Environmental Product Declaration

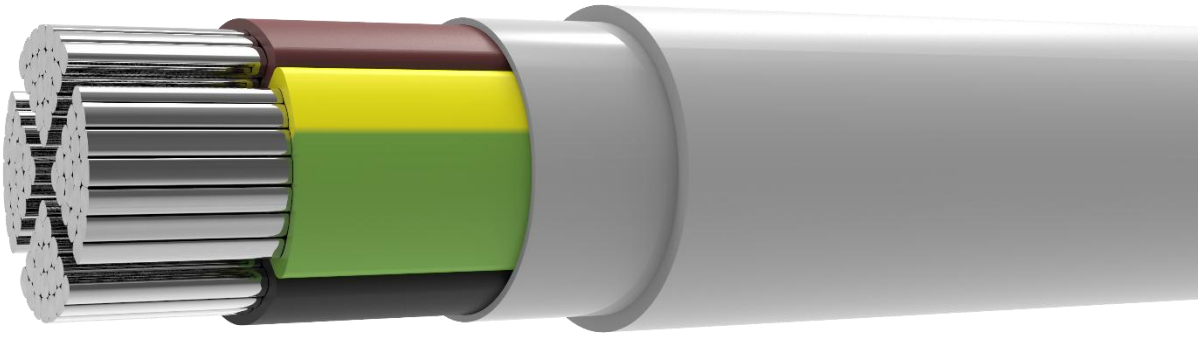
In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

HIK-AL-S / HIK-AL-M / NA2XH Eca and Dca – halogen-free, low smoke, fire resistant power cables with Al conductors

from TT kabeli d.o.o.

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	EPD-IES-0022414
Publication date:	2025-05-21
Valid until:	2030-05-21

EPD of multiple products, based on a representative product
An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
PCR 2019:14 Construction Products (EN 15804:A2), Version 1.3.4. (2024-04-30) PCR 2019:14-c-PCR-019 Electrical cables and wires (for construction sector) (c-PCR to PCR 2019:14) (Adopted from EPD Norway) (2022-03-01)
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: Urtė Valdavičė, UAB Vesta consulting
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Jaka Jelenc (EPD Lead verifier), Camilla Landén Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: TT kabeli d.o.o.

Contact: Eugen Šušak, info@ttcables.com

Description of the organisation: TT Kabeli d.o.o., operating as TT Cables, is a leading producer of low-voltage cables in Southeast Europe. Established in 2007, the company has expanded its reach to supply major wholesalers and cable specialists across Europe, Africa, the Middle East, and North America. Headquartered in Široki Brijeg, Bosnia and Herzegovina, TT Cables has established subsidiaries in Lithuania, Serbia, Croatia, Austria, and Romania to enhance market coverage and customer service. TT Cables offers a diverse product range, including power cables up to 1kV, armoured cables, installation cables, and solar cables, exporting to over 50 countries worldwide. More information can be found here: https://www.ttcables.com/

Product-related or management system-related certifications: TT Kabeli d.o.o. (TT Cables) holds several important certifications related to quality, environmental management, occupational health and safety, and energy management:

- **ISO 9001** – Quality Management System, ensuring consistent product quality and customer satisfaction.
- **ISO 14001** – Environmental Management System, demonstrating commitment to sustainable and environmentally responsible practices.
- **ISO 45001** – Occupational Health and Safety Management System, ensuring a safe working environment and reducing workplace risks.
- **ISO 50001** – Energy Management System, aimed at improving energy efficiency and reducing energy consumption.

Name and location of production site(s): Knešpolje bb, Široki Brijeg, Bosnia and Herzegovina

Product information

Product name: HIK-AL-S / HIK-AL-M / NA2XH Eca and Dca – halogen-free, low smoke, fire resistant power cables with Al conductors

Product group: The EPD covers HIK-AL-S / HIK-AL-M / NA2XH Eca and Dca cables.

Representative product: **INST.KAB.HFALS (N)A2XH 4x240 SM Eca** cable was chosen to represent the product group, because of the highest share in the production quantities by mass within the cables in the group in 2024.

Representative product description: The **INST.KAB.HFALS (N)A2XH 4x240 SM Eca** is a halogen-free, flame-retardant power cable designed for fixed installations in residential, commercial, and industrial environments. It features aluminum conductors, solid or stranded (Class 1 or 2) according to EN 60228, providing a cost-effective solution for power transmission. The conductors are insulated with XLPE compound (DIX 3), offering high thermal and electrical resistance. A bedding layer of extruded elastomere/plastomere or plastic tape adds mechanical protection and structural integrity. The outer sheath is made from a halogen-free flame-retardant (HFFR) compound type HM4, ensuring low smoke emission and minimal toxic gases in the event of a fire. It complies with Eca fire classification under the CPR, suitable for standard fire safety requirements.

Series of cables that falls into the product group is listed in Annex 1

Representative product application areas: The **INST.KAB.HFALS (N)A2XH 4x240 SM Eca** is a halogen-free, flame-retardant power cable designed for fixed installations in a variety of environments where mechanical stress is minimal. It is suitable for laying in earth, ducts, and on support brackets, as

well as in dry and wet conditions, provided that the installation site does not expose the cable to mechanical damage or tensile strain. Its aluminum conductor construction offers a lightweight and cost-effective solution for urban electrical networks, industrial facilities, power generation plants, and other large-scale energy distribution systems. Additionally, the cable is well-suited for connecting control devices across industries such as manufacturing, transportation, and infrastructure, where safe and reliable electrical transmission is essential. The halogen-free design ensures reduced smoke and toxic gas emissions in case of fire, supporting safer evacuation and protection of sensitive equipment.

Representative product technical data:

Feature	Standards	NA2XH
Rated Voltage (U_0/U)	IEC 60502-1, SI 1516-1	0.6/1.0 kV
Test Voltage	IEC 60502-1, SI 1516-1	4 kV
Bending Radius (min)	IEC 60502-1, SI 1516-1	Single-core – 15D Multicore – 12D
Min. Laying Temperature	IEC 60502-1, SI 1516-1	-5°C
Working Temperature	IEC 60502-1, SI 1516-1	Up to +90°C (conductor)
Max. Short-Circuit Temp.	IEC 60502-1, SI 1516-1	+250°C

UN CPC code: 46 - Electrical machinery and apparatus, 4634 - Other electric conductors, for a voltage not exceeding 1000 V

Geographical scope: Global

LCA information

Functional unit / declared unit: in accordance with the PCR the declared unit is 1 meter. The mass of the representative product per declared unit is 3,616 kg.

Reference service life: The reference service life of the product is assumed to be 30 years.

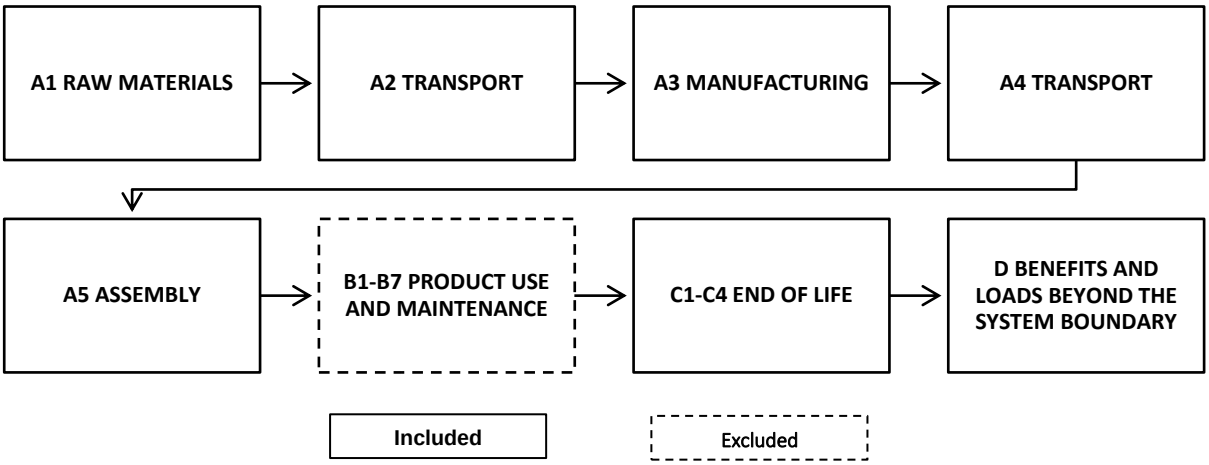
Time representativeness: Primary data was collected internally. The production data refers to the time period of 2024. This is the last full year data.

Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and process materials obtained from the background system. The used database is Ecoinvent 3.10.1. The LCA software used is One Click LCA.

Data quality: The foreground data collected internally is based on yearly production amounts and extrapolations of measurements on specific machines and plants. Overall, the data quality can be described as good. The primary data collection has been done thoroughly.

Description of system boundaries: the EPD cover the cradle to gate with options scope with following modules: A1 (Raw material supply), A2 (Transport), A3 (Manufacturing), A4 (Transport), A5 (Installation), C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing), C4 (Disposal) and D - benefits and loads beyond the system boundary in accordance with EN 15804.

System diagram:



Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	GL	EU	BA	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Specific data used	1,43%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	+13 / -133%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Description of the system boundary (X = Included in LCA; ND = Not declared)

The environmental impacts of capital goods (e.g., production equipment, recycling machinery) and infrastructure (e.g., recycling facilities, transportation systems) have not been included in this assessment.

Cut-off criteria: The study does not exclude any modules or processes which are stated mandatory in the Standards and PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes for which data is available are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total excluded input and output flows do not exceed 5% of energy usage or mass.

Allocation, estimates and assumptions: Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per EN 15804, allocation is conducted in the following order:

1. Allocation should be avoided
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small
3. Allocation should be based on economic values

The allocations in the Ecoinvent 3.10.1 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804'. The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP).

Scenarios included in the LCA are based on realistic scenarios which are currently in use and are representative for one of the most likely scenario alternatives.

Calculation rules for averaging data: The EPD is an EPD of multiple products, based on a representative product. **INST.KAB.HFALS (N)A2XH 4x240 SM Eca** cable was chosen as representative product, because of the highest share in the production quantities by mass within the cables in the group in the analysed period. The EPD does not claim compliance with ISO 21930, therefore variations above 10% are allowed. Applying a representative product ensures fair market representation and supports practical decision-making without skewing results toward extreme cases.

Product life cycle

Product stage (A1-A3)

A1: This module considers the extraction and processing of raw materials.

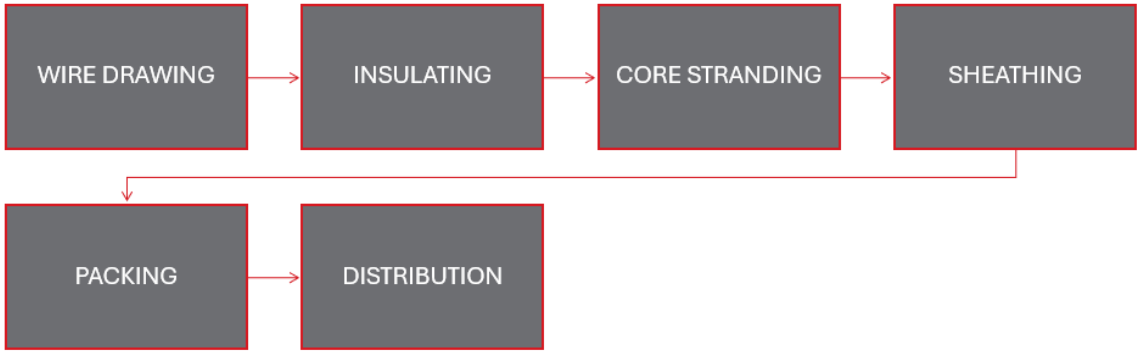
A2: The raw materials are transported to the manufacturing plant. In this case the model includes road transportation of each raw material.

A3: This module includes the manufacture of products and packaging. It has considered all the energy consumption and waste generated in the production plant.

Manufacturing process

The manufacturing process of the **INST.KAB.HFALS (N)A2XH 4x240 SM Eca** cable is designed to ensure safety, durability, and reliable performance in power distribution applications. It begins with the formation of aluminum (Al) conductors, using either Class 1 (RE/SE) solid or Class 2 (RM/SM) stranded construction, in compliance with EN 60228, ensuring consistent mechanical strength and electrical conductivity. These conductors are then insulated with XLPE compound type DIX 3, chosen for its high thermal endurance and dielectric strength, making the cable suitable for demanding, high-voltage environments. Following insulation, a bedding layer is applied using either an extruded elastomere or plastomere compound or a plastic tape, which acts as a protective buffer and prepares the insulated cores for the outer sheathing. Next, the cable is sheathed with a halogen-free flame retardant (HFFR) compound, type HM 4, which ensures low smoke emission, zero halogen content, and enhanced flame resistance. This construction enables the cable to meet the Eca classification under the Construction Products Regulation (CPR), making it suitable for fixed installations that require a basic level of fire performance and environmental safety. After sheathing, the cables undergo quality assurance and compliance testing, and once approved, they are packaged—typically on drums or reels—and sent out for distribution to infrastructure, industrial, or commercial installations.

The manufacturing process diagram is presented below.



Construction process stage (A4-A5)

A4: Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

A5: Environmental impacts from installation into the building (A5) include the generation and treatment of waste at the construction site (100% incineration rate with energy recovery). No energy use has been quantified since installation in buildings is often done by manual labour. No product losses during installation are estimated by the company.

Use stage (B1-B7)

This EPD does not cover the use phase.

Product end of life (C1-C4, D)

C1: Deconstruction, dismantling, demolition

Machinery operations related to de-installation are assumed to be zero, indicating manual execution.

C2: Transport of the discarded product to the processing site

It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. All the end-of-life products are assumed to be sent to the closest facilities such as recycling and incineration. Transportation distance to the closest disposal area is estimated as 100 km and the transportation method is assumed as lorry which is the most common option.

C3: Waste processing for reuse, recovery, and/or recycling

In end-of-life, it is assumed that 60 % of polymer material is collected and sent to incineration facility for energy recovery (R1, >60%) and 90 % of aluminium wire is collected and sent to a recycling site. Product packaging after installation (A5) will also be incinerated with energy recovery.

C4: Discharge (disposal)

It is assumed that 40% of polymer material, 10 % of aluminium wire is not suitable for recycling (e.g. cannot be separated) and are sent for disposal in landfill.

Benefits and loads beyond the system boundary (D):

In the end-of-life scenario D, aluminium is recovered and recycled into post-consumer aluminium, offsetting the need for virgin aluminium production. Additionally, a portion of the product and its packaging is incinerated with energy recovery, reducing the demand for non-renewable energy sources such as natural gas.

Content information

The table below represents the product and packaging material content information for 1 meter of the representative product **INST.KAB.HFALS (N)A2XH 4x240 SM Eca**.

Product components	**Weight, kg/m**	**Post-consumer material, weight-%**	**Biogenic material, weight-% and g C/kg**
Aluminium (conductor)	2,63E+00	10,00	0
XLPE (insulation)	4,39E-01	0	0
HFFR (sheath)	4,94E-01	0	0
XLPE (catalyst)	2,33E-02	0	0
MB-XLPE (colour insulation)	4,67E-03	0	0
MB-EVA (bedding)	7,63E-03	0	0
PP tape (insulation)	1,66E-02	0	0
TOTAL	**3,62E+00**	**7,28**	**0**
Packaging materials	**Weight, kg/m**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C**
[1]Wooden drum (wood)	1,12E+00	30,84	[2] 7,40E+00
Wooden drum (metal)	3,45E-02	0,95	0
Thermal cap	1,76E-03	0,05	0
TOTAL	**1,15E+00**	**31,85**	**7,40E+00**

[1]Global Warming Potential biogenic: -1.81 kg CO_2e / kg
[2] Conversion factor for converting kg CO_2 to kg C: 44/12 = 3.67

All EPDs products do not contain any REACH SVHC substances in amounts greater than 0.1% (1000 ppm).

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Usage of results from A1-A3 without considering the results of module C is not encouraged.

The declared unit is 1 m of **INST.KAB.HFALS (N)A2XH 4x240 SM ECA** cable. The mass of the representative product per declared unit is 3,616 kg/m.

Mandatory impact category indicators according to EN 15804+A2 (Reference package EF3.1)

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	2,24E+01	9,55E-01	2,05E+00	0,00E+00	3,74E-02	1,44E+00	2,66E-02	-1,98E+01
GWP-fossil	kg CO_2 eq.	2,43E+01	9,55E-01	2,98E-02	0,00E+00	3,74E-02	1,44E+00	2,66E-02	-1,98E+01
GWP-biogenic	kg CO_2 eq.	-2,02E+00	0,00E+00	2,02E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-luluc	kg CO_2 eq.	7,17E-02	3,72E-04	9,58E-06	0,00E+00	1,46E-05	5,28E-05	1,62E-05	1,38E-03
ODP	kg CFC 11 eq.	2,89E-07	1,99E-08	4,49E-10	0,00E+00	7,80E-10	8,35E-10	2,56E-10	2,37E-08
AP	mol H^+ eq.	1,38E-01	2,25E-03	2,14E-04	0,00E+00	8,82E-05	5,34E-04	1,06E-04	-7,90E-02
EP-freshwater	kg P eq.	8,10E-03	6,67E-05	8,58E-06	0,00E+00	2,61E-06	2,18E-05	3,10E-05	-2,37E+00
EP-marine	kg N eq.	2,42E-02	5,91E-04	1,06E-04	0,00E+00	2,32E-05	2,56E-04	5,79E-04	-4,90E-03
EP-terrestrial	mol N eq.	2,51E-01	6,39E-03	1,03E-03	0,00E+00	2,50E-04	2,09E-03	3,55E-04	-5,10E-02
POCP	kg NMVOC eq.	8,86E-02	3,92E-03	2,87E-04	0,00E+00	1,53E-04	5,43E-04	1,78E-04	-1,74E-02
ADP-minerals&metals*	kg Sb eq.	2,77E-04	2,73E-06	7,07E-08	0,00E+00	1,07E-07	1,03E-06	3,20E-08	2,38E-04
ADP-fossil*	MJ	3,12E+02	1,43E+01	3,37E-01	0,00E+00	5,62E-01	6,39E-01	2,39E-01	-2,80E+02
WDP*	m^3	8,02E+00	7,34E-02	3,85E-02	0,00E+00	2,88E-03	1,03E-01	4,13E-03	5,34E-01
Acronyms	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								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO2 eq.	2,44E+01	9,55E-01	2,98E-02	0,00E+00	3,74E-02	1,44E+00	2,66E-02	-1,98E+01
Particulate matter	Incidence	3,23E-06	9,31E-08	3,24E-09	0,00E+00	3,65E-09	4,94E-09	1,61E-09	-1,30E-07
Ionizing radiation	kBq U235e	1,67E+00	1,73E-02	3,96E-04	0,00E+00	6,77E-04	5,99E-03	5,52E-04	1,41E-01
Ecotoxicity (freshwater)	CTUe	1,29E+02	1,69E+00	1,42E-01	0,00E+00	6,62E-02	3,16E+00	5,03E+01	2,29E+01
Human toxicity, cancer	CTUh	1,53E-08	1,59E-10	3,53E-11	0,00E+00	6,23E-12	1,59E-10	1,74E-11	-1,25E-07
Human tox. non-cancer	CTUh	2,43E-07	9,26E-09	2,36E-09	0,00E+00	3,63E-10	5,37E-09	2,93E-09	7,56E-08
SQP	-	2,10E+02	1,44E+01	2,24E-01	0,00E+00	5,65E-01	2,07E+00	4,10E-01	1,38E+01

Resource use indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	4,70E+01	2,33E-01	-1,95E+01	0,00E+00	9,14E-03	8,36E-02	-3,61E+00	-3,28E+01
PERM	MJ	1,14E+01	0,00E+00	-1,14E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	5,83E+01	2,33E-01	-3,09E+01	0,00E+00	9,14E-03	8,36E-02	-3,61E+00	-3,28E+01
PENRE	MJ	2,71E+02	1,43E+01	3,37E-01	0,00E+00	5,62E-01	-2,08E+01	-2,13E+00	-2,76E+02
PENRM	MJ	3,90E+01	0,00E+00	-8,53E-02	0,00E+00	0,00E+00	-2,33E+01	-1,55E+01	0,00E+00
PENRT	MJ	3,10E+02	1,43E+01	2,52E-01	0,00E+00	5,62E-01	-4,42E+01	-1,77E+01	-2,76E+02
SM	kg	8,21E-01	6,20E-03	4,48E-04	0,00E+00	2,43E-04	9,73E-04	8,65E-05	2,13E+00
RSF	MJ	8,88E-04	7,82E-05	1,85E-06	0,00E+00	3,06E-06	6,54E-05	1,34E-06	1,14E+01
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
FW	m^3	2,80E-01	2,12E-03	2,58E-04	0,00E+00	8,29E-05	1,81E-03	-2,49E-03	3,79E-02
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

Note: Option A was chosen for the calculations of the primary energy indicators, according to on Annex 3 of PCR 2019:14

Waste indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	4,05E+00	2,07E-02	7,71E-03	0,00E+00	8,13E-04	2,82E-02	1,20E-03	-6,59E+00
Non-hazardous waste disposed	kg	5,83E+01	4,15E-01	1,19E+00	0,00E+00	1,63E-02	8,48E-01	3,46E+00	6,93E+00
Radioactive waste disposed	kg	4,25E-04	4,27E-06	9,83E-08	0,00E+00	1,67E-07	1,53E-06	1,35E-07	-8,09E-04

Output flow indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	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
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,37E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	1,15E+00	0,00E+00	0,00E+00	5,91E-01	0,00E+00	0,00E+00
Exported energy, electricity	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
Exported energy, thermal	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

Variation of core environmental performance indicators

In accordance with the regulations, the variation between the highest and lowest environmental impact indicator results (mandatory and additional) for modules A to C is declared. The thickest cable within the product group is assumed to have the highest environmental impact results and the thinnest cable is assumed to have the lowest environmental impact results. The variation between products is mainly subjected to material weight, due to green energy in production.

Variation of results		
Indicator	**Unit**	**A – C**
GWP-total	kg CO_2 eq.	130%
GWP-fossil	kg CO_2 eq.	130%
GWP-biogenic	kg CO_2 eq.	-
GWP-luluc	kg CO_2 eq.	142%
ODP	kg CFC 11 eq.	117%
AP	mol H^+ eq.	139%
EP-freshwater	kg P eq.	141%
EP-marine	kg N eq.	135%
EP-terrestrial	mol N eq.	136%
POCP	kg NMVOC eq.	129%
ADP-minerals&metals	kg Sb eq.	140%
ADP-fossil	MJ	127%
WDP	m^3	139%

Variation results		
Indicator	**Unit**	**A – C**
GWP-GHG	kg CO2 eq.	130%
Particulate matter	Incidence	138%
Ionizing radiation	kBq U235e	140%
Ecotoxicity (freshwater)	CTUe	140%
Human toxicity, cancer	CTUh	140%
Human tox. non-cancer	CTUh	131%
SQP	-	30%

*Note. For example, if the variation between the values 9 and 10 is calculated, the following calculation shall be made: 1/9.5*100 = 10.526…% ≈ 11% (with two decimals).*

Additional environmental information

Manufacturing energy scenario documentation

Scenario parameter	Global warming potential (A1-A3) value	Source
Renewable energy mix	0.0074 kg CO_{2e} / kWh	Elektroprivreda BiH d.d. Sarajevo (EPBIH) energy generation power balance (2022) https://www.epbih.ba/eng/page/about-company#power-balance
Market for diesel, burned in building machine (Reference product: diesel, burned in building machine)	0.0278 kg CO_{2e} / kWh	Country: World Data source: ecoinvent 3.10.1
Market for propane, burned in building machine (Reference product: propane, burned in building machine)	0.0262 kg CO_{2e} / kWh	Country: World Data source: ecoinvent 3.10.1

Transport to the building site scenario documentation

Scenario information	Value
Vehicle type used for transport	Market for transport, freight, lorry >32 metric ton, EURO6
Distance, km	1936
Capacity utilisation (including empty returns), %	100
Weight of transported products with packaging	4,7676 kg/m
Volume capacity utilisation factor	1

End-of-life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	3,62E+00
Collection process – kg collected with mixed waste	-
Recovery process – kg for re-use	-
Recovery process – kg for recycling	2,37E+00
Recovery process – kg for energy recovery	5,91E-01
Disposal (total) – kg for final deposition	6,57E-01
Scenario assumptions e.g. transportation	Dismantled product is transported 100 km

References

Standards and PCR

1. General Programme Instructions of the international EPD® system. Version 4.0.
2. PCR 2019:14 Construction Products (EN 15804:A2) version 1.3.4 (2024-04-30)
3. Product Category Rules PCR 2019:14-c-PCR-019 Electrical cables and wires (for construction sector) (c-PCR to PCR 2019:14) (Adopted from EPD Norway) (2022-03-01)
4. EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
5. ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
6. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
7. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
8. Cables LCA background report.

Data references:

1. One Click LCA tool
2. Ecoinvent database v3.10.1 (2024)

Annex 1

Series of cables that falls into the product group are presented below.

- HIK-AL-M 4x16 RE Dca
- HIK-AL-M 4x16 RE Eca
- HIK-AL-M 4x25 RE Dca
- HIK-AL-M 4x25 RE Eca
- HIK-AL-M 5G10 RE Dca
- HIK-AL-M 5G16 RE Dca
- HIK-AL-M 5G16 RE Eca
- HIK-AL-M 5G25 RE Dca
- HIK-AL-M 5G25 RE Eca
- HIK-AL-S 4x150 SM Eca
- HIK-AL-S 4x185 SM Eca
- HIK-AL-S 4x240 SM Eca
- HIK-AL-S 4x50 SM Eca
- HIK-AL-S 4x95 SM Eca
- HIK-Al-S 1G120 RM Dca
- HIK-Al-S 1G150 RM Dca
- HIK-Al-S 1G150 RM Eca
- HIK-Al-S 1G240 RM Dca
- HIK-Al-S 1G240 RM Eca
- HIK-Al-S 1G50 RM Dca
- HIK-Al-S 1G50 RM Eca
- HIK-Al-S 1G70 RM Dca
- HIK-Al-S 1G95 RM Dca
- HIK-Al-S 1G95 RM Eca
- HIK-Al-S 1x240 RM Eca
- HIK-Al-S 4x120 SM Dca
- HIK-Al-S 4x150 SM Dca
- HIK-Al-S 4x185 SM Dca
- HIK-Al-S 4x240 SM Dca
- HIK-Al-S 4x300 SM Dca
- HIK-Al-S 4x50 SM Dca
- HIK-Al-S 4x95 SM Dca
- NA2XH-0 1x120 RM Dca
- NA2XH-0 1x150 RM Dca
- NA2XH-0 1x185 RM Dca
- NA2XH-0 1x240 RM Dca
- NA2XH-0 1x25 RM Dca
- NA2XH-0 1x300 RM Dca
- NA2XH-0 1x35 RM Dca
- NA2XH-0 1x50 RM Dca
- NA2XH-0 1x70 RM Dca
- NA2XH-0 1x95 RM Dca
- NA2XH-J 1x35 RM Dca
- INST.KAB.HFALS (N)A2XH 4x25 RM Eca
- INST.KAB.HFALS (N)A2XH 4x16 RM Eca
- INST.KAB.HFALS (N)A2XH 1x95 RM_crna Dca
- INST.KAB.HFALS (N)A2XH 1x70 RM_crna Dca
- INST.KAB.HFALS (N)A2XH 1x50 RM_crna Dca
- INST.KAB.HFALS (N)A2XH 1x300 RM_crna Dca
- INST.KAB.HFALS (N)A2XH 1x240 RM_crna Dca
- INST.KAB.HFALS (N)A2XH 1x185 RM_crna Dca
- INST.KAB.HFALS (N)A2XH 1x150 RM_crna Dca
- INST.KAB.HFALS (N)A2XH 1x120 RM_crna Dca
- INST.KAB.HFALS (N)A2XH 1G95 RM Dca
- INST.KAB.HFALS (N)A2XH 1G50 RM Dca
- INST.KAB.HFALS (N)A2XH 1G240 RM Dca
- INST.KAB.HFALS (N)A2XH 1G150 RM Dca
- INST.KAB.HFALS (N)A2XH 5G25 RM Eca
- INST.KAB.HFALS (N)A2XH 5G16 RM Eca
- INST.KAB.HFALS (N)A2XH 4x95 SM Eca
- INST.KAB.HFALS (N)A2XH 4x70 SM Eca
- INST.KAB.HFALS (N)A2XH 4x50 SM Eca
- INST.KAB.HFALS (N)A2XH 4x50 SM Dca
- INST.KAB.HFALS (N)A2XH 4x300 SM Eca
- INST.KAB.HFALS (N)A2XH 4x240 SM Eca
- INST.KAB.HFALS (N)A2XH 4x185 SM Eca
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- INST.KAB.HFALS (N)A2XH 4x120 SM Eca
- INST.KAB.HFALS (N)A2XH 1G95 RM Eca
- INST.KAB.HFALS (N)A2XH 1G70 RM Eca
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- INST.KAB.HFALM (N)A2XH 5G16 RE Eca
- INST.KAB.HFALM (N)A2XH 5G10 RE Eca
- INST.KAB.HFALM (N)A2XH 4x95 SE Eca
- INST.KAB.HFALM (N)A2XH 4x50 RE Eca
- INST.KAB.HFALM (N)A2XH 4x25 RE Eca
- INST.KAB.HFALM (N)A2XH 4x240 SE Eca
- INST.KAB.HFALM (N)A2XH 4x16 RE Eca
- INST.KAB.HFALM (N)A2XH 4x150 SE Eca

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