E+00	3.02E-08	4.15E-07	3.14E-10	5.61E-07
ADP-fossil*	MJ	2.23E+01	8.87E+00	0.00E+00	1.31E-01	3.07E-01	7.55E-03	-1.24E+01
WDP*	m ³	4.82E-01	4.64E-02	0.00E+00	7.71E-04	6.04E-03	3.82E-04	-7.75E-02
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						

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C.

Disclaimer: Since the factory processes are allocated based on mass allocation, the presented result for module A1-A3 represents a relative impact across all LCIA categories

**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.*

***A1-A3 results includes the "balancing-out reporting" of the biogenic CO₂ of packaging released in module A5*

Potential environmental impact – additional mandatory and voluntary indicators

Results per kg								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	2.47E+00	6.50E-01	0.00E+00	9.26E-03	6.65E-02	2.94E-04	-1.19E+00

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C

Use of resources

Results per kg								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	3.31E+00	1.20E-01	0.00E+00	2.06E-03	3.02E-02	1.49E-04	-2.17E-01
PERM*	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.31E+00	1.20E-01	0.00E+00	2.06E-03	3.02E-02	1.49E-04	-2.17E-01
PENRE	MJ	2.36E+01	9.43E+00	0.00E+00	1.39E-01	3.25E-01	8.03E-03	-1.31E+01
PENRM*	MJ.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	2.36E+01	9.43E+00	0.00E+00	1.39E-01	3.25E-01	8.03E-03	-1.31E+01
SM	kg	0.00E+00	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 ³	1.79E-02	1.89E-03	0.00E+00	3.03E-05	2.53E-04	9.58E-06	-2.90E-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							
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Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C

**For the PERM and PENRM the new "GUIDANCE TO CALCULATING THE PRIMARY ENERGY USE INDICATORS" in Annex 3 of the PCR is followed and calculated according to option A.*

¹ The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production

Results per kg								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1.03E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	2.49E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	7.80E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C

Output flows

Results per kg								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	1.99E-02	0.00E+00	0.00E+00	0.00E+00	9.50E-01	0.00E+00	0.00E+00
Materials for energy recovery	kg	2.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	2.88E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	9.63E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C

References

Ecoinvent, < <https://ecoinvent.org/the-ecoinvent-database/> >

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