Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 for:
EPD of multiple products, based on the average results of the product group

Polarpipe®

From Extena

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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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
E-mail:	info@environdec.com

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) (1.3.2)*
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: *Moa Mellberg and Jesper Agerborn at 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: *David Althoff Palm, Dalemarken AB* 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:
Extena AB
Storlidenvägen 5, 935 93 Norsjö, Sweden

Contact:
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Description of the organisation:
Extena manufactures pipe systems at its factory in Norsjö and specializes in the extrusion of pipes in thermoplastics. Our product range includes pressure pipes made of PE100 RC, multilayer pipes, cable protection pipes, insulated pipes and special pipes for various purposes. Extena is part of the German group Egeplast.

Name and location of production site:
Storlidenvägen 5, 935 93 Norsjö, Sweden

Product information

Product name: Polarpipe®
Product description: Polarpipe® - insulated and frost-protected pipe system for water and sewage. Polarpipe® consisting of one or two standard pipes made of PE100 (OD 20-75 mm).
UN CPC code: 36320

Geographical scope:
The EPD is representative for the Swedish market.
Module A1 and A2 Material suppliers are European
Module A3 production is located in Sweden
Module C and D scenarios are for Sweden

LCA information

Declared unit: 1 kg pipe

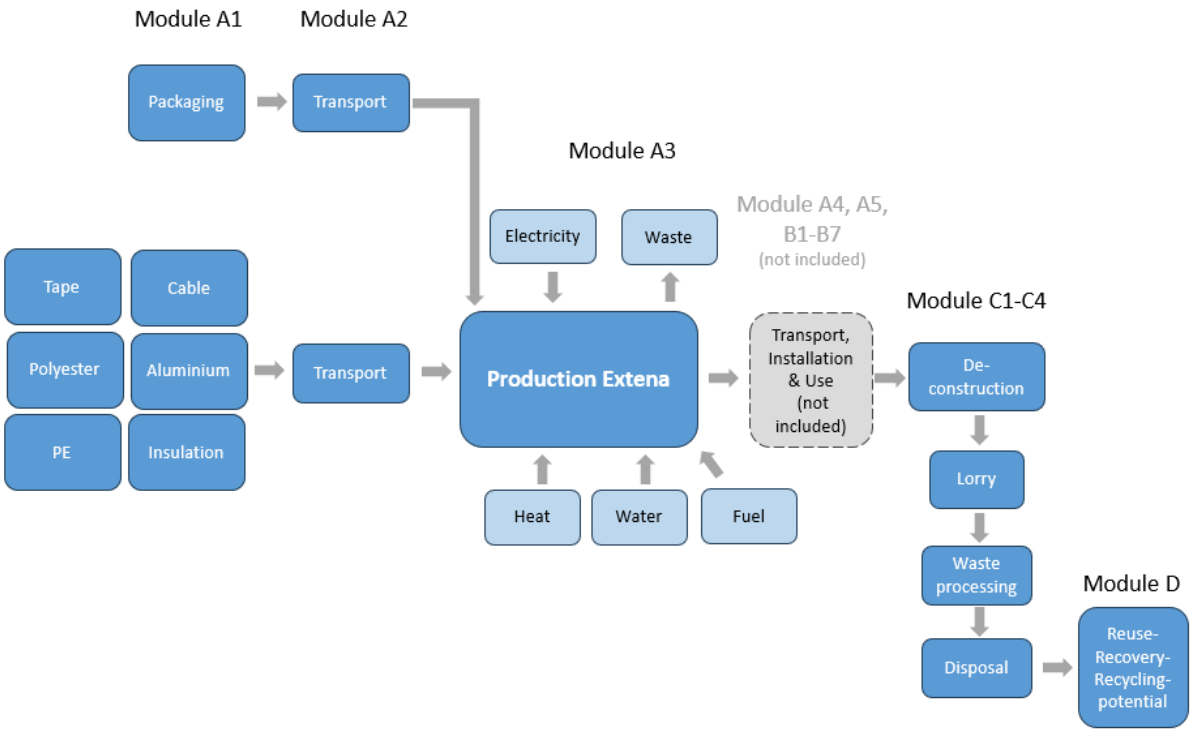
Reference service life: Not declared

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

Database 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. The assessment method used to determine the life cycle impact is EN 15804 +A2 V1.00 / EF 3.1 normalization and weighting set and Cumulative Energy demand and waste 1.11

Description of system boundaries:
Cradle-to-gate with modules C1–C4 and module D (A1–A3 + C + D)

System diagram:



Production
Materials used in the product:
- HD-PE: Main material, High-density polyethene (HD-PE) from English and Belgian suppliers.
- LD-PE: Low-density polyethene (LD-PE) Proactive sheath around the pipe
- Insulation: Polyurethane insulation from Finnish supplier.
- Polyester: Plastic foil from German supplier.
- Aluminium: Foil from Belgian supplier.
- Cable: Heating cable from American supplier.
- Tape: From Swedish supplier.

The raw materials are processed in the production facility in Sweden. The pipes are manufactured by extrusion of plastic granules. The factory processes are allocated to the products with mass allocation. The pipes are delivered with packaging materials to protect the goods from environmental elements during transport and storage at construction sites.

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.

Electricity data
Extena AB sources its electricity from Guarantee of Origin-certified provider. The company purchases electricity produced from renewable resources from Skellefteå Kraft. The energy mix purchased are

77% Hydro power, 20% wind power and 3% bio energy. 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 0.048 kgCO_2eq. per kWh (GWP-GHG).

Estimates and assumptions

- The excavation of the worn-out pipe is allocated to the installation of the new pipe that replace it, C1.
- The pipes is assumed to be transported 50 km, C2
- 95% of the pipes is assumed to go to energy recovery, C3
- 5% of the pipes is assumed to go to landfill, C4
- 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 and EPD's.

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 10% specific data in this EPD. Data is gathered from the actual manufacturing plant with product-specific processes, specific waste and spillage % and specific energy mix. For transportation in A2 specific transportation distances and transportation type is used as data..

Polarpipe® are consisting of one or two standard pipes made of PE100 (OD 20-75 mm), the quantity used in this study is per kg of pipe and is an average quantity based on the total quantity per year. This study includes all sizes of Polarpipe®. The distribution of the constituent materials per kg of pipe is relatively similar for all dimensions. The difference in climate impact (GWP-GHG) between the average dimension and other dimensions is - 13% to + 15% (smallest climate impact: dubble pipe OD 32/63, biggest climate impact: single pipe OD 20).

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	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	SE	ND	ND	ND	ND	ND	ND	ND	ND	ND	SE	SE	SE	SE	SE
Specific data used	10 % *			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	+15/-13 % (OD 20 / OD 32/63)			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-

*See Data quality

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight % and kg C/declared unit
Insulation	0.034 (0.045-0.073)	0.0 %	0.0 kg, 0.0 %
Plastic	0.86 (0.68-0.90)	0.0 %	0.0 kg, 0.0 %
Aluminium	0.006 (0.0023-0.010)	0.0 %	0.0 kg, 0.0 %
Electric component	0.10 (0.22-0.050)	0.0 %	0.0 kg, 0.0 %
TOTAL	1.00	0.0 %	0.0 kg, 0.0 %
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/declared unit**
Plastic	0.013	1.2 %	0.0 kg
TOTAL	0.013	1.2 %	0.0 kg

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

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

The results in parenthesis is the variation of results between the included products expressed as a percentage difference from the presented result. For indicators/modules without parenthesis the variation is < 10 %.

Results per kg							
Indicator	**Unit**	**A1-A3****	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3.18E+00 (+/-20%)	0.00E+00	9.17E-03	2.81E+00	1.72E-04	-2.56E-01
GWP-biogenic**	kg CO_2 eq.	0.00E+00	0.00E+00	8.40E-06	1.33E-04	5.31E-07	0.00E+00
GWP-luluc	kg CO_2 eq.	2.18E-02 (+/-31%)	0.00E+00	4.53E-06	6.08E-06	3.42E-08	-6.23E-03
GWP-total	kg CO_2 eq.	3.20E+00 (+/-20%)	0.00E+00	9.18E-03	2.81E+00	1.72E-04	-2.62E-01
ODP	kg CFC 11 eq.	3.80E-08 (+/-43%)	0.00E+00	2.00E+/-10	1.31E-09	6.06E-12	-5.49E-09
AP	mol H^+ eq.	5.18E-02 (+/-80%)	0.00E+00	2.00E-05	3.11E-04	1.09E-06	-2.50E-03
EP-freshwater	kg P eq.	4.00E-03 (+/-15%)	0.00E+00	6.52E-07	2.74E-06	8.10E-09	-6.69E-05
EP-marine	kg N eq.	4.36E-03 (+/-50%)	0.00E+00	5.06E-06	1.54E-04	4.76E-07	-8.93E-04
EP-terrestrial	mol N eq.	5.03E-02 (+/-54%)	0.00E+00	5.14E-05	1.64E-03	5.10E-06	-9.73E-03
POCP	kg NMVOC eq.	1.88E-02 (+/-54%)	0.00E+00	3.11E-05	4.42E-04	2.05E-06	-2.84E-03
ADP-minerals&metals*	kg Sb eq.	5.27E-04 (+/-98%)	0.00E+00	3.00E-08	3.78E-08	1.85E-10	-1.28E-06
ADP-fossil*	MJ	9.01E+01	0.00E+00	1.30E-01	1.23E-01	4.43E-03	-1.13E+01
WDP*	m^3	2.61E+00 (+/-23%)	0.00E+00	7.65E-04	2.12E-02	2.24E-04	-2.59E-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 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.
**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**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	3.20E+00 (+/-15%)	0.00E+00	9.17E-03	2.81E+00	1.72E-04	-2.62E-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**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	8.21E+00	0.00E+00	2.05E-03	7.33E-03	8.74E-05	-1.33E+01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	8.21E+00	0.00E+00	2.05E-03	7.33E-03	8.74E-05	-1.33E+01
PENRE	MJ	9.61E+01	0.00E+00	1.38E-01	1.32E-01	4.72E-03	-1.14E+01
PENRM	MJ.	2.88E+01	0.00E+00	0.00E+00	-2.69E+01	-8.43E-01	0.00E+00
PENRT	MJ	1.25E+02	0.00E+00	1.38E-01	-2.68E+01	-8.39E-01	-1.14E+01
SM	kg	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	4.25E+01	0.00E+00	1.62E-02	7.58E-02	6.45E-04	-5.50E+01
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

[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**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	6.70E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	1.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	5.06E-08	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**	**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
Material for recycling	kg	2.40E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	3.96E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	1.05E-02	0.00E+00	0.00E+00	7.07E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	3.50E-02	0.00E+00	0.00E+00	2.37E+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

References

EcoInvent (2023). EcoInvent 3.9.1. https://ecoinvent.org/the-ecoinvent-database/data-releases/ecoinvent-3-9-1/

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