Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 for:
Multiple Products, based on worst case.

Fernco EPDM

Fernco EPDM DC, Fernco EPDM AC reducer and IBECO puddle flange LT
Art.nr included in study can be found in p. 12

From

IBECO Uniwater

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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): *PCR 2019:14 Construction products (EN 15804:A2) (1.3.4)*
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: *Tyréns Sverige AB*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Viktor Hakkarainen, CHM Analytics* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ 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 Ingenjörsfirma 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 distributer 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: Fernco EPDM

Product description:
Fernco EPDM couplings are specifically designed to connect and repair pipes of same or different sizes and materials quickly and easily. Used on sewer and drainage applications.

IBECO puddle flange LT (DN 25-630) ensure a watertight seal and radon barrier where pipes pass through concrete walls or slabs of any structure or building

UN CPC code: 36320

Geographical scope:
The EPD is representative for the Swedish market.
Module A1 and A2 are Global
Module A3 production is Germany and Sweden
Module A4 are from Germany to Sweden
Module C and D scenarios are for Sweden

LCA information

Functional unit / declared unit: 1 kg pipe fitting

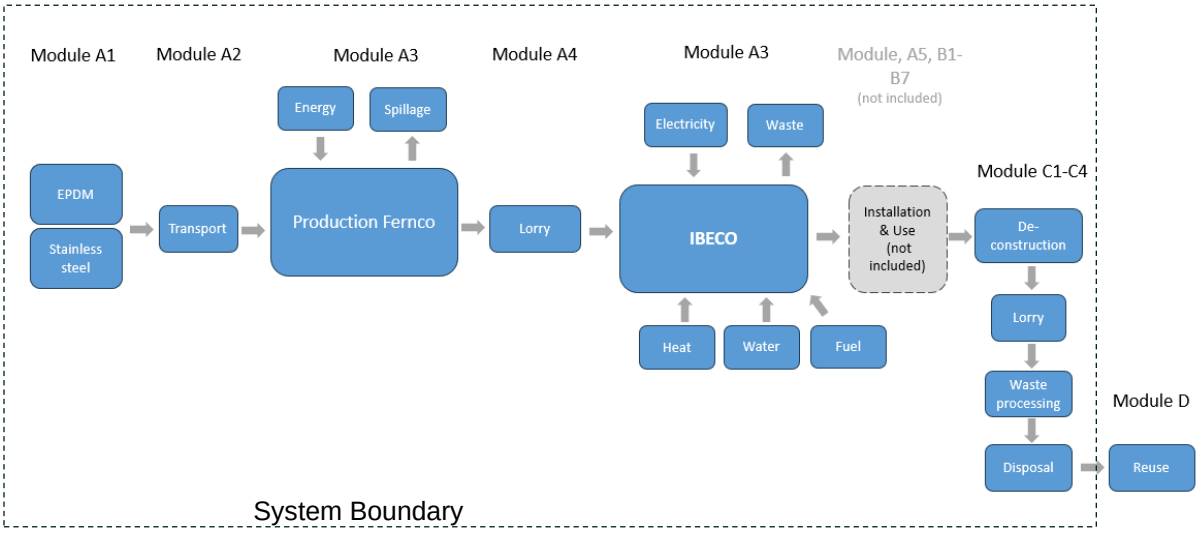
Reference service life: Not declared

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
Materials in the product:
- Stainless steel
- EPDM

All raw materials are processed at Fernco factory in Germany were the product is produced. The product is then delivered to I IBECO's site in Borlänge where it is stored before it's going to the costumer.

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. The Climate impact for the energy mix of IBECO is 0,058 kg CO2eq. per kWh (GWP-GHG). The electricity at Fernco production site comes from from the grid and is calculated as German residual mix. The Climate impact for the energy mix of Fernco is 0.69 kg CO2eq. per kWh (GWP-GHG).

Estimates and assumptions
• The excavation of the worn-out pipes and fittings is allocated to the installation of the new pipe and fittings 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
• Other materials is assumed to be incinerated with energy recovery, C3.
• The recycled steel is assumed to replace primary steel, D
• Truck transports within Europe is assumed to have class EURO 5 and within Sweden EURO 6.

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 2% specific data in this EPD. Data is gathered from the actual manufacturing plant with product-specific materials, specific amounts, specific energy mix, specific transportation distances and transportation type. Data for spillage is generic.

The fitting is available in several dimensions, the quantity used in this study is per kg of pipe and is the presented result is the smallest dimension of Fernco DC coupling (worst case). The difference in climate impact (GWP-GHG) between product with highest climate impact (Fernco EPDM DC ASW: 50-65mm) and other products are up to 21%.

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	EU	EU	ND	ND	ND	ND	ND	ND	ND	ND	SE	SE	SE	SE	SE
Specific data used	2%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	21%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg range of material for included products in parenthesis	Post-consumer material, weight-%	Biogenic material, weight % and kg C/declared unit
Steel	0.27 (0.06-0.27)	0.00 %	0.00 %
EPDM	0.73 (0.73-0.94)	0.00 %	0.00 %
TOTAL	1.00	0.00 %	0.00 %
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/declared unit**
Cardboard and paper	0.04	3.90 %	0.02
TOTAL	0.04	3.90 %	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.	4.58E+00	2.51E-01	0.00E+00	9.24E-03	1.72E+00	7.90E-05	-2.80E-01
GWP-biogenic	kg CO_2 eq.	5.67E-02	2.27E-04	0.00E+00	8.46E-06	9.01E-03	2.44E-07	0.00E+00
GWP-luluc	kg CO_2 eq.	8.40E-03	1.22E-04	0.00E+00	4.56E-06	4.13E-05	1.57E-08	-5.55E-03
GWP-total	kg CO_2 eq.	4.59E+00	2.51E-01	0.00E+00	9.25E-03	1.73E+00	7.93E-05	-2.85E-01
ODP	kg CFC 11 eq.	8.29E-08	5.46E-09	0.00E+00	2.01E-10	1.02E-08	2.79E-12	-9.58E-09
AP	mol H^+ eq.	2.31E-02	8.18E-04	0.00E+00	2.02E-05	4.71E-04	5.04E-07	-2.98E-03
EP-freshwater	kg P eq.	1.40E-03	1.76E-05	0.00E+00	6.57E-07	1.20E-05	3.73E-09	-7.55E-05
EP-marine	kg N eq.	4.46E-03	2.81E-04	0.00E+00	5.09E-06	2.41E-04	2.19E-07	-1.17E-03
EP-terrestrial	mol N eq.	4.55E-02	2.97E-03	0.00E+00	5.18E-05	2.11E-03	2.35E-06	-1.35E-02
POCP	kg NMVOC eq.	2.03E-02	1.22E-03	0.00E+00	3.13E-05	5.58E-04	9.42E-07	-4.32E-03
ADP-minerals&metals*	kg Sb eq.	7.63E-05	8.06E-07	0.00E+00	3.02E-08	2.90E-07	8.49E-11	-5.64E-07
ADP-fossil*	MJ	8.89E+01	3.56E+00	0.00E+00	1.31E-01	4.11E-01	2.04E-03	-1.02E+01
WDP*	m^3	2.03E+00	2.07E-02	0.00E+00	7.71E-04	3.48E-02	1.03E-04	-3.91E-01
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: 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.	4.61E+00	2.51E-01	0.00E+00	9.25E-03	1.72E+00	7.91E-05	-2.87E-01

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	1.05E+01	5.52E-02	0.00E+00	2.06E-03	8.68E-03	4.02E-05	-1.69E+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	1.05E+01	5.52E-02	0.00E+00	2.06E-03	8.68E-03	4.02E-05	-1.69E+01
PENRE	MJ	9.34E+01	3.78E+00	0.00E+00	1.39E-01	1.35E-01	2.17E-03	-1.04E+01
PENRM*	MJ.	2.39E+01	0.00E+00	0.00E+00	0.00E+00	-2.39E+01	0.00E+00	0.00E+00
PENRT	MJ	1.17E+02	3.78E+00	0.00E+00	1.39E-01	-2.38E+01	2.17E-03	-1.04E+01
SM	kg	7.37E-02	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	9.85E-02	8.13E-04	0.00E+00	3.03E-05	5.00E-04	2.59E-06	1.55E-02
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						

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	5.23E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	1.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	3.95E-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	1.97E-02	0.00E+00	0.00E+00	0.00E+00	1.52E-01	0.00E+00	0.00E+00
Materials for energy recovery	kg	1.25E-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	6.34E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	9.63E-02	0.00E+00	0.00E+00	0.00E+00	2.12E+01	0.00E+00	0.00E+00

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

Additional information

Potential environmental impact - Variation between products

	Results per kg	
Indicator	**Unit**	**Variation between products over modules A-C** *The aggregated variation of results over all modules A-C between the included products. The variation is expressed as a percentage difference from the presented result.*
GWP-fossil	kg CO_2 eq.	18%
GWP-biogenic	kg CO_2 eq.	142%
GWP-luluc	kg CO_2 eq.	52%
GWP-total	kg CO_2 eq.	22%
ODP	kg CFC 11 eq.	<10%
AP	mol H^+ eq.	15%
EP-freshwater	kg P eq.	33%
EP-marine	kg N eq.	<10%
EP-terrestrial	mol N eq.	<10%
POCP	kg NMVOC eq.	11%
ADP-minerals&metals*	kg Sb eq.	52%
ADP-fossil*	MJ	<10%
WDP*	m^3	15%
GWP-GHG	kg CO2 eq.	18%
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

Art.nr included in study:

Fernco DC:	Fernco AC reducer:		IBECO puddle flange LT	
3110026	3110220	3110246	4456015	4456042
3110207	3110221	3110247	4456016	4456043
3110208	3110222	3110248	4456017	4456044
3110209	3110223	3110249	4456018	
3110210	3110224	3110250	4456019	
3110211	3110225	3110251	4456020	
3110212	3110226	3110252	4456021	
3110213	3110227	3110253	4456022	
3110214	3110228	3110254	4456023	
3110215	3110229	3110255	4456024	
3110216	3110230	3110256	4456025	
3110217	3110231	3110257	4456026	
3110218	3110232	3110258	4456027	
3110219	3110233	3110259	4456028	
3114390	3110234	3110260	4456029	
3114528	3110235	3110261	4456030	
3114512	3110236	3110262	4456031	
3114529	3110237	3110263	4456032	
	3114349	3110264	4456033	
	3110238	3110265	4456034	
	3110239	3110266	4456035	
	3110240	3110267	4456036	
	3110745	3110268	4456037	
	3110242	3110269	4456038	
	3110243	3110270	4456039	
	3110244	3110271	4456040	
	3110245		4456041	

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