Product Environmental Profile

Family technical name:	PT-HF
Family brand name:	PT LSZH 0,6mm
Reference product name :	PT-HF 4x2x0,6

8,7E-02	2,3E-05	3,6E-01	2,3E+00
kg CO_2 eq.	kg Sb eq.	m^3	MJ
Global Warming	Depletion of abiotic resources - elements	Net use of Freshwater	Total use of Primary Energy

PEP ecopassport N°:	NXNS-00173-V01.01-EN	Product Category Rules:	PEP-PCR-ed3-EN-2015 04 02
		Product Specific Rules:	PSR-0001-ed3-EN-2015 10 16
Verifier accreditation N°:	VH18	Program information & documents:	www.pep-ecopassport.org
Date of publication:	12-2021	Validity period:	5 years

Independent verification of the declaration and data, in accordance with ISO 14025 : 2010

Internal ☐ External ☒

The PCR critical review was conducted by a panel of experts chaired by Philippe Osset (Solinnen).

PEP are compliant with XP C08-100-1 :2016
The elements of the present PEP cannot be compared with elements from another program.

Compliant with ISO 14025: 2010 "Environmental labels and declarations - Type III environmental declarations".

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Nexans Corporate Social Responsibility commitment

Corporate Social Responsibility which is the confluence between environmental, economic and social aspects, is an integral part of the Nexans's strategy. Nexans has been supporting the **United Nations Global Compact** since December 2008 and has implemented internal action plans to integrate Sustainable Development at all levels. It includes responsible governance, healthy and safe working environment for employees, reduced global carbon footprint through the **Nexans Carbon Neutrality strategy.**

Reference Product description

PT-HF 4x2x0,6

Telecom indoor installation HFFR-LS cable intended for use in phone and control plants. The PT-HF cable is composed of PE insulated tinned copper wires twisted in a pair, cables with more then 5 pairs and banded with PETP foil and surrended by halogen free sheath type HFFR-LS.

Products covered:

The aforementioned products belong to the category Wires, Cables and Accessories of the Product Category Rules (PCR) from the PEP ecopassport® program.

The PEP concern all the products in the range PT-HF and the reference product of the PEP is PT-HF 4x2x0,6.

Functional unit:

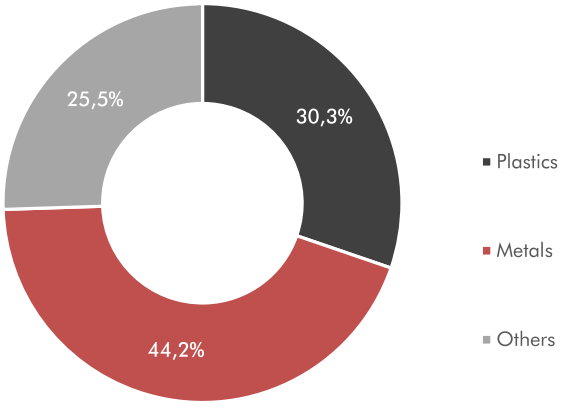
To transmit a communication signal on 1 m, at a frequency of 1000000 Hz during 30 years and a 70% use rate in accordance with the standards in force, detailed in the data sheet available on our website www.nexans.com.
Lifetime and use rate correspond to the Building - Residential / Tertiary / Industrial application as defined in the table given in Appendix 1 of the specific rules for wires, cables and accessories.

This PEP has been drawn up considering the following parameters:

- 1m for manufacturing, distribution and end-of-life stages
- 1m and 1A for the use stage

The potential impact of the use stage shall be calculated by the PEP user considering the real amperage through the product during the use phase by multiplying the impact by the square of the intensity. This PEP is valid in the intensity range taking into account the maximum allowable intensity.

Constituent materials



The total mass of the reference product and packaging is 46,12g/m. Constituent materials are distributed as given in the graph.

Nexans has implemented necessary procedures to ensure product compliance with the relevant standards when products are put on the market.

II. LIFE CYCLE ASSESSMENT

Manufacturing

- All the products in the range PT-HF are manufactured in Sweden.
- The electricity mix model for the manufacturing stage is Sweden, >1 kV.
- All Nexans sites in Sweden have implemented a certified Environmental Management System according to ISO14001 standard.

Packaging designed to reduce environmental impacts:

- Packaging was designed according to the applicable standard (Directive 94/62/EC).
- The packaging considered to transport the reference product is a Plastic drum. It is considered to be used 1 time.

Nexans has developed a collecting system for drums with a dedicated team. The request for returning drums can be done online: www.nexans.no/eservice

Distribution

The transportation scenario for the impact assessment of the distribution stage is local, considering:

- 1000 km covered by truck.

Installation

Installation processes for the reference product are considered out of the scope of the study, according to the Product Specific Rules document for "Wires, Cables and Accessories" from PEP ecopassport® program. Only packaging disposal is considered at this stage.

Use

The use scenario considers the operation of the reference product in Building - Residential / Tertiary / Industrial, with:

- Reference Lifetime (RLT) = 30 years
- Input power (W): 6,78
- L average (m): 100
- Use rate = 70 %
- Attenuation (dB): 1,6

Considering the aforementioned hypotheses, the energy consumption over the RLT at use stage is 0,0154 kWh/m.

- The electricity mix considered at use stage is Norway, ≤1 kV.
- No maintenance is necessary to ensure the operation of the cable during the considered reference lifetime.

The reference lifetime mentioned in this PEP corresponds to an average data used for impact calculation, taking into account the average time a cable might be installed in a system before being disposed. **It CANNOT BE considered as an equivalent to the guaranteed product technical lifetime.**

End-of-life

- The transportation scenario chosen for the impact analysis associated with end-of-life stage is 1000 km covered by truck.
- The assumed electricity mix model for end-of-life stage is Norway, >1 kV.

The cables are recycled through a grinding process for the separation of polymers and metal parts. It was considered that 100% of metals are recycled and 100% of other materials are landfilled.

Nexans has the know-how of cables recycling at their end-of-life through the structure named Nexans Recycling Services (recycling.services@nexans.com), to offer a complete solution for the recycling of polymers and metals.

III. ENVIRONMENTAL IMPACTS

The reference product PT-HF 4x2x0,6 belongs to the Product Category Rules (PEP-PCR-ed3-EN-2015 04 02) and Product Specific Rules (PSR-0001-ed3-EN-2015 10 16) from the PEP ecopassport® program. According to the PCR, the life cycle impact assessment of the reference product takes into account manufacturing, distribution, installation, use and end-of-life stages.

All the necessary hypotheses to evaluate the environmental impacts of the reference product lifecycle are presented in the previous sections (electricity mix models, use scenario, etc). The software used to perform the evaluation is EIME 5.9.3, with the Nexans-2021-06 database.

Representativeness: the study is representative of cable production in Sweden with a local scenario for distribution. The electricity model for use is Norway, ≤1 kV and the model for end-of-life is Norway, >1 kV.

Impact results for 1 m of PT-HF 4x2x0,6

Mandatory indicators:

Environmental indicator/flows	Unit	Manufacturing	Distribution	Installation*	Use	End-of-life	TOTAL
Global Warming	kg CO_2 eq.	8,05E-02	2,30E-03	5,76E-04	3,62E-04	2,99E-03	8,67E-02
Ozone Depletion	kg CFC-11 eq.	1,57E-08	4,65E-12	1,47E-11	7,08E-13	3,52E-11	1,58E-08
Acidification of soil and water	kg SO_2 eq.	3,22E-04	1,03E-05	2,19E-06	4,12E-07	1,25E-05	3,48E-04
Eutrophication	kg PO_4^{3-} eq.	5,86E-05	2,37E-06	2,50E-06	5,05E-08	9,69E-06	7,33E-05
Photochemical Ozone Creation	kg C_2H_4 eq.	2,57E-05	7,33E-07	1,71E-07	3,39E-08	9,17E-07	2,76E-05
Depletion of abiotic resources - elements	kg Sb eq.	2,30E-05	9,19E-11	3,71E-11	3,10E-09	1,43E-09	2,30E-05
Total use of Primary Energy	MJ	2,10E+00	3,25E-02	6,28E-03	7,53E-02	6,74E-02	2,28E+00
Net use of Freshwater	m^3	1,60E-01	2,05E-07	5,07E-07	1,45E-01	5,97E-02	3,64E-01

Optional indicators:

Environmental indicator/flow complete name	Unit	Manufacturing	Distribution	Installation*	Use	End-of-life	TOTAL
Depletion of abiotic resources - fossil fuels	MJ	1,54E+00	3,23E-02	5,61E-03	1,75E-03	3,54E-02	1,61E+00
Water Pollution	m^3	1,01E+01	3,78E-01	6,50E-02	5,68E-03	4,06E-01	1,10E+01
Air Pollution	m^3	9,48E+01	9,41E-02	6,83E-02	8,70E-03	2,68E-01	9,53E+01
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	1,82E-01	4,33E-05	1,58E-04	7,22E-02	3,02E-02	2,84E-01
Use of renewable primary energy resources as raw materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources	MJ	1,82E-01	4,33E-05	1,58E-04	7,22E-02	3,02E-02	2,84E-01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	1,39E+00	3,24E-02	6,12E-03	3,12E-03	3,72E-02	1,47E+00
Use of non-renewable primary energy resources as raw materials	MJ	5,34E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,34E-01
Total use of non-renewable primary energy resources	MJ	1,92E+00	3,24E-02	6,12E-03	3,12E-03	3,72E-02	2,00E+00
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of secondary materials	kg	3,05E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,05E-03
Hazardous waste disposed	kg	2,12E+00	0,00E+00	2,55E-06	1,21E-05	1,25E-05	2,12E+00
Non-hazardous waste disposed	kg	2,20E-02	8,16E-05	5,36E-03	9,66E-04	2,27E-02	5,11E-02
Radioactive waste disposed	kg	7,04E-05	5,81E-08	1,84E-07	5,62E-07	6,55E-07	7,18E-05
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	1,28E-03	0,00E+00	0,00E+00	0,00E+00	2,04E-02	2,17E-02

* Installation stage includes only packaging disposal. Impacts related to installation processes might be completed by the PEP user.

IV. EXTRAPOLATION RULES FOR THE PRODUCT FAMILY PT-HF

General information

The extrapolation rules have been calculated based on the environment impact assessment results of 3 products in the range PT-HF . The reference product is PT-HF 4x2x0,6. The weight of reference product is 41,32g/m.

The extrapolation rules below apply to 1m of product. In the following sections, the product weight is expressed in g for 1m of cable, where applicable.

Extrapolation rules for each life cycle stage

	Life cycle stage	Applicable extrapolation principle	Formula to calculate each environmental indicator	Example: If the product weight is 51,32 g/m, each indicator value shall be calculated with:	Mean deviation of extrapolation rule
	Manufacturing	Linear variation versus weight	Indicator = a x Cable weight + b	Indicator = 51,32 x a + b.	4,48%
	Distribution	Linear variation versus weight	Indicator = a x Cable weight + b	Indicator = 51,32 x a + b.	1,95%
	Installation	Maximum impact value	The maximum impact values (MIV) indicated in the table below are applicable to the whole range for installation stage impacts	N/A	N/A
	Use	Variation versus resistivity ratio	Indicator = Indicator for Reference Product x (number of pairs / number of pairs of the reference product) x Y x Z. Y depends on the cable under study. Z = Power consumption of the product studied / Power consumption of the reference product. Y = 1 for a mono cable Y = 2 for a dual cable Y = X/1 for a multi (X) cable	Indicator = Indicator of reference product x (Number of pairs of product to be evaluated / 4) x 1 x Z.	0,00%
	End of life	Linear variation versus weight	Indicator = a x Cable weight + b	Indicator = 51,32 x a + b.	1,41%

Table to be considered for extrapolation calculations of different life cycle stages:

	Manufacturing		Distribution		Installation		End of life	
	a	b	a	b	MIV		a	b
Global Warming	2,20E-03	-6,39E-03	5,62E-05	2,18E-05	1,44E-03	-	6,98E-05	9,09E-05
Ozone Depletion	3,85E-10	-2,31E-10	1,14E-13	4,41E-14	3,68E-11	-	7,65E-13	3,04E-12
Acidification of soil and water	9,24E-06	-4,38E-05	2,52E-07	9,78E-08	5,48E-06	-	2,88E-07	4,63E-07
Eutrophication	1,61E-06	-5,06E-06	5,80E-08	2,25E-08	6,25E-06	-	1,93E-07	1,39E-06
Photochemical Ozone Creation	7,22E-07	-2,98E-06	1,79E-08	6,95E-09	4,28E-07	-	2,12E-08	3,41E-08
Depletion of abiotic resources - elements	7,13E-07	-5,20E-06	2,25E-12	8,72E-13	9,27E-11	-	3,43E-11	6,21E-12
Total use of Primary Energy	5,47E-02	-5,17E-02	7,94E-04	3,08E-04	1,57E-02	-	1,60E-03	9,59E-04
Net use of Freshwater	3,79E-03	6,70E-03	5,03E-09	1,95E-09	1,27E-06	-	1,44E-03	-7,85E-07
Depletion of abiotic resources - fossil fuels	0,00E+00	0,00E+00	7,89E-04	3,06E-04	1,40E-02	-	8,34E-04	7,98E-04
Water Pollution	3,96E-02	-1,73E-02	9,24E-03	3,57E-03	1,63E-01	-	9,57E-03	8,87E-03
Air Pollution	2,54E-01	2,58E-02	2,30E-03	8,94E-04	1,71E-01	-	5,56E-03	3,06E-02
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	2,83E+00	-1,80E+01	1,06E-06	4,11E-07	3,95E-04	-	7,30E-04	5,43E-05
Use of renewable primary energy resources as raw materials	4,83E-03	-1,16E-02	0,00E+00	0,00E+00	0,00E+00	-	0,00E+00	0,00E+00
Total use of renewable primary energy resources	0,00E+00	0,00E+00	1,06E-06	4,11E-07	3,95E-04	-	7,30E-04	5,43E-05
Use of non-renewable primary energy,excluding non-renewable primary	4,83E-03	-1,16E-02	7,93E-04	3,08E-04	1,53E-02	-	8,73E-04	9,04E-04
Use of non-renewable primary energy resources as raw materials	3,67E-02	-6,93E-02	0,00E+00	0,00E+00	0,00E+00	-	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources	1,31E-02	2,93E-02	7,93E-04	3,08E-04	1,53E-02	-	8,73E-04	9,04E-04
Use of renewable secondary fuels	4,98E-02	-4,01E-02	0,00E+00	0,00E+00	0,00E+00	-	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-	0,00E+00	0,00E+00
Use of secondary materials	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-	0,00E+00	0,00E+00
Hazardous waste disposed	9,44E-05	-6,89E-04	0,00E+00	0,00E+00	6,38E-06	-	2,66E-07	1,23E-06
Non-hazardous waste disposed	6,57E-02	-4,78E-01	2,00E-06	7,73E-07	1,34E-02	-	4,05E-04	4,79E-03
Radioactive waste disposed	4,29E-04	3,39E-03	1,42E-09	5,53E-10	4,59E-07	-	1,48E-08	3,79E-08
Components for reuse	1,69E-06	2,03E-06	0,00E+00	0,00E+00	0,00E+00	-	0,00E+00	0,00E+00
Exported energy	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-	0,00E+00	0,00E+00
Materials for energy recovery	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-	0,00E+00	0,00E+00
Materials for recycling	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-	6,35E-04	-4,62E-03

V. PRODUCTS COVERED BY THE PEP

The products covered by the given PEP are represented in the below table with a: ●

The below table gives the structure of the cable, along with its conductor size and fire resistance category included in this PEP for the cable family PT-HF .

Fire resistance	Eca																														
N° pairs	1x2P	2x2P	3x2P	4x2P	6x2P	8x2P	10x2P	20x2P	1xQ																						
Conductor size (AWG)																															
26																															
25																															
24																															
23	●	●	●	●	●	●	●	●	●																						
22																															
21																															
20																															

AWG or American Wire Gauge is the US standard measure for the diameter of electrical conductors.
The correlation between conductor size in AWG & mm2 is given in the norm UL 444

The technical datasheet of the products can be obtained from the link below:

https://www.nexans.no/products/Telecommunication-cables/Low-Voltage-Cables-Indoor---Copper/Copper-Alarm-Cables/PT-LSZH-0,16421.html