Environmental Product Declaration

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

Fernco EPDM with shear band

Fernco SCW, Fernco LCW, Fernco SC and Fernco LC
Art.nr included in study can be found in p. 12

From

IBECO Uniwater

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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): *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 with shear band

Product description:
Shear banded couplings are specifically designed to connect and repair pipes on sewer and drainage applications. The stainless steel central band protects the joint under shear loads and helps to keep the joining pipes aligned, helping to prevent pipe displacement.

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

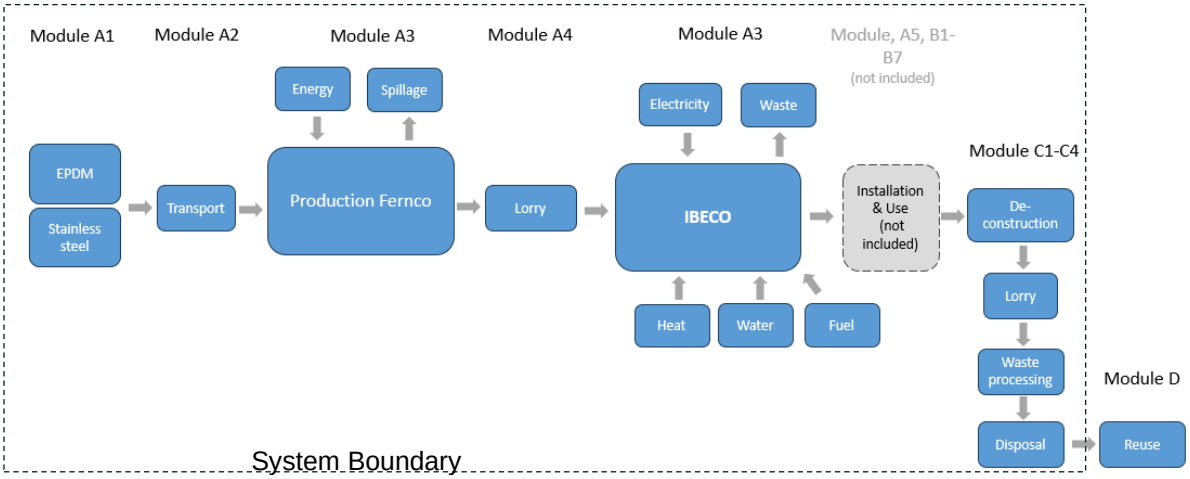
Reference service life: Not declared

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 is 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 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 are 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 fitting and is the middle dimension. The distribution of the constituent materials per kg of fitting is relatively similar for all dimensions. The difference in climate impact (GWP-GHG) between representative product (Fernco EPDM LC ASW 760 – 785mm) and other products are < 10%.

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	< 10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	0.41 (0.33-0.44)	0.00 %	0.00 %
EPDM	0.59 (0.56-0.67)	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.	5.21E+00	2.51E-01	0.00E+00	9.24E-03	1.40E+00	1.20E-04	-2.56E-01
GWP-biogenic	kg CO_2 eq.	9.00E-02	2.27E-04	0.00E+00	8.46E-06	1.35E-02	3.71E-07	0.00E+00
GWP-luluc	kg CO_2 eq.	9.18E-03	1.22E-04	0.00E+00	4.56E-06	3.78E-05	2.39E-08	-4.37E-03
GWP-total	kg CO_2 eq.	5.26E+00	2.51E-01	0.00E+00	9.25E-03	1.41E+00	1.20E-04	-2.60E-01
ODP	kg CFC 11 eq.	8.66E-08	5.46E-09	0.00E+00	2.01E-10	8.32E-09	4.23E-12	-1.10E-08
AP	mol H^+ eq.	2.68E-02	8.18E-04	0.00E+00	2.02E-05	4.09E-04	7.65E-07	-2.37E-03
EP-freshwater	kg P eq.	1.67E-03	1.76E-05	0.00E+00	6.57E-07	1.14E-05	5.66E-09	-6.79E-05
EP-marine	kg N eq.	5.15E-03	2.81E-04	0.00E+00	5.09E-06	2.08E-04	3.33E-07	-9.31E-04
EP-terrestrial	mol N eq.	5.26E-02	2.97E-03	0.00E+00	5.18E-05	1.79E-03	3.56E-06	-1.11E-02
POCP	kg NMVOC eq.	2.18E-02	1.22E-03	0.00E+00	3.13E-05	4.80E-04	1.43E-06	-3.91E-03
ADP-minerals&metals*	kg Sb eq.	9.42E-05	8.06E-07	0.00E+00	3.02E-08	3.14E-07	1.29E-10	3.49E-08
ADP-fossil*	MJ	9.00E+01	3.56E+00	0.00E+00	1.31E-01	3.91E-01	3.10E-03	-8.52E+00
WDP*	m^3	2.05E+00	2.07E-02	0.00E+00	7.71E-04	2.93E-02	1.57E-04	-4.28E-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.	5.26E+00	2.51E-01	0.00E+00	9.25E-03	1.40E+00	1.20E-04	-2.61E-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	1.29E+01	5.52E-02	0.00E+00	2.06E-03	1.28E-02	6.11E-05	-1.35E+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	1.29E+01	5.52E-02	0.00E+00	2.06E-03	1.28E-02	6.11E-05	-1.35E+01
PENRE	MJ	9.48E+01	3.78E+00	0.00E+00	1.39E-01	1.71E-01	3.29E-03	-8.62E+00
PENRM*	MJ.	1.97E+01	0.00E+00	0.00E+00	0.00E+00	-1.97E+01	0.00E+00	0.00E+00
PENRT	MJ	1.16E+02	3.78E+00	0.00E+00	1.39E-01	-1.95E+01	3.21E-03	-8.74E+00
SM	kg	1.12E-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^3	1.07E-01	8.13E-04	0.00E+00	3.03E-05	4.52E-04	3.93E-06	2.98E-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	3.90E-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	4.45E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	9.63E-02	0.00E+00	0.00E+00	0.00E+00	1.49E+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.	<10%
GWP-biogenic	kg CO_2 eq.	77%
GWP-luluc	kg CO_2 eq.	20%
GWP-total	kg CO_2 eq.	<10%
ODP	kg CFC 11 eq.	<10%
AP	mol H^+ eq.	<10%
EP-freshwater	kg P eq.	<10%
EP-marine	kg N eq.	<10%
EP-terrestrial	mol N eq.	<10%
POCP	kg NMVOC eq.	<10%
ADP-minerals&metals*	kg Sb eq.	<10%
ADP-fossil*	MJ	<10%
WDP*	m^3	<10%
GWP-GHG	kg CO2 eq.	<10%
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 SCW:	Fernco LCW:				
3110171	3110322	LC1325W	LC1730W	LC440W	LC630W
3110181	3110323	LC1365W	LC1750W	LC445W	LC650W
3110169	3110350	LC1370W	LC1765W	LC450W	LC655W
3110170	3110432	LC1375W	LC1790W	LC455W	LC660W
3110172	LC1000W	LC1400W	LC1800W	LC460W	LC670W
3110312	LC1010W	LC1410W	LC1815W	LC470W	LC675W
3110173	LC1020W	LC1425	LC1850W	LC475W	LC680W
3110174	LC1025W	LC1425W	LC1900W	LC480W	LC685WN
3110313	LC1045W	LC1460W	LC1925W	LC485W	LC690W
3110175	LC1065W	LC1465W	LC1955	LC490W	LC710W
3110176	LC1075W	LC1475W	LC1955W	LC495W	LC725W
3110177	LC1095W	LC1475WN	LC1960W	LC505W	LC730W
3110178	LC1100W	LC1485W	LC2000W	LC515W	LC735W
3110179	LC1115W	LC1500W	LC2025W	LC520W	LC740W
3110180	LC1135W	LC1515W	LC2065W	LC530W	LC760W
3110314	LC1135WN	LC1565W	LC2075W	LC535W	LC770W
3110182	LC1155W	LC1590W	LC2095W	LC540W	LC785WN
3110183	LC1165W	LC1595W	LC2175W	LC545W	LC860W
3110184	LC1175W	LC1600W	LC2195W	LC555W	LC910WN
3110185	LC1190W	LC1630W	LC2205W	LC560W	LC925W
3110186	LC1200W	LC1675W	LC2215W	LC570W	LC940W
3110187	LC1225W	LC1695W	LC2255W	LC575W	LC955W
3110315	LC1245W	LC1700W	LC2430W	LC585W	
3110188	LC1285W	LC1715W	LC2520W	LC590W	
3110189	LC1290W	LC1720W	LC2640W	LC595W	
3110190	LC1300W	LC1725W	LC435W	LC625W	

Fernco SC:					
3110100	3110126	3114290	3114316	3110344	3114341
3110101	3110127	3114291	3114317	3110404	3114342
3110102	3110128	3114292	3114318	3110320	3114343
3110103	3110129	3114293	3114319	3114328	3114344
3110104	3110130	3114294	3114320	3110345	3110350
3110105	3110131	3114295	3114321	3110322	3110352
3110106	3110132	3114296	3114322	3114329	3110359
3110107	3110133	3114297	3114323	3114333	3114345
3110108	3110134	3114298	3114324	3114330	
3110109	3110135	3114299	3114325	3114331	
3110110		3114300	3110364	3110419	
3110111	Fernco LC	3114301	3110365	3114332	
3110112	3114276	3114302	3110335	3114334	
3110113	3114277	3114303	3110367	3114335	
3110114	3114278	3114304	3110368	3110431	
3110115	3114279	3114305	3110338	3110432	
3110116	3114280	3114306	3110369	3110323	
3110117	3114281	3114307	3110339	3114336	
3110118	3114282	3114308	3110382	3110436	
3110119	3114283	3114309	3110340	3110324	
3110120	3114284	3114310	3110341	3110439	
3110121	3114285	3114311	3110342	3114337	
3110122	3114286	3114312	3114326	3114338	
3110123	3114287	3114313	3110336	3114339	
3110124	3114288	3114314	3114327	3114340	
3110125	3114289	3114315	3110343	3110325	

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