

ICME ECAB S.A.



ENVIRONMENTAL PRODUCT DECLARATION

Product: name:

Site Plant:

**Railway signaling cable EPR/PCP
650/1.100 V 1X2.5 RM flexible**

**Drumul Între Tarlale 42, București 032982, Bucharest,
Romania**

Program Operator	EPDItaly
Publisher	EPDItaly
Declaration Number	EI0002
Registration Number	EPDITALY 0774
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Valid to	2029-06-30



in compliance with ISO 14025:2006 and EN 50693:2019

General information

EPD OWNER	ICME ECAB S.A. Drumul Între Tarlale 42, București 032982, Bucharest, Romania
SITE	Drumul Între Tarlale 42, București 032982, Bucharest, Romania
FIELD OF APPLICATION OF THE PRODUCT	<p>The present document includes the environmental impact assessment of:</p> <ul style="list-style-type: none">Railway signaling cable, with EPR (rubber) and PCP 650/1.100 V 1x2,5 RM flexible conductor <p>Geographical scope is global for upstream module and manufacturing is performed in Romania and distribution (downstream) in the UK.</p>
PROGRAM OPERATOR	<p>EPDItaly info@epditaly.it (via Gaetano De Castillia n° 10 - 20124 Milan, Italy)</p> <p>The PCR EPDITALY007 review was performed by Ing. Massimo De Pieri, Arch. Michele Paleari, Ing. Sara Toniolo. - info@epditaly.it. (via Gaetano De Castillia n° 10 20124 Milan, Italy. Accredited by Accredia.)</p> <p>Independent verification of the declaration and data, carried out according to</p>
VERIFICATION INFORMATION	<p>ISO 14025: 2010.</p> <p><input type="checkbox"/> Internal <input checked="" type="checkbox"/> External</p> <p>Third party verification carried out by: SGS Italia S.p.A., 0005VV</p>
EPD type	Product specific EPD
CPC CODE	463 – family “Insulated wire and cable; optical fibre cables” and sub-sequent clusters
CONTACTS for information on the EPD	Konstantinos Loukas kloukas@hellenic-cables.com
PROJECT REPORT LCA	ICME ECAB S.A. (internally performed)
COMPARABILITY STATEMENT	<p>Environmental statements published within the same product category, but from different programs, may not be comparable.</p> <p>ICME ECAB S.A. declares to comply with environmental legislation (ISO 14001 certified). The holder of the declaration will be responsible for the information and supporting evidence.</p>
LIABILITY STATEMENT	
PRODUCT CATEGORY RULES – PCR	<p>Core-PCR: EPDITALY007 " Electronic and electrical product and systems" Rev. 3 13/01/2023</p> <p>Sub-PCR: EPDITALY016 "Electronic and electrical product and systems – Cables and wires" Rev. 2 del 25/09/2020</p>
SYSTEM BOUNDARIES	Cradle-to-grave, excluding installation and de-installation stages

Introduction

ICME ECAB S.A. is a power and telecommunication cable manufacturer, as well as polymer and rubber compounds. The Company is located in Bucharest, Romania and operates a single manufacturing facility. The company's wide product range extends to PVC, EPR power and telecom, low smoke halogen free cables, fire resistant cables, telecommunication, signal and data cables with copper conductors or optical fibers, as well as fire retardant halogen free plastic and elastomer compounds. Wires and cables are supplied to a variety of international standards. The Company's Quality Management System is certified to ISO 9001:2015, its Environmental Management System to ISO 14001:2015, GHG emissions Management System to ISO 14064:2018 and its Occupational Health and Safety to ISO 45001:2018. The present EPD follows EPD regulations v.6.0 from the EPDItaly.

Goal and scope of the study

The goal of the study is to evaluate the environmental performance of a low voltage single core signaling cable (railway), in order to develop the Environmental Product Declaration (EPD) of this product. The scope of the study is to calculate the environmental performance of the production of low voltage single core signaling cable from cradle to grave, excluding the installation and de-installation stage (as it does not classify as a construction product). The additional/potential benefits at the EoL stage are excluded. Table 1 presents the modules included in the present study.

Table 1 Modules included under cradle to grave

MANUFACTURING STAGE		DISTRIBUTION STAGE	USE STAGE	END-OF-LIFE STAGE
UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE		
Extraction and preparation of raw materials, including waste recycling-pretreatment processes	manufacturing of the product constituents, including relevant processes, energy flows and packaging materials	Transportation via ship and truck to the customer	Electrical losses of the cable during use stage (energy dissipated as heat)	Cable stripping and dismantling, treatment of different components (energy recovery, recycling)
transportation of raw materials to the manufacturing site	product assembly	According to EN 50693		
	packaging			
	waste management processes			

Product Description

The present assessment was performed according to the guidelines of the EPDItaly Program Operator in accordance with standards (ISO 14040 and 14044) and other reference documents already cited in the

introduction (PCR EPDItaly016 - Cables and wires). The power cable under assessment is the EPR/PCP 650/1.100 V 1X2.5 RM with flexible copper conductor. The cable is used as a signaling railway cable, being a finished product which does not require further processing (apart from the installation). Electrical and mechanical properties are usually defined by the end customer and the design phase follows the corresponding technical specifications, to meet the use phase conditions (nominal voltage, power in Amperes etc.). Table 2 includes the main technical specifications.

Table 2 Technical specifications of the cable

General Description: Railway signaling cable EPR/PCP 650/1.100 V 1X2.5 RM FLEXIBLE	
Standard specification:	NR/PS/SIG/00005 ISSUE 1
Type of cable:	EPR/PCP
Rated voltage U ₀ /U (U _{max}):	650/1.100 V
Number of cores x Nominal cross-section:	1x2.5 mm ²
Approximate cable overall diameter:	11.88 mm
Approximate cable overall weight:	0,171 kg/m
Nominal drum length (Tolerance):	500 m (± 1%)

The production includes utilization of copper cathodes, used for the production of the cable conductor (melting primary copper to form a solid copper rod, which will then undergo a wire drawing process, reducing the rod diameter to the designed cross-section, in this case 2,5 mm²). The conductor will be then electrically insulated with a rubber compound and a helically applied polyester-based tape. A PVC-based compound, internally produced at the site, will be then extruded as the outer sheath of the cable. Table 2 presents the main components included.

Table 3 Cable bill of materials according to IEC 62474

Material class	Material category	Raw materials	Units	Amount
Inorganic materials	M-121	Copper conductor	Kg/m	0,024
Organic materials	M-322	Ethylene Propylene Rubber	Kg/m	0,015324
Organic materials	M-301	Polyester-based tape	Kg/m	0,00064
Organic materials	M-339	PCP (polychloroprene)	Kg/m	0,1656
Total weight			Kg/m	0,1713

The total weight of the wood used for packaging (wooden drum) per 1 km is 19 k

Manufacturing stage includes all the processes presented below:

1. Copper conductor casting (Fulgor copper foundries, Greece)
2. Copper wire drawing and stranding (ICME ECAB, Bucharest)
3. Insulating layer (Ethylene Propylene Rubber)
4. Polyester-based tape
5. PCP outer jacket (PVC-based compound)

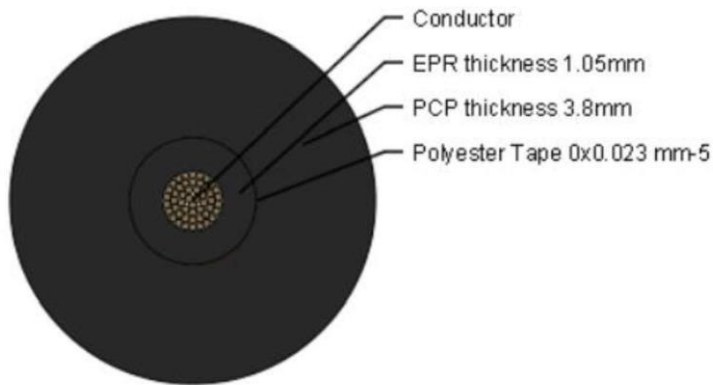


Figure 1 Cable manufacturing steps

The cable does not contain any hazardous substances, specifically identified as substances of very high concern, according to REACH regulation.

Description of modules included

The production starts with the material supply. This stage includes the mining and processing of raw materials. The company is part of a global supply chain, with suppliers and raw materials scattered across different continents. Main materials used in the production are the copper cathodes used for the production of the cable conductor, rubber compound for electrical insulation and PVC-based compound, internally produced at the site, used as the outer sheath of the cable. Primary materials arrive to the company's gate mostly via trucks and container ships. During manufacturing, the company is using diesel oil (for inhouse transportation) and natural gas for steam generation. In addition, manufacturing stage includes the treatment of generated waste, which considers plastics and metals recycling/landfilling, respectively. The manufactured product will be transported to the UK, to the storage facility.

For the use stage of the product, an amount of electrical energy will be dissipated to the environment, as a result of the conductor's electrical losses from the resistivity of copper. To calculate the respective losses over the cable's life cycle, the following assumptions were used:

- Current: 1 A
- Resistivity of Copper: 8,21 Ω km (IEC 60228)
- Reference Service Life: 30 years and 100% use rate (seconds)

Losses are calculated as: $I^2 \cdot R \cdot RSL$ (in Joules)

After deinstallation of the cable (excluded in this study), dismantled cables will be transported to the recycling facility to reclaim recyclable parts, where plastics will be driven to energy recovery, via mechanical separation. Therefore, no disposal will take place with regards to stripped cable components.

Use of renewable electricity

ICME ECAB has an active power purchase agreement with Hidroelectrica, the largest producer of hydropower in Romania, followed by the respective guarantees of origin (GOs). Hence, the following dataset has been

METHODOLOGY

The methodology followed as a reference standard is that of the Life Cycle Assessment, which considers all environmental aspects and potential environmental impacts along the life cycle of the product, from the extraction and transport of raw materials through manufacture and use, up to at the end of life.

DECLARED UNIT

1 km of cable for all the life cycle stages besides use phase

EXCLUSIONS AND CUT OFF

The impacts from these things are not considered in the present study:

- electricity consumption for office;
- production, transport and installation of capital goods (buildings, infrastructures, machinery);
- materials and energy flows of the installation and deinstallation stages

DATA QUALITY

In the context of this study, the activity data are mainly of "primary type", i.e., collected with the support of the Company for the specific production site.

Generic data refer to LCA for Experts, professional database CUP v.2023.2. The database used is regarded as representative on the basis of a comparative study, which examined the data for a reference product of the EPD Owner.

REFERENCE PERIOD

The primary data collected in the context of this study refer to the year 2023.

ALLOCATION

The allocation criteria adopted for the LCA model comply with the reference standards. Primary data from the production stage have been allocated to the product on the basis of production mass. Mass allocation was used to estimate energy and resources consumption of each product.

STAGES

UPSTREAM CORE

Manufacturing stage:

- Extraction of raw materials and production of final cable products;
- Transport of materials in manufacturing site;
- Manufacturing and assembling of the product;
- Waste disposal and recycling.

DOWNSTREAM

Distribution stage: transport of the finished product to the final customer.

Use and maintenance stage: the electrical energy losses of the cables encountered during operation, for the whole duration of their life cycle (40 years).

End of life stage: the transport of the product to the treatment site and the final disposal of the product.

The disposal scenario of both cables under the present EPD consider stripping, plastics incineration and metals recycling.

Reference

Service Life (RSL)

In this LCA study, functional to obtaining the EPD certification, a useful life was considered 40 years and 100% use rate, in accordance with the provisions of the reference PCR.

REFERENCES:

- General Programme Instructions of the EPDItaly, Version 6.0
- EPDItaly007-CORE-PCR-EN-50693_13012023-rev.3
- EN 15804:2012+A2:2019 Sustainability of construction works - Environmental Product Declarations, Core rules for the product category of construction products
- EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems
- ISO 14020:2000 Environmental labels and declarations, General principles
- ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations — Principles and procedures
- ISO 14040:2006 Environmental management - Life cycle assessment-Principles and framework
- ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines
- EPDItaly016-SUB-PCR-EN-50693_cables_v2