Environmental Product Declaration

Polyethylene (PE) structured (twin) wall cable protection pipe system EVOCAB

1. DECLARATION OF GENERAL INFORMATION

Introduction

The present EPD outlines the various environmental aspects, which accompany the polyethylene (PE) structured (twin) wall cable protection pipe system EVOCAB, from the primary extraction of raw materials up to and including the end of life (EoL) treatment after its reference service life time.

Name and address of manufacturer:

EVOPIPES SIA, Langervaldes street 2a, Jelgava, LV-3002, Latvia.
Tel.: +371 63094300, Fax: +371 63094301, E-mail: info@evopipes.lv, http://www.evopipes.com

PE pipe system's use and functional unit

The EPD refers to a PE structured (twin) wall underground cable protection pipe system EVOCAB, from the cradle to the grave, including raw material extraction, transportation to converters, converting process, transport to trench, construction, use and end of life. Environmental indicators are expressed for the complete life cycle, from the cradle to the grave. The functional unit is defined as "The below ground mechanical protection and insulation of cables by PE structured (twin) wall pipe system EVOCAB (DN/OD 40 - 160 mm), over its complete service life cycle of 100 years, calculated per year".

Product name & graphic display of product

PE structured (twin) wall cable protection pipe system EVOCAB.

Description of the PE structured (twin) wall cable protection pipe system EVOCAB components

The environmental burdens are calculated in relation to the functional unit, which resulted for the PE structured (twin) wall cable protection pipe system EVOCAB in the following basic pipe system components: PE corrugated pipes, PE fittings and TPE sealing rings.
The system consists of PE structured (twin) wall pipes and fittings, yellow or red, 450N and 750N, diameter from DN/OD 40 to 160 mm, 6 - 100 m lengths, with snap-on socket. Representative for the typical pipe diameter is DN/OD 110 mm.
Volume of fittings including seals (approximately 1%) calculated based on actual sales data. The pipe system has a reference length of 100 meters; no slope. Service life time of 100 years.
The EPD is declared as the average environmental performance for PE structured (twin) wall cable protection pipe system EVOCAB, over its reference service life cycle of 100 years, calculated per year, in accordance to EN 61386.

EPD program and program operator

The present EPD is in line with the ongoing standardization work. A program operator has not been established yet.

Date of declaration and validity

April, 2018
The EPD has a 5 year validity period (April, 2023)

Comparability
Please note that EPDs of construction products may not be comparable if they do not comply with the CEN standards.

Content of the product system
The product system does not contain materials or substances that can adversely affect human health and the environment in all stages of the life cycle.

Retrieve information
Explanatory material may be obtained by contacting EVOPIPES (http://www.evopipes.com)

2. DECLARATION OF THE MATERIAL CONTENT

The Polyethylene (PE) structured (twin) wall cable protection pipe system EVOCAB does not contain any substances as such or in concentration exceeding legal limits, which can adversely affect human health and the environment in any stages of its entire life cycle.

Construction of the EVOCAB pipe

Material	Proportion, %	Description of the component
PE	**~ 97 – 99**	**High Density Polyethylene (HDPE)**
Additive	**~ 0.1 – 0.9**	**Antioxidant, UV-stabilizer for long term performance**
Pigment	**~ 0.1 – 2.5**	**Polyethylene-based color masterbatch or mix of such**

3. DECLARATION OF THE ENVIRONMENTAL PARAMETERS DERIVED FROM LCA

3.1 Life cycle flow diagram

The EPD refers to PE structured (twin) wall cable protection pipe system EVOCAB, from the cradle to the grave, including product stage, transport to construction site and construction process stage, use stage and end of life stage.

-Product stage: raw material extraction and processing, recycling processes for recycled material input, transport to the manufacturer, manufacturing (including all energy provisions, waste management processes during the product stage up to waste for final disposal):
o Production of raw materials for PE pipes
o Transport of PE pipe raw materials to converter
o Converting process for PE structured (twin) wall pipes (extrusion)
o Production of raw materials for PE fittings
o Transport of PE fittings raw materials to converter
o Converting process for PE fittings (injection molding)
o Production raw materials for TPE rings
o Transport of TPE raw materials to converter
o Converting process for TPE rings (injection molding)

-Construction process stage: including all energy provisions, waste management processes during the construction stage up to waste for final disposal
o Transport of complete PE structured (twin) wall cable protection pipe system EVOCAB to the trench;
o Installation of complete PE structured (twin) wall cable protection pipe system EVOCAB in the trench;

-Use stage (maintenance and operational use): including transport and all energy provisions, cable system management processes
o Use and maintenance of the complete PE structured (twin) wall cable protection pipe system EVOCAB during 100 years of reference service life time;

-End of life stage: including all energy provisions during the end of life stage
o Disassembly of complete PE structured (twin) wall cable protection pipe system EVOCAB after 100 years of reference service life time;
o Transport of complete PE structured (twin) wall cable protection pipe system EVOCAB after 100 years of reference service life time;
o End-of-life waste treatment of complete PE structured (twin) wall cable protection pipe system EVOCAB after 100 years of reference service life time.

3.2 Parameters describing environmental impacts

The following environmental parameters are expressed with the impact category parameters of the life cycle impact assessment (LCIA).

Impact category	Abiotic depletion	Acidification	Eutrophication	Global warming	Ozone layer depletion	Photochemical oxidation
	kg Sb eq	kg SO2 eq	kg PO4--- eq	kg CO2 eq	kg CFC-11 eq	kg C2H4 eq
Product stage	0,02	0,0048	0,0012	1,26	0,0000002	0,001
Construction process stage	0,004	0,0036	0,001	0,56	0,0000003	0,0002
Use stage	0	0	0	0	0	0
End of life stage	-0,00008	-0,00004	-0,00004	0,028	0,000000001	-0,000005
Total	**0,02392**	**0,00836**	**0,00216**	**1,848**	**0,0000005**	**0,001195**

3.3 Parameters describing resource input

The following environmental parameters apply data based on the life cycle inventory (LCI).

Environmental parameter	Non-renewable energy indicator	Renewable energy indicator	Non-renewable material resources (other than energy)	Renewable material resources (other than energy)	Crude oil (feedstock and energy)	Natural gas (feedstock and energy)	Input of net fresh water
	MJ primary	MJ primary	kg	kg	kg	kg	m^3
Product stage	44,1	0,92	0,052	0,0108	0,468	0,308	1,736
Construction process stage	9,6	0,28	0,022	0,0014	0,148	0,0152	1,588
Use stage	0	0	0	0	0	0	0
End of life stage	-0,24	-0,03	0,00011	-0,000402	0,00126	-0,00116	-0,1044
Total	**53,46**	**1,17**	**0,07411**	**0,011798**	**0,61726**	**0,32204**	**3,2196**

3.4 Parameters describing different waste categories and further output material flows

The parameters describing waste categories and other material flows are output flows derived from the life cycle inventory (LCI)

Parameters describing different waste categories

Environmental parameter	Hazardous waste	Non-hazardous waste	Nuclear waste
	kg	kg	kg
Product stage	0,0190	0,012	0,00002
Construction process stage	0,00003	0,058	0,00001
Use stage	0	0	0
End of life stage	-0,000001	0,48	-0,000002
Total	**0,01903**	**0,550**	**0,000028**

Parameters describing further output material flows

Parameter	Parameter unit expressed per functional unit
Components for re-use	0,468 kg
Materials for recycling	0,042 kg
Materials for energy recovery	0,014 kg

4. SCENARIOS AND TECHNICAL INFORMATION

4.1 Construction process stage

Transport from the production gate to the construction site (trench)

Parameter	Parameter unit expressed per functional unit
Fuel type consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat etc.	The PE structured (twin) wall cable protection pipe system EVOCAB is transported over an average distance of 400 km by means of a truck from the producers of the different pipe system components to the trench. The average actual load is 5 tons. The loading factor for EVOCAB pipes is limited by volume. Environmental burdens associated with this kind of transport are calculated by means of the Ecoinvent V2.2 data record "Transport, lorry 16-32t, EURO4/tkm/RER".
Capacity utilization (including empty returns)	
Bulk density	
Volume capacity utilization factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	

Construction (installation at trench)

Parameter	Parameter unit expressed per functional unit
Ancillary materials for installation	**0,09 m³ of backfilling fraction** trucked to trench over an average distance of 15 km.

<table>
<tr><td></td><td>Environmental burdens associated with this kind of energy are calculated by means of the Ecoinvent V2.2 data record “Sand, at mine/CH + Transport, lorry >32t, EURO4/tkm/RER”</td></tr>
<tr><td>Other resource consumption</td><td>Not relevant</td></tr>
<tr><td>Quantitative description of energy type (regional mix) and consumption during the installation process</td><td>10 MJ of mechanical energy is needed for excavating the soil (dig up) and backfilling. Environmental burdens associated with this kind of energy are calculated by means of the Ecoinvent V2.2 data record “Diesel, burned in building machine/MJ/GLO”</td></tr>
<tr><td>Waste on the building site, generated by the product’s installation</td><td rowspan="2">0,004 kg of PE pipe left over during installation: 1% to landfill, 4% to incineration and 95% to mechanical recycling. Transportation of PE pipe left over to waste management treatment facilities is included: 600 km to recycling plant, 150 km to incineration with energy recovery and 50 km to landfill. Environmental burdens are calculated by means of the Ecoinvent v2.2 data record “Transport, lorry 3.5-7.5t, EURO4/tkm/RER”.
0,021 kg of packaging waste: treated according to European average packaging waste scenarios (EU27, 2006):
<table>
<tr><th></th><th>Recycling</th><th>Energy recovery</th><th>Landfill</th></tr>
<tr><td>Plastic</td><td>45%</td><td>45%</td><td>10%</td></tr>
<tr><td>Wood</td><td>25%</td><td>70%</td><td>5%</td></tr>
<tr><td>TOTAL</td><td>35%</td><td>58%</td><td>7%</td></tr>
</table>
0,098 m^3 of soil that has to be transported over an average distance of 10 km to the nearest depot. Environmental burdens are calculated by means of the Ecoinvent v2.2 data record “Transport, lorry 3.5-7.5t, EURO4/tkm/RER”.</td></tr>
<tr><td>Output materials as result of waste management processes at the building site e.g. of collection for recycling, for energy recovery, final disposal</td></tr>
<tr><td>Emissions to ambient air, soil and water</td><td>No direct emissions at the trench. Emissions are related to the upstream processes (mining of sand, transportation processes and mechanical energy) and downstream processes (waste management and treatment) and are included in the Ecoinvent data records that are used for modeling the environmental impacts.</td></tr>
</table>

4.2 Use stage: operation and maintenance

Operation:
Operational use is not relevant for the EPD, since it falls outside the system boundaries of the LCA project. PE structured (twin) wall cable protection pipe system EVOCAB does not need maintenance

4.3 End of life

The following end of life scenarios have been taken into account:

- Estimated reference service life time of 100 years based on technical assumptions
- EoL approach for landfill, incineration with energy recovery (impacts and credits are assigned to the life cycle that generates the waste flows)
- Recycled content approach for recycling and use of recycled material (= impact of recycling and credits for recycled materials, because less virgin materials are needed is assigned to the life cycle that uses the recycled materials).

Parameter	Parameter unit expressed per functional unit
Collection process	After a reference service life time of 100 years the PE structured (twin) wall cable protection pipe system might be replaced. In most cases (95%) the pipe system will be left in the ground. In some cases (5%) the pipe system is taken out and treated (mechanical recycling, incinerated or landfilled). Thus 4,9% is transported over an average distance of 600 km to a recycling plant, 0,1% is transported over an average distance of 150 km to an incinerator, and the remaining 95% is left in the ground. For the functional unit of TPE rings available at the trench 5% will be transported to landfill over an average distance of 50 km, the rest is left in the ground. **EoL scenario PE pipes and fittings:** Mechanical recycling 4,9% Incineration 0,1% Left in ground 95% **EoL scenario TPE rings:** Landfill 5% Left in ground 95% Environmental burdens associated with transportation are calculated by means of the following Ecoinvent v2.2 data record “Transport, lorry 3.5-7.5t, EURO4/tkm/RER”
Recycling system	
Final deposition	

5. ADDITIONAL INFORMATION ON EMISSIONS TO INDOOR AIR, SOIL AND WATER DURING USE STAGE

<u>Emissions to indoor air:</u>

Since the PE structured (twin) wall cable protection pipe system EVOCAB is a buried system (in trench) we can confirm that emissions to indoor air are not relevant.

Emissions to soil and water:
Despite there is no approved European measurement method available, we can confirm that the PE structured (twin) wall cable protection pipe system EVOCAB does not contain any substances mentioned on the REACH-list.

6. OTHER ADDITIONAL INFORMATION

Product certification, conformity, marking

EN 61386-1 Conduit systems for cable management - Part 1: General requirements (IEC 61386-1:2008)

EN 61386-24 Conduit systems for cable management - Part 24: Particular requirements - Conduit systems buried underground (IEC 61386-24:2004)

EN 1295-1, Structural design of buried pipelines under various conditions of loading. Part 1: General requirements

In compliance with European Construction Products Directive (89/106/EEC).

EVOPIPES' quality management system's compliance with ISO 9001, ISO 14001 and ISO 50001 is certified by BVQI.

Your contact:

EVOPIPES SIA
Langervaldes str.2a, Jelgava
LV-3002, Latvia

Phone: +371 63094300
E-mail: info@evopipes.lv

www.evopipes.com