epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Component EPD Ringebu: Extruded PE pipe systems from Ringebu - used as material component in various finished mixed products



PIPELIFE

The Norwegian EPD Foundation

Owner of the declaration:
Pipelife Norge AS

Product:
Component EPD Ringebu: Extruded PE pipe systems from Ringebu - used as material component in various finished mixed products

Declared unit:
1 kg

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR Part A: Construction products and services. Ver. 2.0 March 2021

Program operator:
The Norwegian EPD Foundation

Declaration number:

Registration number:

Issue date:

Valid to:

EPD software:
LCAno EPD generator ID: 429099

General information

Product

Component EPD Ringebu: Extruded PE pipe systems from Ringebu - used as material component in various finished mixed products

Owner of the declaration:

Pipelife Norge AS
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Program operator:

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Manufacturer:

Pipelife Norge AS
Hamnesvegen 97
6650 Surnadal, Norway

Declaration number:

Place of production:

Pipelife Norge AS - Ringebu
Flyplassvegen 16
2630 Ringebu, Norway

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR Part A: Construction products and services. Ver. 2.0 March 2021

Management system:

NS-EN ISO 9001:2015 NS-EN ISO 14001:2015

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Organisation no:

980 457 575

Declared unit:

1 kg Component EPD Ringebu: Extruded PE pipe systems from Ringebu - used as material component in various finished mixed products

Issue date:

Declared unit (cradle to gate) with option:

A1-A3,A4,A5,C1,C2,C3,C4,D

Valid to:

Year of study:

2022

Functional unit:

Not applicable

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804+A2 and seen in a construction context.

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway. NEPDT15

Developer of EPD: Diana Karin Schleider

Reviewer of company-specific input data and EPD: Are Lyubråten

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Approved:

Third party verifier:

Michael M. Jenssen, Asplan Viak AS

(no signature required)

Product

Product description:

PE 100 pipes, fittings and chambers made from PE 100 pipes for water supply and sewers under pressure; non-pressure drains, sewers, surface water piping systems and jacket pipes (smooth casings), as well as HDPE pipes for cable protection, jacket pipes (corrugated casings) and fiber cable pipes.
The colours are according to the product standards and the colour codes for these applications in Norway.
This EPD covers both finished products and products as material components, intended for use in various finished mixed products as e.g. flexible piping systems with or without integrated frost protection, pre-insulated piping systems, etc..
More information is found on www.pipelife.no

Product specification

The products covered by this EPD have small variations in composition and are manufactured with the same type of equipment. The composition below represents an average for these products manufactured in 2022.

Materials	kg	%
Polyethylene (HDPE)	0,93	99,96
Tape	0,00	0,04
Total	0,93	100,00

Packaging	kg	%
Packaging - Plastic	0,02	29,24
Packaging - Wood	0,05	70,76
Total incl. packaging	1,00	100,00

Technical data:

For products covered by this EPD the following applies:
Products used as media pipes for water supply, sewers, drains and surface water fullfill the requirements in accordance with EN 12201 (Nordic Poly Mark). Pipes intended for drinking water are also approved according to the Danish requirements (DK-VAND).
Single-walled corrugated pipes for land drainage fullfill the requirements in accordance with NS 3065 (NS marking).
Double-walled corrugated pipes in coils used for cable protection fullfill the requirements in accordance with NEK-EN 61386-1 and -24.
Smooth-walled pipes used for fiber cables fullfill the requirements in accordance with prNS 2967.
For technical information, see our handbook:
https://www.pipelife.no/content/dam/pipelife/norway/marketing/general/r%C3%B8rh%C3%A5ndboka/r%C3%B8rh%C3%A5ndboka2021/M-Materialdata.pdf

Market:

Mainly Norway, but also the Nordic countries.

Reference service life, product

When installed according to the relevant installation manual, used according to product spesifications and having normal operations, the service lifetime is at least 100 years.

Reference service life, building

Not relevant

LCA: Calculation rules

Declared unit:

1 kg Component EPD Ringebu: Extruded PE pipe systems from Ringebu - used as material component in various finished mixed products

Cut-off criteria:

All raw materials and all the essential energy are included.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and waste production in-house is allocated equally among all products manufactured at Ringebu from raw materials, through mass allocation. The Ringebu factory has its own water supply. Water is not consumed, it is used for cooling and then returned to natural flows. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

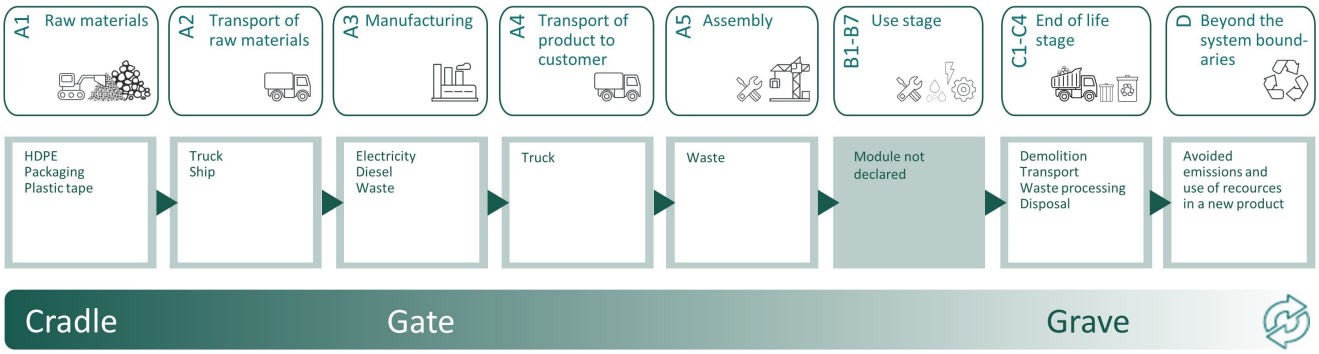
Materials	Source	Data quality	Year
Packaging - Plastic	ecoinvent 3.6	Database	2019
Packaging - Wood	ecoinvent 3.6	Database	2019
Polyethylene (HDPE)	ecoinvent 3.6	Database	2019
Tape	ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:

The analysis is a cradle-to-gate (A1 - A3) study, with option A4 transport to market. It includes the extraction and production of raw materials, transportation to the production site, the production process itself and transport to the market. A5, installation, is included for the transport of packaging waste from the construction site and the treatment of this waste - not the installation of the products.



Additional technical information:

Professionally executed design, storage, handling, installation and operations are a precondition for a long service life. The installation instructions must be followed.
Pipelife Norway AS is certified according to EN ISO 14001:2015
See www.pipelife.no for more information on how we are working on environmental issues.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	100	0,043	l/tkm	4,30

Assembly (A5)	Unit	Value			
Waste, hazardous waste, to average treatment (kg)	kg	0,00			
Waste, packaging, plastic film (LDPE), to average treatment - A5 including transport (kg)	kg	0,02			
Waste, packaging, wood to average treatment - A5 including transp. (kg)	kg	0,05			

Waste processing (C3)	Unit	Value			
Waste treatment of polyethylene (PE), incineration with energy recovery and fly ash extraction (kg)	kg	0,46			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Polyethylene (PE), process per kg ashes and residues (kg)	kg	0,02			
Landfilling of plastic mixture (kg)	kg	0,46			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity, in Norway (MJ)	MJ	0,90			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	13,63			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact										
	Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	2,03E+00	1,63E-02	7,94E-02	0	0	1,40E+00	5,40E-02	-8,19E-02
	GWP-fossil	kg CO_2 -eq	2,09E+00	1,63E-02	3,21E-03	0	0	1,40E+00	5,40E-02	-7,90E-02
	GWP-biogenic	kg CO_2 -eq	-6,38E-02	6,76E-06	7,62E-02	0	0	1,13E-05	5,21E-06	-1,63E-04
	GWP-luluc	kg CO_2 -eq	1,09E-03	5,81E-06	8,82E-07	0	0	1,66E-06	1,17E-06	-2,72E-03
	ODP	kg CFC11 -eq	7,41E-08	3,70E-09	3,36E-10	0	0	1,07E-09	1,55E-09	-5,76E-03
	AP	mol H+ -eq	8,12E-03	4,69E-05	1,33E-05	0	0	1,75E-04	3,91E-05	-6,51E-04
	EP-FreshWater	kg P -eq	3,97E-05	1,31E-07	2,58E-08	0	0	1,07E-07	5,99E-08	-7,02E-06
	EP-Marine	kg N -eq	1,47E-03	9,29E-06	6,58E-06	0	0	8,42E-05	6,90E-05	-2,13E-04
	EP-Terrestial	mol N -eq	1,64E-02	1,04E-04	5,80E-05	0	0	9,11E-04	1,54E-04	-2,30E-03
	POCP	kg NMVOC -eq	7,39E-03	3,98E-05	1,55E-05	0	0	2,18E-04	5,51E-05	-6,35E-04
	ADP-minerals&metals[1]	kg Sb-eq	2,31E-05	4,51E-07	3,15E-08	0	0	4,91E-08	4,01E-08	-7,86E-07
	ADP-fossil[1]	MJ	6,97E+01	2,47E-01	2,38E-02	0	0	9,17E-02	1,15E-01	-1,13E+00
	WDP[1]	m^3	2,04E+02	2,39E-01	5,21E-02	0	0	2,08E-01	9,86E-01	-1,41E+01

GWP-total = Global Warming Potential total; 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

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Remarks to environmental impacts

Mechanical recycling of PE is very sustainable and in line with the circular economy. Scrap and used products should be collected for recycling.

Additional environmental impact indicators										
Indicator		**Unit**	A1-A3	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	7,12E-08	1,00E-09	1,76E-10	0	0	6,88E-10	7,66E-10	-3,94E-08
	IRP[2]	kgBq U235 -eq	6,56E-02	1,08E-03	9,23E-05	0	0	1,55E-04	5,54E-04	-7,22E-03
	ETP-fw[1]	CTUe	1,54E+01	1,83E-01	2,94E-02	0	0	2,74E-01	1,43E-01	-6,15E+00
	HTP-c[1]	CTUh	7,05E-10	0,00E+00	2,00E-12	0	0	3,10E-11	4,00E-12	-1,12E-10
	HTP-nc[1]	CTUh	1,69E-08	2,00E-10	1,05E-10	0	0	1,18E-09	1,10E-10	-5,89E-09
	SQP[1]	dimensionless	6,71E+00	1,73E-01	2,22E-02	0	0	1,11E-02	4,26E-01	-7,56E+00

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Resource use										
Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	1,17E+01	3,54E-03	7,96E-04	0	0	2,69E-03	5,41E-03	-6,98E+00
	PERM	MJ	6,98E-01	0,00E+00	-6,98E-01	0	0	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,24E+01	3,54E-03	-6,97E-01	0	0	2,69E-03	5,41E-03	-6,98E+00
	PENRE	MJ	3,22E+01	2,47E-01	2,38E-02	0	0	9,17E-02	1,15E-01	-1,13E+00
	PENRM	MJ	4,03E+01	0,00E+00	-8,76E-01	0	0	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	7,25E+01	2,47E-01	-8,52E-01	0	0	9,17E-02	1,15E-01	-1,13E+00
	SM	kg	3,30E-04	0,00E+00	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	7,65E-02	1,26E-04	1,74E-05	0	0	7,59E-05	1,14E-04	-1,22E-03
	NRSF	MJ	3,06E-02	4,52E-04	1,56E-04	0	0	0,00E+00	1,83E-03	-4,14E-01
	FW	m^3	9,58E-02	2,64E-05	1,60E-05	0	0	2,59E-04	1,40E-04	-8,41E-03

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 resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	HWD	kg	1,07E-02	1,27E-05	1,94E-04	0	0	0,00E+00	1,39E-02	-5,31E-05
	NHWD	kg	1,70E-01	1,20E-02	7,06E-02	0	0	0,00E+00	4,73E-01	-2,67E-02
	RWD	kg	5,70E-05	1,68E-06	5,80E-09	0	0	0,00E+00	7,52E-07	-5,92E-06

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	8,26E-02	0,00E+00	1,06E-02	0	0	0,00E+00	4,17E-05	0,00E+00
	MER	kg	3,10E-02	0,00E+00	5,00E-02	0	0	4,65E-01	1,02E-06	0,00E+00
	EEE	MJ	2,63E-02	0,00E+00	3,47E-02	0	0	9,01E-01	6,61E-05	0,00E+00
	EET	MJ	3,97E-01	0,00E+00	5,25E-01	0	0	1,36E+01	1,00E-03	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	2,08E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Source	Amount	Unit
Electricity, Norway (kWh)	ecoinvent 3.6	24,33	g CO2-eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

Not relevant

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products									
Indicator	**Unit**	A1-A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	2,00E+00	1,63E-02	3,17E-03	0	0	1,40E+00	5,40E-02	-8,07E-02

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Bibliography

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ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.
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