EPD - ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Halogen Free Rigid Tube for electrical installation LLH, MLH and FLH

JSL Material Eléctrico SA

GENERAL INFORMATION

Manufacturer: **JSL MATERIAL ELÉCTRICO SA**

Address: Rua Mário Castelhano 3, Zona Industrial de Queluz de Baixo, 2730-120 Barcarena - Portugal

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EPD STANDARDS, SCOPE AND VERIFICATION

Reference standard: **EN 15804+A2:2019 and ISO 14025**

Sector: **Electrical installation products**

PCR : **EPD Hub Core PCR version 1.0, 1 Feb 2022**

Category of EPD : **Group EPD (EPD of multiple products)**

Scope of the EPD: **Cradle to gate with options, A4-A5, and modules C1-C4, D**

EPD author: **Paulo Oliveira, Chem. Engineer and Quality and Environment Manager at JSL**

EPD verification: **Verification of this EPD and data, according to ISO 14025 made by internal JSL staff**

External verification: **None. Type II EPD**

NOTICE: The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name : **Halogen Free rigid conduit for electrical and telecommunications installations (see JSL catalogue)**

Tubes Product references: LLH, MLH and FLH with external diameters (mm): 16, 20, 25, 32, 40, 50 and 63

Place of production: **JSL MATERIAL ELÉCTRICO SA,** Rua Mário Castelhano 3, Zona Industrial de Queluz de Baixo, 2730-120 Barcarena - Portugal

Period for data : 2023

Averaging in EPD: YES, average of all the references of the tube

ENVIRONMENTAL DATA SUMMARY

Declared unit: 1 kg of tube
Declared unit mass: 1 kg
GWP-fossil, A1-A3 (kgCO2e) 2,05E0
GWP-total, A1-A3 (kgCO2e) 6,17E-1
Secondary material, inputs (%) 66,1
Secondary material, outputs (%) 5,0
Total energy use, A1-A3 (kWh) 9,94
Total water use, A1-A3 (m3e) 7,76E-2

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

JSL is an electrical products manufacturer since 1960 and always producing their products rethinking raw materials consumption, water and energy and the impact on both costs and environment as also the facility and recyclability of the products on their end of life. . Our offer, including electrical installation safety, performance and halogen free conduits and reliable infrastructure, enables a more sustainable living environment.

We help our customers in residential and commercial construction, municipalities and utilities, as well as different industries to work faster , smarter and with a competitive price, but always assuring safe products and according the applicable Standards. We employ about 96 professionals in our plant , export to all European countries and more than 56 countries in the world.

We create trust together with our partners: Customers, prospective customers and suppliers. We establish this with shared knowledge, quality and sustainable results.

JSL is a Certified Company according ISO 9001 and ISO 14001 Standards

PRODUCT DESCRIPTION

Rigid tube made of polymer blend halogen free according to applicable standards; acid free and complying with the general European Standards EN 61386 (2023) and their amendments. The tube is produced in 3 different colors; RAL 7035 grey color, RAL 9005 Black Color and RAL 9010 White color. It´s mainly used in electrical and telecommunications infrastructure in both indoor and outdoor use, ensuring that the cables of low and high voltage cables and all kinds of data transmission are well protected.
The LLH, MLH and FLHD (low loads halogen free tube, medium loads halogen free tube and heavy loads halogen free tube) are part of JSL halogen free product offering. Polymer blend used as raw material for the pipe is based on the SABIC product range supplied by SABIC and includes recycled raw material added at JSL extrusion plant.
The product is supplied in 3 meter sections and packed with film protection band.

PRODUCT RAW MATERIAL MAIN COMPOSITION (LLH, MLH, FLH)

Raw material	category	Amount,	mass- %	Material origin
Metals	--	--	--	--
Minerals	CaCO3	3%	3.0	EU
Fossil materials	PC-ABS Polymer	95.9%	96.9	EU
Fossil materials	Polyolefin(PE)	0.1%	0.1	EU
Bio-based materials	Masterbatch colorant	1%	1.0	EU

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit : 1 kg of pipe
Mass per declared unit : 1 kg
Reference service life: 50 years

SUBSTANCES, REACH - VERY HIGH CONCERN (LLH, MLH, FLH)

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
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		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = **MND.**
Modules not relevant = **MNR**.

MANUFACTURING AND PACKAGING (A1-A3 steps)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

–Material conveying and transportation
–Material Drying
–Extrusion (melting, material processing)
–Cooling
–Cutting
–Packing

Packaging of the finished product consists of a wooden U-frame with a wooden floor on the bottom . The tubes are joint and wrapped with film according their diameter. The amount of pipes join differs depending of the pipe diameter. The wooden frame and palette as a plastic band around to tighten the package.
Notice: as the palette could be used again and several times, it has not been included in the calculations of the EPD.

The Rigid halogen free tubes are manufactured in compliance with the requirements in the following standard: EN 61386-1:2021 Conduit systems for cable management – Part 1: General requirements (IEC 61386-1:2008: Amd 1 2019) Amendment A1 Conduit systems for cable management , EN 61386-21:2021 and EN 60754-1:2014

MANUFACTURING PROCESS

TRANSPORT AND INSTALLATION (A4-A5 steps)
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. The transportation distance is defined according to the PCR. The average distance of transportation from the production plant to the installation site is based on the actual sales average figures of the company in the local Markets in Europe using Belgium as a milestone. The installation scenarios in JSL's infrastructure product EPDs are based on TEPPFA's (The European Plastic Pipe and Fittings Association) industry averaged EPDs. These documents and their background reports include industry consensus estimates of the resource use, emissions and affluents of typical European installations; these parameters have been used as input for the JSL EPD present modeling and futur calculations for similar products. Environmental impacts from installation include standardized energy and installation tools, waste packaging materials and release of biogenic carbon dioxide from wood pallets.

PRODUCT USE AND MAINTENANCE (B1-B7 steps)
This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied considering that are not on our domain or control.

PRODUCT END OF LIFE (C1-C4, D steps)
Since the consumption of energy and natural resources is negligible for disassembling of the end-of-life product, the impacts of demolition are assumed negligible (C1). After ca 50 years of service life 5% of the end-of-life product is assumed to be sent to the closest treatment facilities (C2). The collected 5% from the demolition site is sent to recycling (C3), whereas the remaining 95% is left inert under the ground (C4). Due to the recycling of PC-ABS Polymers , the end-of-life product is converted into recycled Polymer blend of PC-ABS (D).

LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA
The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied 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 for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also 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. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

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.

As it is impossible to collect all energy consumption data separately for each product produced in the plant, data is allocated. Allocation is based on annual production rate and made with high accuracy and precision. The values for 1 kg of the product, which is used within this study, are calculated by considering the total product weight per annual production per tube reference and size. In the factory, several kinds of pipes are produced; since the production processes of these products are similar, the annual production percentage is taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total fuel consumption, consumed water and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 1 kg and the corresponding amount of product is used in the calculations. Besides, since the formulation of the product is certain, raw materials in the product do not need to be allocated considering the total annual production.

AVERAGES AND VARIABILITY

Type of average: average for the total range of references and sizes according annual total production

Averaging method : Weighted average

Variation in GWP-fossil for A1-A3: Not applicable

CALCULATIONS AND BIBLIOGRAPHY

This EPD has been created using excel sheet developed at JSL. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and other European database sources were used as sources of environmental data.

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.
EN 50693:2019. Product category rules for life cycle assessments of electronic and electrical products and systems.
Ecoinvent v3, 2019. Allocation, cut-off by classification. Swiss Centre of Life Cycle Inventories.

DATA QUALITY:

Specific data for the product composition is provided by JSL. The data represent the production of the declared product and were collected for EPD development in the year of study (2023). 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 - PC-ABS Blend	ECOINVENTE 3.6	Database	2019
Plastic - Polyethylene	ECOINVENTE 3.6	Database	2019
Mineral - Calcium carbonate	ECOINVENTE 3.6	Database	2019

Data from material supplier and the LCA generator has been accepted "As-Is" Data from processing JSL in-house has been repeated ongoingly without major deviations. Figures given in document are worst case values.

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs. Allocation used in environmental data sources is aligned with the above.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	5,65E-1	1,4E-2	3,87E-2	6,17E-1	6,4E-2	1,2E-1	MND	MND	MND	MND	MND	MND	MND	2,58E-6	2,27E-4	1,2E-1	1,95E0	-9,9E-2
GWP – fossil	kg CO_2e	1,99E0	1,4E-2	4E-2	2,05E0	6,45E-2	1,18E-1	MND	MND	MND	MND	MND	MND	MND	2,58E-6	2,27E-4	1,85E-2	7,27E-3	-1,02E-2
GWP – biogenic	kg CO_2e	-2,07E0	9,17E-6	-1,36E-3	-2,07E0	4,69E-5	1,79E-3	MND	MND	MND	MND	MND	MND	MND	-1,81E-9	1,65E-7	1,02E-1	1,94E0	-8,89E-2
GWP – LULUC	kg CO_2e	6,4E-1	4,29E-6	1,97E-5	6,4E-1	1,94E-5	1,32E-5	MND	MND	MND	MND	MND	MND	MND	7,42E-9	6,84E-8	1,07E-5	3,56E-6	4,33E-5
Ozone depletion pot.	kg CFC_{-11}e	7,44E-8	3,25E-9	2,11E-9	7,97E-8	1,52E-8	2,48E-8	MND	MND	MND	MND	MND	MND	MND	1,85E-13	5,34E-11	1,34E-9	1,98E-9	1,24E-9
Acidification potential	mol H^+e	9,82E-3	5,92E-5	2,55E-4	1,01E-2	2,71E-4	1,21E-3	MND	MND	MND	MND	MND	MND	MND	3,29E-8	9,54E-7	5,29E-5	5,52E-5	-2,68E-5
EP-freshwater[2)]	kg Pe	1,64E-4	1,22E-7	1,63E-6	1,66E-4	5,25E-7	6,92E-7	MND	MND	MND	MND	MND	MND	MND	2,81E-10	1,85E-9	3,07E-7	1,19E-7	-4,76E-9
EP-marine	kg Ne	8,62E-3	1,77E-5	1,58E-4	8,8E-3	8,17E-5	5,27E-4	MND	MND	MND	MND	MND	MND	MND	3,72E-9	2,88E-7	1,47E-5	1,9E-5	9,71E-6
EP-terrestrial	mol Ne	3,39E-2	1,96E-4	9,93E-4	3,51E-2	9,02E-4	5,78E-3	MND	MND	MND	MND	MND	MND	MND	4,34E-8	3,18E-6	1,6E-4	2,1E-4	5,33E-5
POCP ("smog")[3)]	kg NMVOCe	6,56E-3	6,28E-5	1,64E-4	6,78E-3	2,9E-4	1,59E-3	MND	MND	MND	MND	MND	MND	MND	1,42E-8	1,02E-6	5,18E-5	6,01E-5	-2,72E-5
ADP-minerals & metals[4)]	kg Sbe	1,33E-5	2,38E-7	1,5E-6	1,5E-5	1,1E-6	2,04E-7	MND	MND	MND	MND	MND	MND	MND	2,66E-10	3,88E-9	2,26E-7	1,13E-7	2,63E-8
ADP-fossil resources	MJ	3,44E1	2,16E-1	2,35E-1	3,49E1	1E0	1,62E0	MND	MND	MND	MND	MND	MND	MND	2,92E-5	3,53E-3	1,81E-1	1,47E-1	-8,97E-1
Water use[5)]	m^3e depr.	1,05E0	8,53E-4	6,69E-3	1,05E0	3,73E-3	1,16E-2	MND	MND	MND	MND	MND	MND	MND	1,32E-6	1,31E-5	3,89E-3	4,8E-3	-8,23E-3

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	6,29E-8	1,26E-9	2,41E-9	6,66E-8	5,84E-9	3,17E-8	MND	MND	MND	MND	MND	MND	MND	2,44E-13	2,06E-11	9,14E-10	9,68E-10	1,21E-9
Ionizing radiation[6)]	kBq U235e	1,75E-1	9,32E-4	7,89E-4	1,77E-1	4,39E-3	6,87E-3	MND	MND	MND	MND	MND	MND	MND	7,87E-8	1,54E-5	5,47E-4	6,04E-4	5,87E-5
Ecotoxicity (freshwater)	CTUe	1,06E1	1,71E-1	7,16E-1	1,15E1	7,67E-1	1,03E0	MND	MND	MND	MND	MND	MND	MND	2,7E-4	2,7E-3	1,91E-1	1,1E-1	1,88E-1
Human toxicity, cancer	CTUh	3,45E-10	4,24E-12	6,06E-11	4,1E-10	1,96E-11	5,35E-11	MND	MND	MND	MND	MND	MND	MND	1,09E-14	6,91E-14	1,95E-11	4,23E-12	2,61E-11
Human tox. non-cancer	CTUh	1,03E-8	1,97E-10	1,3E-9	1,18E-8	9,09E-10	1,03E-9	MND	MND	MND	MND	MND	MND	MND	3,4E-13	3,2E-12	2,72E-10	1,01E-10	2,46E-10
SQP[7)]	-	2,92E1	3,25E-1	3,77E-1	2,99E1	1,52E0	4,95E-2	MND	MND	MND	MND	MND	MND	MND	2,19E-5	5,34E-3	1,1E-1	4,1E-1	1,21E-1

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8]	MJ	1,23E1	2,56E-3	2,42E0	1,48E1	1,26E-2	1,29E-2	MND	MND	MND	MND	MND	MND	MND	3,89E-4	4,45E-5	8,94E-3	2,85E-3	1,08E-3
Renew. PER as material	MJ	3,05E1	0E0	1,22E-1	3,06E1	0E0	-1,22E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-1,52E0	-2,9E1	1,52E0
Total use of renew. PER	MJ	4,28E1	2,56E-3	2,55E0	4,54E1	1,26E-2	-1,09E-1	MND	MND	MND	MND	MND	MND	MND	3,89E-4	4,45E-5	-1,52E0	-2,9E1	1,52E0
Non-re. PER as energy	MJ	2,06E1	2,16E-1	2,35E-1	2,1E1	1E0	1,62E0	MND	MND	MND	MND	MND	MND	MND	2,92E-5	3,53E-3	1,81E-1	1,47E-1	-8E-2
Non-re. PER as material	MJ	1,7E1	0E0	0E0	1,7E1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-8,49E-1	-1,61E1	-5,45E-5
Total use of non-re. PER	MJ	3,76E1	2,16E-1	2,35E-1	3,8E1	1E0	1,62E0	MND	MND	MND	MND	MND	MND	MND	2,92E-5	3,53E-3	-6,68E-1	-1,6E1	-8E-2
Secondary materials	kg	6,61E-1	0E0	0E0	6,61E-1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	4,99E-2
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	7,7E-2	4,51E-5	6,05E-4	7,76E-2	2,09E-4	6,05E-4	MND	MND	MND	MND	MND	MND	MND	3,61E-8	7,36E-7	5,44E-5	1,25E-4	3,49E-5

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,59E-2	2,32E-4	2,68E-3	1,88E-2	9,75E-4	2,54E-3	MND	MND	MND	MND	MND	MND	MND	3,76E-7	3,43E-6	0E0	2,52E-4	8,48E-4
Non-hazardous waste	kg	5,56E-1	2,35E-2	6,72E-2	6,46E-1	1,08E-1	2,83E-2	MND	MND	MND	MND	MND	MND	MND	1,91E-5	3,8E-4	0E0	4,22E-1	2,09E-2
Radioactive waste	kg	1,41E-5	1,47E-6	8,68E-7	1,65E-5	6,89E-6	1,11E-5	MND	MND	MND	MND	MND	MND	MND	8,02E-11	2,43E-8	0E0	9,13E-7	2,86E-7

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	1,5E-2	1,5E-2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	5E-2	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	4,71E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	8,86E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	3,54E-1	1,39E-2	4,04E-2	4,08E-1	6,4E-2	1,17E-1	MND	MND	MND	MND	MND	MND	MND	2,5E-6	2,25E-4	1,81E-2	7,16E-3	-6,8E-3
Ozone depletion Pot.	kg CFC_{-11}e	2,89E-6	2,58E-9	1,98E-9	2,9E-6	1,21E-8	1,96E-8	MND	MND	MND	MND	MND	MND	MND	1,7E-13	4,25E-11	1,12E-9	1,58E-9	9,09E-10
Acidification	kg SO_2e	7,45E-3	3,43E-5	1,69E-4	7,65E-3	1,31E-4	1,85E-4	MND	MND	MND	MND	MND	MND	MND	2,85E-8	4,62E-7	3,33E-5	3,04E-4	-2,86E-5
Eutrophication	kg PO_4^3e	5,13E-3	7,36E-6	1,11E-4	5,25E-3	2,65E-5	3,84E-5	MND	MND	MND	MND	MND	MND	MND	1,24E-8	9,34E-8	3,84E-5	8,21E-6	8,67E-5
POCP ("smog")	kg C_2H_4e	5,81E-4	1,8E-6	6,03E-6	5,89E-4	8,32E-6	1,93E-5	MND	MND	MND	MND	MND	MND	MND	1,53E-9	2,93E-8	3,15E-6	1,57E-6	-4,59E-6
ADP-elements	kg Sbe	1,33E-5	2,38E-7	1,5E-6	1,5E-5	1,1E-6	2,04E-7	MND	MND	MND	MND	MND	MND	MND	2,66E-10	3,88E-9	2,26E-7	1,13E-7	2,63E-8
ADP-fossil	MJ	3,44E1	2,16E-1	2,35E-1	3,49E1	1E0	1,62E0	MND	MND	MND	MND	MND	MND	MND	2,92E-5	3,53E-3	1,81E-1	1,47E-1	-8,97E-1

ENVIRONMENTAL IMPACTS – TRACI 2.1. / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	6,64E-1	1,39E-2	4,05E-2	7,18E-1	6,39E-2	1,16E-1	MND	MND	MND	MND	MND	MND	MND	2,49E-6	2,25E-4	1,81E-2	7,14E-3	-6,83E-3
Ozone Depletion	kg CFC_{-11}e	2,23E-8	3,44E-9	2,32E-9	2,8E-8	1,61E-8	2,62E-8	MND	MND	MND	MND	MND	MND	MND	2,11E-13	5,66E-11	1,47E-9	2,1E-9	1,35E-9
Acidification	kg SO_2e	2,12E-3	5,17E-5	2,02E-4	2,38E-3	2,36E-4	1,1E-3	MND	MND	MND	MND	MND	MND	MND	2,65E-8	8,32E-7	4,68E-5	4,9E-5	-1,79E-5
Eutrophication	kg Ne	1,67E-4	7,23E-6	1,37E-4	3,11E-4	3,32E-5	9,79E-5	MND	MND	MND	MND	MND	MND	MND	3,01E-9	1,17E-7	6,39E-6	5,66E-6	7,22E-6
POCP ("smog")	kg O_3e	2,84E-2	1,12E-3	3,12E-3	3,26E-2	5,18E-3	3,35E-2	MND	MND	MND	MND	MND	MND	MND	2,16E-7	1,82E-5	9,05E-4	1,21E-3	2,75E-4
ADP-fossil	MJ	3,6E0	3,08E-2	2,48E-2	3,65E0	1,44E-1	2,34E-1	MND	MND	MND	MND	MND	MND	MND	2,45E-6	5,06E-4	2,24E-2	2,01E-2	-1,4E-1

VERIFICATION STATEMENT AND VERIFICATION PROCESS FOR THIS EPD

It has been carefully revised by Quality and Environment Technical department staff and Manager and is part of the study and research into the product's ecological passport and following the process, methodology and checklists of the Standards EN 15804+A2 & ISO 14025 / ISO 21930

This EPD has not been verified in accordance with ISO 14025 by an independent third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044.

This EPD must be considered as "Type II".

LIABILITY

I confirm that I have sufficient knowledge and experience of electrical products, extruded products in this specific product category, the construction industry, the electrical and IEC and EN relevant standards, and the geographical area of the EPD to carry out this verification.

I work at JSL - Material Eléctrico company since 1991 and I am the JSL delegate on the Technical Committees TC 23 and TC 64 on Electrical Standards and Standardization of the IPQ – Portuguese Quality Institute

All the information provided is true and in good faith. It has been calculated in the most objective manner and with the minimum possible errors.

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Valid till; December 3, 2029

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