epd-norge
Global program operatør

Environmental product declaration

In accordance with 14025 and EN15804+A2

MultiPex® TG rir

The Norwegian EPD Foundation

Owner of the declaration:
Roth North Europe A/S

Product:
MultiPex® TG rir

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. 1.0. March 2021

Program operator:
The Norwegian EPD Foundation

Declaration number:
NEPD-4492-3753-EN

Registration number:

NEPD-4492-3753-EN

Issue date: 23.05.2023

Valid to: 23.05.2028

EPD Software:
LCA.no EPD generator ID: 61952

General information

Product

MultiPex® TG rir

Owner of the declaration:

Roth North Europe A/S
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Program operator:

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Manufacturer:

Roth North Europe A/S

Declaration number:

NEPD-4492-3753-EN

Place of production:

Roth North Europe A/S
Centervej 5
3600 Frederikssund, Denmark

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. 1.0. March 2021

Management system:

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:

34012113

Declared unit:

1 kg MultiPex® TG rir

Issue date: 23.05.2023

Declared unit with option:

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

Valid to: 23.05.2028

Year of study:

2021

Functional unit:

The declared unit is 1 kg of pipe

Comparability:

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

The EPD has been worked out by:

Stine Bøgh Petersen

Verification:

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

Third party verifier:

Mie Vold, LCA.no

(Independent verifier, approved by EPD-Norway)

Approved:

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

The MultiPex® TG rir is a versatile pipe suitable for tap water systems. With its exceptional design and construction, the MultiPex® TG rir fulfills all the necessary requirements for tap water piping systems. This includes meeting the standards for diffusion resistance outlined in DIN 4726, obtaining approval from Sintef TG2556, as well as receiving GDV and VA approvals.

Production of the MultiPex® TG rir takes place at the company's own German factories, ensuring stringent quality control measures aligned with ISO 9001 standards. This commitment to quality assurance further reinforces the reliability and performance of the MultiPex® TG rir.

The pipe is available in different dimensions to cater to various installation needs, including sizes of 12 x 2.0mm, 15 x 2.5mm, 18 x 2.5mm and 22 x 3.0mm.

Product specification

Materials	Value	Unit
Polyethylene high density (basic pipe)	50-60	%
Polyethylene (adhesive layer)	0-5	%
Polyethylene (oxygen barrier layer)	0-5	%
Polyethylene low density (process aid)	0-5	%
Polyethylene (corrugated pipe)	30-40	%

Technical data:

The MultiPex® TG rir exhibits excellent heat stability, allowing for a permissible operating temperature of up to 70°C (with a maximum short-term temperature of 95°C) under an operating pressure of 10 bar. Additionally, it possesses a heat-conduction capacity of 0.33 W/mK.

The MultiPex® TG is a crosslinked three-layer co-extruded pipe with an incorporated EVOH (ethyl vinyl alcohol) oxygen barrier. This barrier serves as a protective layer, preventing the entry of oxygen into the system. Moreover, the pipe meets the requirements for oxygen diffusion resistance in accordance with DIN 4726.

To enhance its structural integrity, the pipe is equipped with an outer corrugated layer, which has received approval from Sintef based on the TG2556 standard. The external corrugated pipe further reinforces the reliability and durability of the MultiPex® TG rir, and secures a watertight tap water installation and an exchangeable basic pipe.

Market:

Denmark, Sweden, Norway, Finland & UK

Reference service life, product

50 years (Haugbølle, K., et.al, 2022)

Reference service life, building or construction works

50 years (Haugbølle, K., et.al, 2022)

LCA: Calculation rules

Declared unit:

1 kg MultiPex® TG rir

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. 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
Plastic - Polyethylene	ecoinvent 3.6	Database	2019
Plastic - Polyethylene (HDPE)	ecoinvent 3.6	Database	2019
Plastic - Polyethylene (LDPE)	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

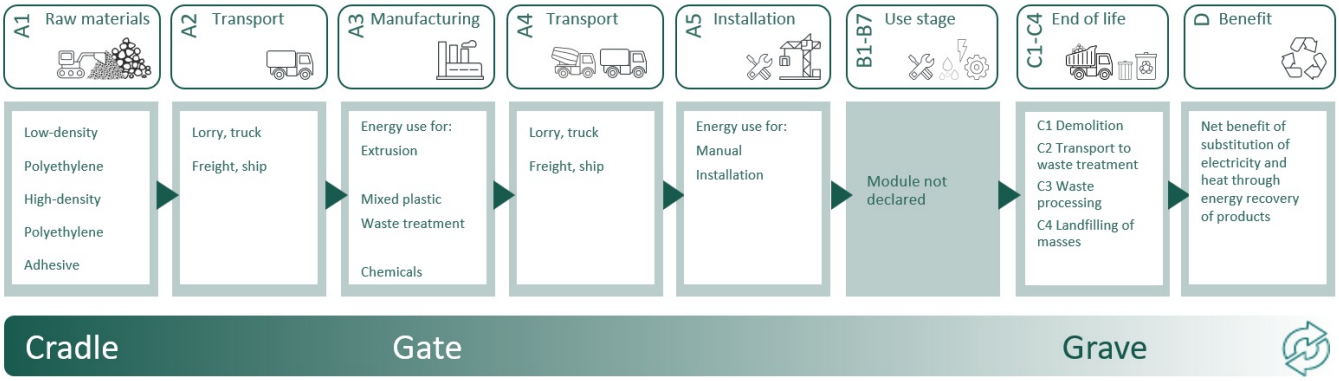
System boundary:

Module A1: Packaging has not been included due to several different available packaging options*.

Module A4: The transportation distances provided in this EPD are derived from precise data concerning the distances between the production facility and various sales departments in different countries. Subsequently, it is assumed that the distribution from each of these sales departments to the end customers covers an approximate distance of 300 km*.

Module C2: The estimated transportation distance to the waste handling facility in this EPD is 100 km, assuming the use of a truck as the transportation method.

*For specific packaging and transport scenarios please take contact for a project specific EPD.



MultiPex® TG rir

Dimensions (mm)	Weight (kg/m)
12 x 2,0	0,162
15 x 2,5	0,200
18 x 2,5	0,208
22 x 3,0	0,300

Additional technical information:

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)
Ship, Coastal Barge (km)	71,0 %	165	0,011	l/tkm	1,82
Truck, 16-32 tonnes, EURO 5 (km) - Europe	36,7 %	698	0,044	l/tkm	30,71
Truck, 16-32 tonnes, EURO 5 (km) - Europe	36,7 %	439	0,044	l/tkm	19,32
Truck, 16-32 tonnes, EURO 5 (km) - Europe	36,7 %	300	0,044	l/tkm	13,20

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 5 (km) - Europe	36,7 %	100	0,044	l/tkm	4,40

Waste processing (C3)	Unit	Value			
Waste treatment per kg Polyethylene (PE), incineration with fly ash extraction (kg)	kg	1,00			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Polyethylene (PE), process per kg ashes and residues (kg)	kg	0,04			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity (MJ)	MJ	1,94			
Substitution of thermal energy, district heating (MJ)	MJ	29,37			

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	3,39E+00	2,47E-01	0	0	1,67E-02	3,02E+00	1,97E-03	-1,76E-01
	GWP-fossil	kg CO_2 -eq	3,36E+00	2,47E-01	0	0	1,67E-02	3,02E+00	1,96E-03	-1,70E-01
	GWP-biogenic	kg CO_2 -eq	1,89E-02	1,04E-04	0	0	6,80E-06	2,44E-05	1,03E-06	-3,52E-04
	GWP-luluc	kg CO_2 -eq	1,77E-03	9,81E-05	0	0	5,83E-06	3,59E-06	2,96E-07	-5,87E-03
	ODP	kg CFC11 -eq	1,41E-07	5,59E-08	0	0	3,80E-09	2,31E-09	2,03E-10	-1,24E-02
	AP	mol H+ -eq	1,31E-02	1,06E-03	0	0	6,81E-05	3,78E-04	6,78E-06	-1,40E-03
	EP-FreshWater	kg P -eq	1,38E-04	1,98E-06	0	0	1,31E-07	2,31E-07	2,67E-08	-1,51E-05
	EP-Marine	kg N -eq	2,22E-03	3,24E-04	0	0	2,02E-05	1,82E-04	2,11E-06	-4,59E-04
	EP-Terrestial	mol N -eq	2,62E-02	3,58E-03	0	0	2,23E-04	1,96E-03	2,40E-05	-4,96E-03
	POCP	kg NMVOC -eq	1,02E-02	1,08E-03	0	0	6,84E-05	4,70E-04	6,61E-06	-1,37E-03
	ADP-minerals&metals[1]	kg Sb -eq	4,32E-05	6,55E-06	0	0	4,52E-07	1,06E-07	1,06E-08	-1,69E-06
	ADP-fossil[1]	MJ	9,23E+01	3,71E+00	0	0	2,51E-01	1,98E-01	1,73E-02	-2,43E+00
	WDP[1]	m^3	1,66E+02	3,61E+00	0	0	2,40E-01	4,47E-01	1,87E-01	-3,03E+01

GWP total Global Warming Potential total; GWP fossil Global Warming Potential fossil fuels ; GWP biogenic Global Warming Potential biogenic; GWP luluc Global W Potential land use change; ODP Ozone Depletion; AP Acidification; EP freshwater Eutrophication aquatic freshwater; EP marine Eutrophication aquatic marine; EP terrestrial Eutrophication terrestrial ;POCP Photochemical zone formation; ADPE Abiotic Depletion Potential minerals and metals; ADPf Abiotic Depletion Potential fossil fuels;

"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

Additional environmental impact indicators

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	1,02E-07	1,74E-08	0	0	1,20E-09	1,48E-09	8,20E-11	-8,50E-08
	IRP[2]	kgBq U235 -eq	1,00E-01	1,62E-02	0	0	1,10E-03	3,34E-04	8,30E-05	-1,56E-02
	ETP-fw[1]	CTUe	3,45E+01	2,74E+00	0	0	1,85E-01	5,90E-01	3,30E-02	-1,32E+01
	HTP-c[1]	CTUh	1,07E-09	0,00E+00	0	0	0,00E+00	6,60E-11	2,00E-12	-2,43E-10
	HTP-nc[1]	CTUh	3,27E-08	2,87E-09	0	0	2,00E-10	2,53E-09	6,10E-11	-1,27E-08
	SQP[1]	dimensionless	1,11E+01	2,57E+00	0	0	1,73E-01	2,40E-02	4,76E-02	-1,63E+01

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	3,49E+00	5,35E-02	0	0	3,55E-03	5,81E-03	1,05E-03	-1,50E+01
	PERM	MJ	0,00E+00	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	3,49E+00	5,35E-02	0	0	3,55E-03	5,81E-03	1,04E-03	-1,50E+01
	PENRE	MJ	4,87E+01	3,71E+00	0	0	2,51E-01	1,98E-01	1,74E-02	-2,43E+00
	PENRM	MJ	4,25E+01	0,00E+00	0	0	0,00E+00	-4,25E+01	0,00E+00	0,00E+00
	PENRT	MJ	9,12E+01	3,71E+00	0	0	2,51E-01	-4,23E+01	1,74E-02	-2,43E+00
	SM	kg	2,99E-03	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	4,62E-01	1,98E-03	0	0	1,27E-04	1,64E-04	2,60E-05	-2,63E-03
	NRSF	MJ	1,57E-02	6,89E-03	0	0	4,53E-04	0,00E+00	3,59E-03	-8,92E-01
	FW	m^3	3,63E-02	3,99E-04	0	0	2,65E-05	5,58E-04	1,60E-05	-1,81E-02

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 Use of net 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	5,62E-03	1,91E-04	0	0	1,28E-05	0,00E+00	2,99E-02	-1,14E-04
	NHWD	kg	2,87E-01	1,73E-01	0	0	1,20E-02	0,00E+00	1,64E-02	-5,75E-02
	RWD	kg	1,04E-04	2,53E-05	0	0	1,71E-06	0,00E+00	1,05E-07	-1,27E-05

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	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	6,97E-02	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MER	kg	1,78E-03	0,00E+00	0	0	0,00E+00	1,00E+00	0,00E+00	0,00E+00
	EEE	MJ	3,05E-02	0,00E+00	0	0	0,00E+00	1,94E+00	0,00E+00	0,00E+00
	EET	MJ	4,61E-01	0,00E+00	0	0	0,00E+00	2,94E+01	0,00E+00	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; 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	0,00E+00

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

Additional Norwegian 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	Data source	Amount	Unit
Electricity, Germany (kWh)	ecoinvent 3.6	585,93	g CO2-eq/kWh

Dangerous substances

The product contains substances given by the REACH Candidate list and the Norwegian priority list that are less than 0,1 % by weight.

Indoor environment

Additional Environmental Information

Environmental impact indicators EN 15804+A1 and NPCR Part A v2.0									
Indicator	**Unit**	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO_2 -eq	1,95E+00	2,45E-01	0	0	1,65E-02	3,02E+00	2,04E-03	-1,73E-01
ODP	kg CFC11 -eq	7,81E-08	4,43E-08	0	0	3,00E-09	2,08E-09	1,66E-10	-1,79E-08
POCP	kg C_2H_4 -eq	4,98E-04	3,27E-05	0	0	2,20E-06	3,88E-06	2,31E-07	-2,04E-04
AP	kg SO_2 -eq	5,26E-03	5,25E-04	0	0	3,27E-05	2,61E-04	3,59E-06	-1,04E-03
EP	kg PO_4^{3-} -eq	7,04E-04	6,21E-05	0	0	3,49E-06	8,14E-05	4,89E-07	-2,97E-04
ADPM	kg Sb -eq	1,72E-05	6,55E-06	0	0	4,52E-07	1,06E-07	1,06E-08	-1,70E-06
ADPE	MJ	5,57E+01	3,63E+00	0	0	2,46E-01	1,98E-01	1,74E-02	-1,96E+00
GWPIOBC	kg CO_2 -eq	3,31E+00	2,47E-01	0	0	1,67E-02	3,02E+00	2,04E-03	-1,74E-01

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources; GWP-IOBC/GHG Global warming potential calculated according to the principle of instantanious oxidation (except emissions and uptake of biogenic carbon)

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 Environmental product declaration - Core rules for the product category of construction products.
ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.
Iversen et al., (2021) eEPD v2021.09 Background information for EPD generator tool system verification, LCA.no Report number: 07.21
Jeroen Graafland, (2023) EPD for Roth MultiPex RIR - TG 2556 and Roth X-PERT S5, Background information for manual EPD and LCA data, LCA.no report number: 08.23
NPCR Part A: Construction products and services. Ver. 2.0. April 2021, EPD-Norge.

Haugbølle, K., Mahdi, V., Morelli, M., & Wahedi, H. (2022). BUILD Levetidstabel. BUILD - Institut for Byggeri, by Og Miljø, 2, 978-87-563-2072–6. https://build.dk/Pages/BUILD-levetidstabel.aspx

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