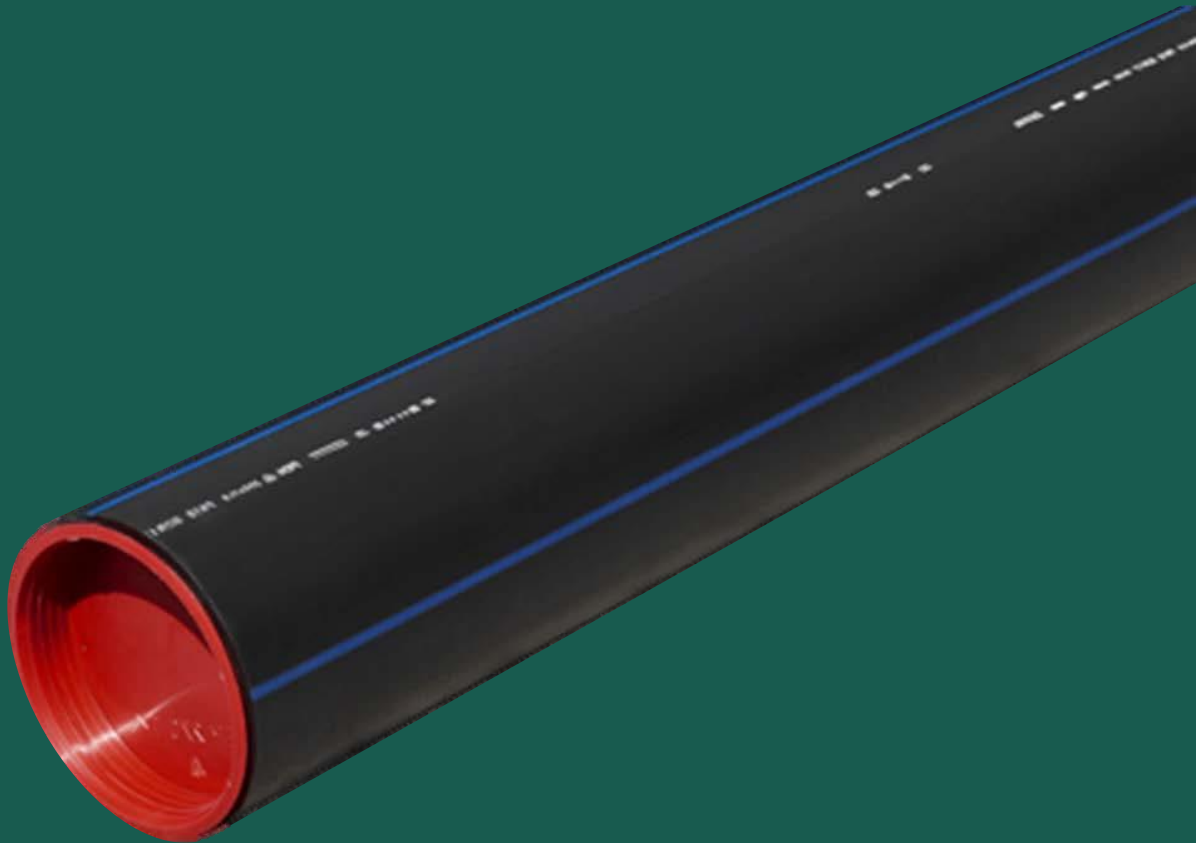


Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A2



Owner of the declaration:
Norsk Wavin AS

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-3586-2251-EN

Registration Number:
NEPD-3586-2251-EN

Issue date: 16.08.2022
Valid to: 16.08.2027

PE100/PE100 RC

PE100/PE100 RC are Wavin's pressure pipe systems made with black color with blue stripes. Wavin pressure pipe systems made of PE100 and PE100 RC have proven themselves around the world to be effective and economical systems for supplying potable water and gas, as well as for waste water pressure discharge.

Manufacturer
AB Svenska Wavin

General information

Product:

PE100 / PE100 RC Pipe; PN 6,3, 10, 16, 20; SDR 9, 11, 17, 26 black (BK) with blue (BL) or brown (BR) stripes

Program Operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Tlf: +47 23 08 80 00
e-mail: post@epd-norge.no

Declaration Number:

NEPD-3586-2251-EN

This declaration is based on Product

Category Rules:

CEN standard EN 15804:2012+A2:2019 serves as core PCR, supplied with NPCR Part A and NPCR Part B, Version 2.0.

Statements:

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

Declared unit:

1 kg PE100/PE100RC Pipe BK/BL

Declared unit with option:

A1,A2,A3,A4,A5,C1,C2,C3,C4,D

Functional unit:

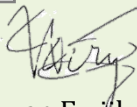
Not applicable.

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

internal ☐

external ☒



Harry van Ewijk, SGS Search

Independent verifier approved by EPD Norway

EPD for the best environmental decision

Owner of the declaration:

Norsk Wavin AS
Contact person: Matteo Tagliaferri
Phone: +31 623193684
e-mail: matteo.tagliaferri@wavin.com

Manufacturer:

AB Svenska Wavin
Kjulamon 6, 635 06, Eskilstuna, Sweden
Phone: +46 (0) 16 541 00 00
e-mail: kundservice.se@wavin.com

Place of production:

Kjulamon 6, 635 06, Eskilstuna, Sweden

Management system:

EN ISO 9001:2015 and EN ISO 14001:2015

Organization no:

823355092

Issue date:

16.08.2022

Valid to:

16.08.2027

Year of study:

2020

Comparability:

EPDs from other programmes than the Norwegian EPD foundation may not be comparable.

The EPD has been worked out by:

Lisa Overmars and Emma Thunnissen,
Ecochain Technologies



Approved (Manager of EPD Norway)

Product

Product description:

PE100 and PE100 RC are Wavin's pressure pipe systems for transport of potable water and gas, as well as for waste water pressure discharge. The PE material ensures flexibility, and the pipes are thus easy to handle, even in large dimensions. At the same time, the flexibility means that the pipes follow the movements of the earth, prolonging its life. The color is black with blue stripes. PE100 is distinguished by:

- Great wear and tear resistance
- High corrosion resistance
- Slight friction due to the smooth inside

The abbreviation "RC" in the designation PE100 RC stands for "Resistance to Crack" and describes the pipe materials resistance to the formation of slow-growing cracks.

Product specification:

A typical composition of the pipes covered by this EPD is as follows:

Materials	%
PE	99,6%
Packaging	0,4%

The physical properties of the pipes covered in this EPD are:

- Pipe material: Polyethylene (PE)
- Density $\sim 950 \text{ kg/m}^3$
- E-Modul $\sim 1.100 \text{ Mpa}$
- Elongation at break $\sim > 600\%$
- Permitted elongation $\sim 2,5\text{-}5\%$
- Linear expansion coefficient $\sim 0,17 \text{ mm/mx}^\circ\text{C}$
- Thermal Conductivity: $0,43 \text{ W / mK}$

The color of the pipe is black (BK) with blue (BL) or brown (BR) stripes.

Technical data:

The declared unit of this EPD is 1 kg PE100 Pipe. The results per kg are based on the product 'PE100 Pipe BK/BL 160 PN10 SDR17 L=12' ('base product'). The number 160 in the product name refers to the diameter, which is equal to 160 mm. It follows that the pipe diameters can be derived from the product names by taking the number after the colour abbreviations.

The table below provides the products covered with this EPD. The selected base product is representative for all products described in this table; deviations of the LCA results of the other products compared to the base product are not more than 10%.

The list below provides the mass per 1 meter pipe (including packaging). These masses should be used to calculate the LCA results per 1 meter pipe, by multiplying the results of all modules, except 'A5 – installation only' presented on page 10-13, with the weight specified below. The

LCA results of 'A5 – installation' should be calculated from the LCA results presented on pages 8-9 under 'additional technical information'.

Product	Mass (kg/meter)	Product	Mass (kg/meter)
PE100 RC Pipe BK/BL 20 SDR11 L= 25	0,12	PE100 Pipe BK/BL 180 PN16 SDR11 L=12	8,52
PE100 RC Pipe BK/BL 20 SDR11 L=100	0,12	PE100 RC Pipe BK/BL 180 PN16 SDR11 L=12	8,52
PE100 RC Pipe BK/BL 20 SDR11 L= 10	0,12	PE100 Pipe BK/BL 180 PN16 SDR11 L=6	8,52
PE100 RC Pipe BK/BL 20 SDR11 L= 50	0,12	PE100 RC Pipe BK/BL 180 PN16 SDR11 L=6	8,52
PE100 RC Pipe BK/BL 20 SDR11 L=300	0,12	PE100 Pipe BK/BR 200 PN10 SDR17 L=12	7,06
PE100 RC Pipe BK/BL 25 SDR11 L= 10	0,17	PE100 Pipe BK/BL 200 PN10 SDR17 L=12	7,12
PE100 RC Pipe BK/BL 25 SDR11 L= 25	0,17	PE100 Pipe BK/BL 200 PN10 SDR17 L=6	7,12
PE100 RC Pipe BK/BL 25 SDR11 L=300	0,17	PE100 Pipe BK/BL 200 PN16 SDR11 L=12	10,50
PE100 RC Pipe BK/BL 25 SDR11 L=100	0,17	PE100 Pipe BK/BR 200 PN16 SDR11 L=12	10,50
PE100 RC Pipe BK/BL 25 SDR11 L= 50	0,17	PE100 Pipe BK/BL 200 PN16 SDR11 L=6	10,51
PE100 RC Pipe BK/BL 32 SDR11 L=300	0,28	PE100 Pipe BK/BL 225 PN6,3 SDR26 L=6	5,95
PE100 RC Pipe BK/BL 32 SDR11 L=25	0,28	PE100 Pipe BK/BR 225 PN10 SDR17 L=12	9,02
PE100 RC Pipe BK/BL 32 SDR11 L=100	0,28	PE100 Pipe BK/BL 225 PN10 SDR17 L=12	9,03
PE100 RC Pipe BK/BL 32 SDR11 L=50	0,28	PE100 Pipe BK/BL 225 PN10 SDR17 L=6	9,03
PE100 RC Pipe BK/BL 32 SDR11 L=10	0,28	PE100 Pipe BK/BL 225 PN16 SDR11 L=12	13,29
PE100 RC Pipe BK/BL 40 SDR11 L=25	0,43	PE100 RC Pipe BK/BL 225 PN16 SDR11 L=12	13,29
PE100 RC Pipe BK/BR 40 SDR11 L=150	0,43	PE100 Pipe BK/BL 225 PN16 SDR11 L=6	13,30
PE100 RC Pipe BK/BL 40 SDR11 L=150	0,43	PE100 Pipe BK/BR 250 PN6,3 SDR26 L=12	7,36
PE100 RC Pipe BK/BL 40 SDR11 L=50	0,43	PE100 Pipe BK/BL 250 PN10 SDR17 L=12	11,06
PE100 RC Pipe BK/BL 50 SDR11 L=150	0,67	PE100 Pipe BK/BR 250 PN10 SDR17 L=12	11,06
PE100 RC Pipe BK/BR 50 SDR11 L=150	0,67	PE100 Pipe BK/BL 250 PN10 SDR17 L=6	11,07
PE100 RC Pipe BK/BL 50 SDR11 L= 50	0,67	PE100 Pipe BK/BL 250 PN16 SDR11 L=12	16,35
PE100 RC Pipe BK/BL 63 SDR11 L=150	1,05	PE100 Pipe BK/BR 250 PN16 SDR11 L=12	16,35
PE100 RC Pipe BK/BR 63 SDR11 L=150	1,05	PE100 RC Pipe BK/BL 250 PN16 SDR11 L=12	16,35
PE100 RC Pipe BK/BL 63 SDR11 L= 50	1,05	PE100 Pipe BK/BL 250 PN16 SDR11 L=6	16,36
PE100 RC Pipe BK/BL 75 SDR11 L=75	1,47	PE100 Pipe BK/BL 250 PN20 SDR9 L=12	19,59
PE100 Pipe BK/BL 90 PN16 SDR11 L=6	2,14	PE100 Pipe BK/BL 280 PN10 SDR17 L=12	13,90
PE100 Pipe BK 110 PN10 SDR17 L=6	2,17	PE100 Pipe BK/BR 280 PN10 SDR17 L=12	13,90
PE100 Pipe BK/BL 110 PN10 SDR17 L=12	2,18	PE100 Pipe BK 280 PN10 SDR17 L=12	13,90
PE100 Pipe BK/BR 110 PN10 SDR17 L=12	2,18	PE100 Pipe BK/BL 280 PN16 SDR11 L=12	20,50
PE100 Pipe BK/BL 110 PN16 SDR11 L=12	3,17	PE100 Pipe BK/BL 315 PN10 SDR17 L=18	17,59
PE100 RC Pipe BK/BL 110 PN16 SDR11 L=12	3,17	PE100 Pipe BK/BL 315 PN10 SDR17 L=12	17,60
PE100 Pipe BK/BL 110 PN16 SDR11 L=6	3,18	PE100 Pipe BK/BR 315 PN10 L=12	17,60
PE100 Pipe BK/BR 110 PN16 SDR11 L=12	3,18	PE100 Pipe BK/BR 315 PN10 SDR17 L=6	17,61
PE100 Pipe BK/BR 125 PN6,3 SDR26 L=12	1,85	PE100 Pipe BK/BL 315 PN16 SDR11 L=12	25,94
PE100 Pipe BK/BR 125 PN10 SDR17 L=12	2,77	PE100 Pipe BK 315 PN16 SDR11 L=12	25,94
PE100 Pipe BK/BL 125 PN10 SDR17 L=12	2,78	PE100 Pipe BK/BL 315 PN16 SDR11 L=6	25,97
PE100 Pipe BK/BL 125 PN16 SDR11 L=12	4,14	PE100 Pipe BK/BL 355 PN10 SDR17 L=12	22,40
PE100 Pipe BK/BL 125 SDR11 L=6	4,15	PE100 Pipe BK/BR 355 PN10 SDR17 L=12	22,40
PE100 Pipe BK/BR 140 PN10 SDR17 L=12	3,49	PE100 Pipe BK/BL 355 PN10 SDR17 L=6	22,42
PE100 Pipe BK/BL 140 PN10 SDR17 L=12	3,51	PE100 Pipe BK/BR 355 PN10 SDR17 L=6	22,42
PE100 Pipe BK/BL 140 PN16 SDR11 L=6	5,14	PE100 Pipe BK/BL 355 PN16 SDR11 L=12	32,93
PE100 Pipe BK 160 PN6,3 SDR26 L=12	3,06	PE100 Pipe BK/BR 400 PN6,3 SDR26 L=12	18,75
PE100 Pipe BK 160 PN10 SDR17 L=12	4,55	PE100 Pipe BK/BL 400 PN10 SDR17 L=12	28,31

PE100 Pipe BK/BL 160 PN10 SDR17 L=12	4,56	PE100 Pipe BK/BR 400 PN10 SDR17 L=12	28,31
PE100 Pipe BK/BR 160 PN10 SDR17 L=12	4,56	PE100 Pipe BK/BL 400 PN10 SDR17 L=6	28,33
PE100 Pipe BK/BL 160 PN10 SDR17 L=6	4,56	PE100 RC Pipe BK/BL 400 PN16 SDR11 L=12	41,81
PE100 Pipe BK 160x9,5 PN10 SDR17 L=6	4,56	PE100 Pipe BK/BL 450 PN10 SDR17 L=12	35,86
PE100 Pipe BK/BR 160 PN16 SDR11 L=12	6,74	PE100 Pipe BK/BL 450 PN16 SDR11 L=12	52,95
PE100 RC Pipe BK/BL 160 PN16 SDR11 L=12	6,74	PE100 Pipe BK/BL 500 PN10 SDR17 L=12	44,31
PE100 Pipe BK/BL 160 PN16 SDR11 L=12	6,74	PE100 Pipe BK/BR 500 PN10 SDR17 L=12	44,31
PE100 Pipe BK/BL 160 PN16 SDR11 L=6	6,76	PE100 Pipe BK/BL 500 PN16 SDR11 L=12	65,33
PE100 Pipe BK/BL 180 PN10 SDR17 L=12	5,77	PE100 Pipe BK/BL 560 PN10 SDR17 L=12	55,51
PE100 Pipe BK/BR 180 PN10 SDR17 L=12	5,77	PE100RC TS Pipe BL 560 SDR17 L=12	55,51
PE100 Pipe BK/BL 180 PN10 SDR17 L=6	5,77	PE100 Pipe BK 560 PN10 SDR17 L=6	55,61
PE100 Pipe BK/BR 180 PN10 SDR17 L=6	5,77	PE100 Pipe BK/BR 630 PN10 SDR17 L=12	70,31
PE100 Pipe BK/BR 180 PN16 SDR11 L=12	8,51	PE100 Pipe BK/BL 710 PN10 SDR17 L=22	89,32

Market:

Europe, but the EPD is specific for Nordic countries.

Reference service life, product:

Lifetime on product calculated more than 100 year.

Reference service life, building:

Equal to building service life.

LCA: Calculation rules

Declared unit:

1 kg PE100/PE100RC Pipe

Data quality:

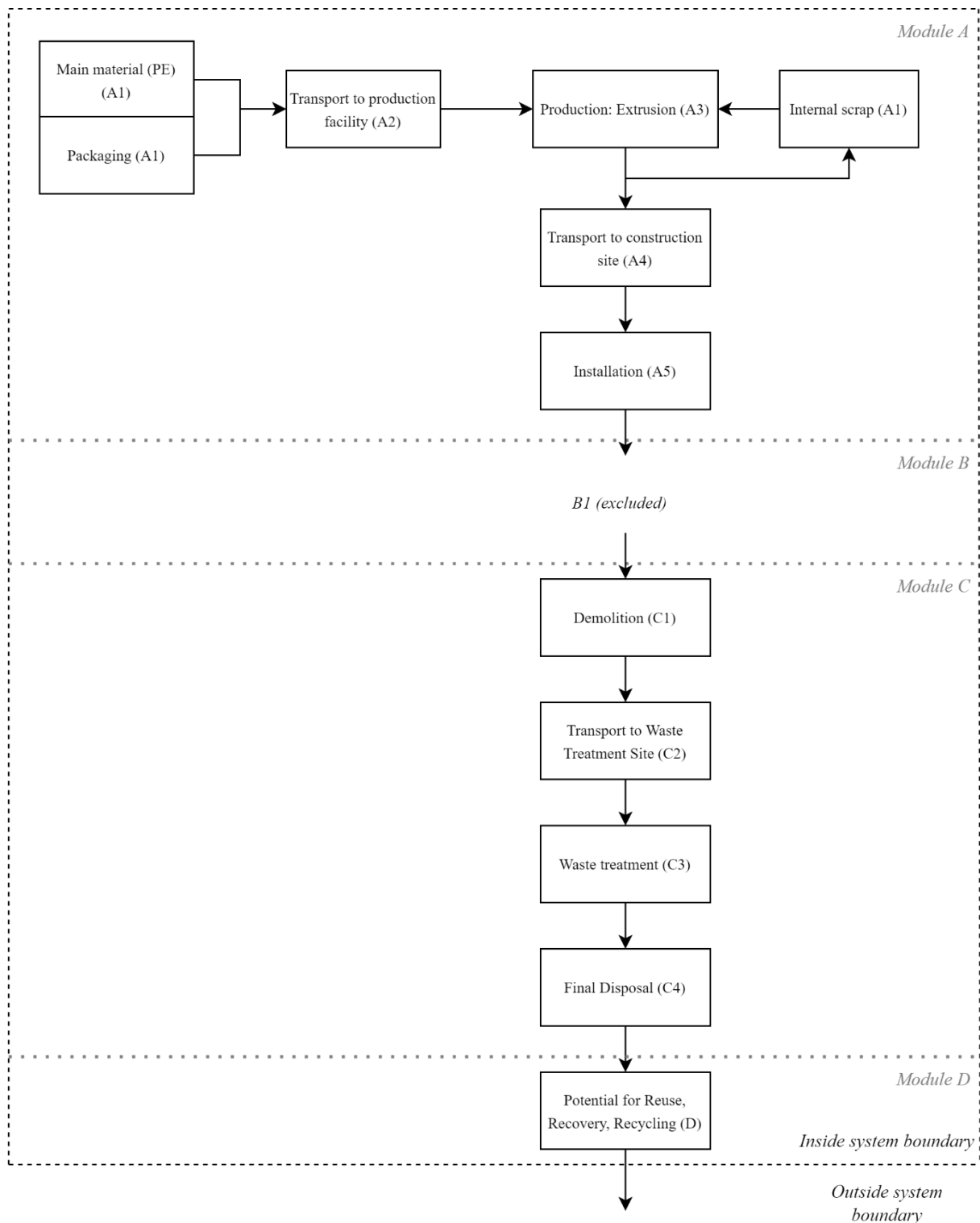
For module A1, specific data for product compositions as provided by the manufacturer are used. For module A2, transportation data of the raw materials used to the production site was collected. For module A3, energy consumption and waste production data was collected for production year 2020. The used background processes are derived from Ecoinvent 3.6.

Allocation:

Allocation was carried out in accordance with the provisions of the EN15804. All manufacturing inputs (energy and auxiliary materials) at production site level are allocated to different production processes, followed by allocation of the production processes to the products that are produced using these processes through mass allocation. No secondary materials have been used in the production process.

System boundary:

Modules A1-A5 and C1-D are included. The figure below shows a (simplified) process tree.



Cut-off criteria:

All relevant inputs and outputs - like emissions, energy and materials - have been taken into account in this LCA. In accordance with EN15804, the total neglected input flows per module does not exceed 5% of energy usage and mass.

LCA: Scenarios and additional technical information

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

Transport from production place to assembly/user (A4)

The transportation distance from Eskilstuna to Oslo was considered.

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption
Truck	50%	Unspecified	422	0,027 l diesel/tkm

Assembly (A5)

Product losses of 5% are considered. This product is used underground, therefore use of an excavator, soil transport, and a gravel foundation are necessary. For the foundation, gravel is used; this gravel is assumed to be transported for 150 km. The excavation of the soil is performed with a hydraulic digger. It is assumed that most of the soil is backfilled; however, the soil replaced by the gravel foundation and the pipe is assumed to be transported elsewhere (150 km). The compaction of the soil is considered negligible. The dimensions of the trench are dependent on the diameter of the pipe; for this reason, different scenarios were devised.

	Unit	Value
Material loss	kg	0,05
Packaging waste	kg	0,0037

	Unit	Installation <225 mm diameter pipe	Installation 225-355 mm diameter pipe	Installation 355-710 mm diameter pipe
Energy consumption of excavated volume	l/tonne excavated (diesel)	0.07	0.07	0.07
Excavated mass, total	kg	853.13	1517.20	4454.19
Excavated mass transported to deposite	kg	267.02	454.46	1214.84
Transport distance from construction site	km	150.00	150.00	150.00
Refilling mass (dirt + gravel foundation)	kg	754.85	1293.59	3620.05
Transport distance for refilling mass to construction site	km	150.00	150.00	150.00
Energy used for compaction	kWh or l/tonne compacted	-	-	-

End of Life (C1, C3, C4)

For the end-of life, it is assumed that the pipes are left in the ground after use. Therefore, there is no data input for the end-of-life (C1, C3, C4).

Transport to waste processing (C2)

As it is assumed that the pipes are left in the ground after use, there is no transport to waste processing (C2).

Benefits and loads beyond the system boundaries (D)

Module D contains the benefits and loads of energy recovery from incineration and recycling of the packaging materials and product losses. For the product losses, the considered waste treatment is 70% recycling, 20% incineration and 10% landfill. For the PE, 0,67 kg of saved virgin PE was considered per kg material recycled. The benefits from exported energy were calculation from the energy efficiencies for Northern countries reported by CEWEP, which is equal to an electrical efficiency of 11,0%, and a thermal efficiency of 72,6%. Substitution of Norwegian electricity mix and district heating mix was assumed.

	Unit	Value
Saving of virgin PE	kg	0,023
Substitution of electric energy	MJ	0,06
Substitution of thermal energy	MJ	0,40

Additional technical information

Although most of this EPD can be scaled with the weight of the pipe, this is not the case for module A5, which scales with the length and the diameter of the pipe. For each applicable diameter, a scenario for installation of 1 meter pipe was established. The results of these scenarios per meter pipe are described in the tables below.

To calculate the results for a specific product, the masses of the pipes per meter as described on page 4-5 (under technical data) should be used to calculate the LCA results per 1 meter pipe, combined with the data in the tables below. This should be done by multiplying the LCA results presented on page 10-13 of all modules, except 'A5 – installation only' with the mass per meter. The LCA results of A5 – installation should be calculated from the LCA results presented in the tables below.

Impact Category/Parameter	Installation <225 mm diameter	Installation 225-355 mm diameter	Installation 355-710 mm diameter
GWP-total	6.40E+00	5.16E+00	1.98E+01
GWP-fossil	6.39E+00	5.14E+00	1.98E+01
GWP-biogenic	1.14E-02	1.33E-02	2.86E-02
GWP-LULUC	2.28E-03	1.80E-03	6.72E-03
ODP	1.44E-06	1.14E-06	4.47E-06
AP	3.97E-02	3.47E-02	1.26E-01
EP-freshwater	5.87E-05	5.02E-05	1.73E-04
EP-marine	1.45E-02	1.30E-02	4.71E-02
EP-terrestrial	1.61E-01	1.45E-01	5.20E-01
POCP	4.55E-02	4.05E-02	1.47E-01
ADP-M&M	1.78E-04	1.47E-04	5.09E-04
ADP-fossil	9.79E+01	7.85E+01	3.01E+02
WDP	6.35E-01	6.95E-01	1.65E+00
PM	6.96E-07	6.62E-07	2.30E-06
IRP	4.60E-01	3.86E-01	1.39E+00

ETP-fw	8.06E+01	6.48E+01	2.44E+02
HTP-c	3.14E-09	2.71E-09	9.52E-09
HTP-nc	9.51E-08	7.56E-08	2.86E-07
SQP	8.49E+01	6.68E+01	2.47E+02
RPEE	3.01E+00	3.30E+00	7.82E+00
RPEM	0.00E+00	0.00E+00	0.00E+00
TPE	3.01E+00	3.30E+00	7.82E+00
NRPE	1.04E+02	8.32E+01	3.20E+02
NRPM	0.00E+00	0.00E+00	0.00E+00
TRPE	1.04E+02	8.32E+01	3.20E+02
SM	0.00E+00	0.00E+00	7.82E+00
RSF	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	0.00E+00
W	2.51E-01	3.37E-01	0.00E+00
HW	3.04E-05	2.03E-04	5.74E-01
NHW	3.78E-01	3.70E+00	7.78E-04
RW	7.86E-05	5.45E-04	1.59E+01
CR	0.00E+00	0.00E+00	0.00E+00
MR	0.00E+00	0.00E+00	0.00E+00
MER	0.00E+00	0.00E+00	0.00E+00
EEE	0.00E+00	0.00E+00	0.00E+00
ETE	0.00E+00	0.00E+00	0.00E+00

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document. Recalculation to results for pipes per meter should be done based on the technical data specified on pages 4-5, and the additional technical information specified on pages 8-9.

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

Product stage			Assembly stage		Use stage								End of life stage				Benefits & loads beyond system boundary
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								X	X	X	X	X	

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5, installation	A5, other	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	2,15E+00	5,52E-02	1,40E+00	1,62E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-8,20E-02
GWP-fossil	kg CO2 eq.	2,12E+00	5,51E-02	1,40E+00	1,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-8,18E-02
GWP-biogenic	kg CO2 eq.	2,33E-02	3,35E-05	2,49E-03	1,11E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,57E-04
GWP-LULUC	kg CO2 eq.	6,60E-03	1,95E-05	5,00E-04	3,38E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,56E-05
ODP	kg CFC11 eq.	1,27E-07	1,27E-08	3,16E-07	7,68E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,64E-09
AP	mol H ⁺ eq.	8,32E-03	3,14E-04	8,71E-03	4,66E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,96E-04
EP-freshwater	kg P eq.	3,53E-05	4,54E-07	1,29E-05	1,99E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-8,44E-07
EP-marine	kg N eq.	1,50E-03	1,12E-04	3,19E-03	9,04E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,70E-05
EP-terrestrial	mol N eq.	1,68E-02	1,24E-03	3,53E-02	1,01E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-4,12E-04
POCP	kg NMVOC eq.	7,45E-03	3,54E-04	9,97E-03	4,25E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,87E-04
ADP-M&M	kg Sb eq.	2,80E-05	1,43E-06	3,91E-05	1,60E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-4,30E-07
ADP-fossil	MJ	7,25E+01	8,47E-01	2,15E+01	3,78E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,23E+00
WDP	m ³	1,87E+00	2,60E-03	1,39E-01	9,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,90E-02

GWP-total: Global Warming Potential; **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; See “additional Norwegian requirements” for indicator given as PO4 eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption

Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	A5, installation	A5, other	C1	C2	C3	C4	D
PM	Disease incidence	8,42E-08	4,98E-09	1,53E-07	5,02E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,49E-09
IRP	kBq U235 eq.	6,65E-02	3,70E-03	1,01E-01	3,82E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,32E-03
ETP-fw	CTUe	1,54E+01	6,87E-01	1,77E+01	9,37E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,93E-01
HTP-c	CTUh	6,43E-10	2,45E-11	6,89E-10	5,13E-11	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,50E-11
HTP-nc	CTUh	1,53E-08	8,19E-10	2,08E-08	1,01E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,19E-10
SQP	Dimensionless	4,00E+00	7,24E-01	1,86E+01	3,30E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,42E-02

PM: Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
ILCD type / level 2	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2
Disclaimer 1 – 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.		
Disclaimer 2 – 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		

Resource use

Parameter	Unit	A1-A3	A4	A5, installation	A5, other	C1	C2	C3	C4	D
RPEE	MJ	4,39E+00	1,21E-02	6,59E-01	2,26E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,96E-02
RPPEM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	4,39E+00	1,21E-02	6,59E-01	2,26E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,96E-02
NRPE	MJ	7,78E+01	8,99E-01	2,28E+01	4,05E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,41E+00
NRPM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TRPE	MJ	7,78E+01	8,99E-01	2,28E+01	4,05E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,41E+00

SM	kg	0,00E+00	0,00E+00	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	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	0,00E+00	0,00E+00
W	m ³	3,12E-02	9,58E-05	5,50E-02	1,64E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,91E-04

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE 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; W Use of net fresh water

End of life - Waste

Parameter	Unit	A1-A3	A4	A5, installation	A5, other	C1	C2	C3	C4	D
HW	KG	1,36E-05	2,16E-06	5,53E-05	9,50E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-9,06E-07
NHW	KG	1,27E-01	5,25E-02	1,17E+00	1,94E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,70E-03
RW	KG	7,45E-05	5,76E-06	1,48E-04	4,37E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,29E-06

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life – output flow

Parameter	Unit	A1-A3	A4	A5, installation	A5, other	C1	C2	C3	C4	D
CR	kg	0,00E+00	0,00E+00	0,00E+00	8,44E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MR	kg	0,00E+00	0,00E+00	0,00E+00	3,51E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	1,31E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,11E-02
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,03E-01

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0
Biogenic carbon content in the accompanying packaging	kg C	0

Additional Norwegian requirements

Greenhouse gas emission 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).

National electricity grid	Unit	Value
Hydroelectricity, average (Ecoinvent 3.6)	kg CO ₂ -eq/kWh	0,0496

Additional environmental impact indicators required in NPCR Part A for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator for GWP has been sub-divided into the following:

GWP-IOBC Climate impacts calculated according to the principle of instantaneous oxidation
GWP-BC Climate impacts from the net uptake and emission of biogenic carbon from each module.

Indicator	Unit	A1-A3	A4	A5, installation	A5, other	C1	C2	C3	C4	D
GWP-IOBC	kg CO2 eq.	2,12E+00	5,52E-02	1,40E+00	1,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-8,18E-02
GWP-BC	kg CO2 eq.	2,33E-02	3,35E-05	2,49E-03	1,11E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,57E-04
GWP	kg CO2 eq.	2,15E+00	5,52E-02	1,40E+00	1,62E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-8,20E-02

EP-freshwater* Eutrophication potential, fraction of nutrients reaching freshwater end compartment. Declared as PO4 eq. **GWP-IOBC** Global warming potential calculated according to the principle of instantaneous oxidation. **GWP-BC** Global warming potential from net uptake and emissions of biogenic carbon from the materials in each module. **GWP** Global warming potential

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- ☒ The product contains no substances given by the REACH Candidate list or the Norwegian priority list.
- ☐ The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- ☐ The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- ☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforsikten, Annex III), see table.

Indoor environment





The product meets the requirements for low emissions.

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction – Environmental declaration of building products
NPCR Part A	Construction products and services. Ver. 2.0. March 2021, EPD-Norge
NPCR Part B	NPCR - Part B for piping systems for use in sewage and storm water systems (under gravity), the Norwegian EPD Foundation/EPD-Norge, version 2.0, dated 18-10-2018
CEWEP	Results of Specific Data for Energy, R1 Plant Efficiency Factor and NCV of 314 European Waste-to-Energy (WtE) Plants, CEWEP Energy Report III (status 2007-2010), 2012, Reiman, D.O.

 epd-norway Global Program Operator	Program Operator	tlf	+47 23 08 80 00
	The Norwegian EPD Foundation	e-post:	post@epd-norge.no
	Post Box 5250 Majorstuen, 0303 Oslo Norway	web	www.epd-norge.no
 epd-norway Global Program Operator	Publisher	tlf	+47 23 08 80 00
	The Norwegian EPD Foundation	e-post:	post@epd-norge.no
	Post Box 5250 Majorstuen, 0303 Oslo Norway	web	www.epd-norge.no
	Owner of the declaration	tlf	+4745190625
	Norsk Wavin AS	Fax	
	Karihaugveien 89, 1086, Oslo	e-post:	Invoice.no@wavin.com
	Norway	web	www.wavin.com/nn-no
 Ecochain	Author of the life cycle assessment	tlf	+31 (0)20 303 5777
	Emma Thunissen	Fax	
	H.J.E. Wenckebachweg 123, 1096 AM Amsterdam	e-post:	emma@ecochain.com
	The Netherlands	web	www.ecochain.com

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