ENVIRONMENTAL PRODUCT DECLARATION

MOSDORFER RAIL
KNILL GRUPPE

In accordance with
UNI EN ISO 14025:2010,
EN 50693:2019

15kV AC CANTILEVER INSULATOR

Registration Number
EPDITALY0598

Date of publication (first issue)
29/05/2024

CPC Code
46940 - Electrical insulators, except of glass or ceramics

Manufacturing site
Dalian CTC Insulator Company Limited
32 Guangyuan Street
Lvshun Economic Development zone
Dalian,
Liaoning Province
China

Program operator & EPD publisher
EPDITALY

Declaration Number
Mosdorfer001

Date of validity
29/05/2029

INFORMATION ON THE PROGRAMME AND VERIFICATION PROCESS

PROGRAMME OPERATOR
EPDItaly
Via Gaetano De Castillia, 10; 20124 – MILANO; E-mail: www.epditaly.it

EPDs within the same product category but from different programmes may not be comparable.
The EPD owner has the sole ownership, liability and responsibility of the EPD.
EN 50693:2019 establishes the framework reference for PCR.

INDEPENDENT VERIFICATION OF THE DECLARATION AND DATA, ACCORDING TO ISO 14025:2010
☐ Internal ☑ External

THIRD PARTY VERIFIER
ICMQ s.p.a.

ACCREDITED OR APPROVED BY
Accredia

GENERAL INFORMATION

EPD OWNER
MOSDORFER RAIL ltd
2-4 Orgreave Place, Orgreave - S13 9LU - Sheffield - UK
www.mosdorfer.com

YEAR OF REPORTED PRIMARY DATA
2022

MARKET APPLICABILITY
Sweden

CPC CODE
46940 - Electrical insulators, except of glass or ceramics

APPLICATION FIELD
Electric power transmission and distribution

REFERENCE PCR - PROJECT DOCUMENTS
EPDITALY007 (core PCR, rev3 13/01/2023) and EPDItaly 010, rev 0 16/03/2020
Regolamento del Programma EPDItaly - v. 6.0 - 16/02/2022
EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems (2019/08/30)

COMPANY REFERENCE CONTACT
Sean Corcoran
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TECHNICAL SUPPORT PROVIDED BY
Life Cycle Engineering SpA
www.lcengineering.eu

THE COMPANY

As a privately owned family business with its head quarters in Weiz (Austria) and manufacturing bases in Austria, Slovakia, Bosnia, Germany, Great Britain, Spain, India, Switzerland and Thailand as well as global distribution centers, KNILL Energy possess a widespread company network. The roots of the group go back to 1712 and is now managed by the 12th generation of the Knill Family. With a global footprint the group employs more than 2000 people world wide. As a leading designer, manufacturer and supplier of Railway Catenary Systems, Mosdorfer Rail production facilities are located in Spain, Great Britain and India.

RAILWAY AND TRAMWAY OVERHEAD LINES

Reliable and maintenance-free infrastructure provides the basis for trouble free operation of electric railways for local and long-distance travel. Rail traffic is steadily increasing around the world. This places new demands on railway lines both on existing routes as they expand and on newly built lines.Mosdorfer Rail is a full-service provider offering innovative and sustainable solutions for electric railways and tramways. We maintain a consistent focus on the reliability of the overhead contact system and high track availability.

TENSOREX C+ SPRING TENSIONING DEVICE

Patented Spring Automatic Tensioning Device for Railway and Tramway Overhead Contact Lines

The overhead contact lines of railways and tramways are exposed to variation in temperature both from the day/night cycle and in the course of seasonal changes.This makes it necessary to constantly and reliably compensate for the resulting expansion and contraction of the contact wire in order to guarantee efficient train services. As a full-service provider in the field of rail infrastructure, Mosdorfer Rail has an innovative solution that is clearly superior to conventional weight-based tensioning systems the TENSOREX C+.

RAILWAY CATENARY SYSTEMS

Better capacity utilisation of railway lines, denser intervals between trains and higher speeds mean that stresses and strains on overhead lines are constantly increasing. Mosdorfer Rail offers overhead contact solutions and an extensive range of:

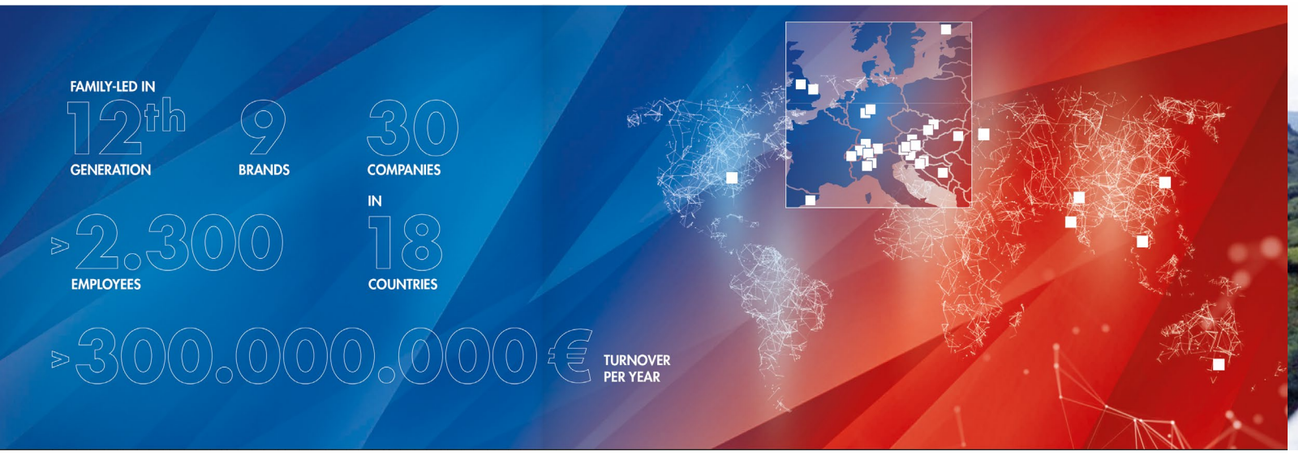
- Cantilevers
- Connectors
- Suspension clamps
- Catenary laser measuring device

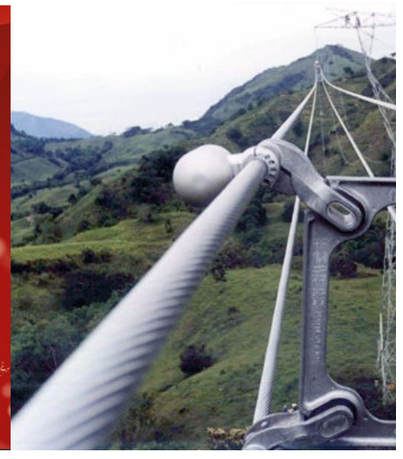
INSULATION TECHNOLOGY

Insulators are a key component in all energy networks including on electrical overhead lines and in distribution stations. Mainly porcelain or composite insulators are used in railway engineering.
There is no functional difference between the two types of material but silicone is advantageous depending on the application.
Mosdorfer Rail can look back on long experience in the manufacture of insulators.

SAFETY EQUIPMENT

Safety equipment is one of the most sensitive aspects of railway electrification.
Reliable products, ease of use and operational safety are therefore essential. Mosdorfer Rail offers a complete range of voltage detectors, earthing and short-circuiting devices, as well as earthing and operating poles, which can be exactly matched to any requirements thanks to our modular system design.
Our safety equipment represents the highest international standards of quality, safety and reliability.





SCOPE AND TYPE OF EPD

The approach used in this EPD is "Cradle to grave", according to reference PCR

TABLE OF MODULES

MANUFACTURING STAGE		DISTRIBUTION STAGE	INSTALLATION STAGE	USE AND MAINTENANCE STAGE	END-OF-LIFE STAGE DE-INSTALLATION
UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE			

TYPE OF EPD
Product specific EPD related to Cantilever insulator 210/900 42 Pipe &19 Tongue 12kN

SOFTWARE
SimaPro ver. 9.5.0.0 (www.pre.nl)

MAIN DATABASE
Ecoinvent 3.8

REPORT LCA
Report LCA_Mosdorfer

GEOGRAPHICAL SCOPE OF THE EPD
Sweden

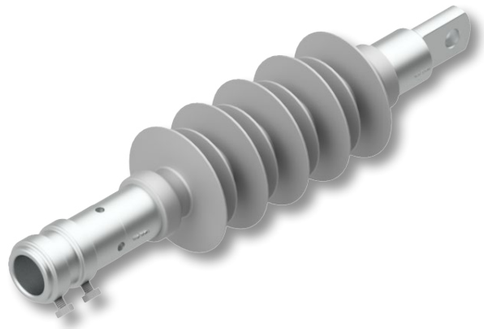
REFERENCE YEAR
2022

DECLARED UNIT
The declared unit used is a single piece of equipment (5.88 kg overall weight), operating for 20 years

Environmental declarations published within the same product category, though originating from different programs, may not be comparable.

THE PRODUCT

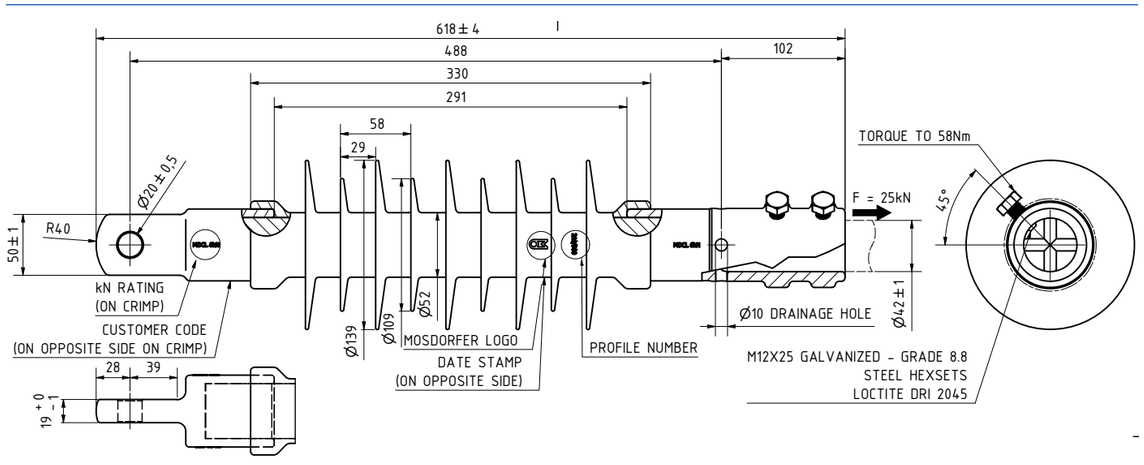
15kV AC CANTILEVER INSULATOR



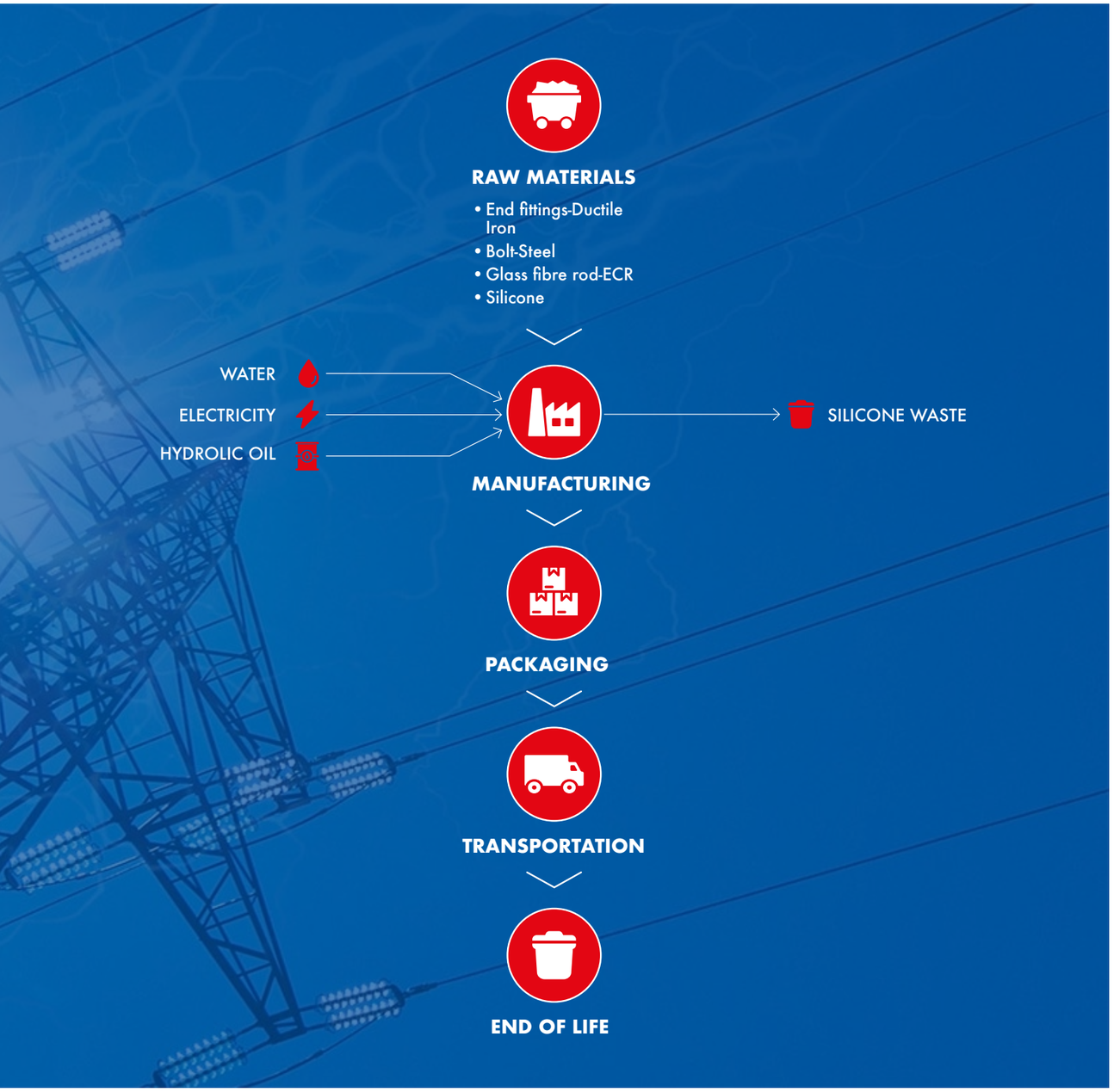
Insulators are a key component in all energy networks – including on electrical overhead lines and in distribution stations.

Mainly porcelain or composite insulators are used in railway engineering.
There is no functional difference between the two types of material – but silicone is advantageous depending on the application.

Composite insulators, specifically those manufactured with high temperature valcanising (HTV) silicone offer significant advantages over porcelain and glass insulators.
Superior hydrophobicity, excellent tracking & erosion resistance and the ability to transfer their intrinsic properties through the pollution layer ensures longterm performance.
Furthermore superior tracking and erosion resistance ensures minimised leakage currents and risk of neucance flashovers, especialy in highly polluted environments



THE PROCESS



CALCULATION RULES

This declaration is a cradle to grave EPD type, based on the application of Life Cycle Assessment (LCA) methodology to the whole life-cycle system. In the whole LCA model, infrastructures and production equipments are not taken into account.
Electronic equipment production processes were described by using specific data from manufacturing facility. Customized LCA questionnaires were used to gather in-depth information about all aspects of the production system (for example, raw materials contents and specifications, pre treatments, process efficiencies, air and water emissions, waste management), in order to provide a complete picture of the environmental burden of the system from raw materials supply to Transport and Manufacturing.

According to ISO 14040 and 14044, allocation is avoided whenever possible by dividing the system into sub-systems; in this EPD, mass allocation was adopted to allocate annual manufacturing data to the investigated product based on the relative share of the EPD target product on total production.
Data quality has been assessed and validated during data collection process. No cutoff has been performed on product Bill of Materials (BOM) besides packaging of semifinished products and components bought by the company from suppliers (due to the combination of low relevance on the final results and high difficulty of data collection). Use phase scenario is modelled considering 20 years of Reference Service Life (PCR-based scenario); according to reference PCR, no energy losses are reported in this module.
The “modularity” and “polluter pays” principles apply.

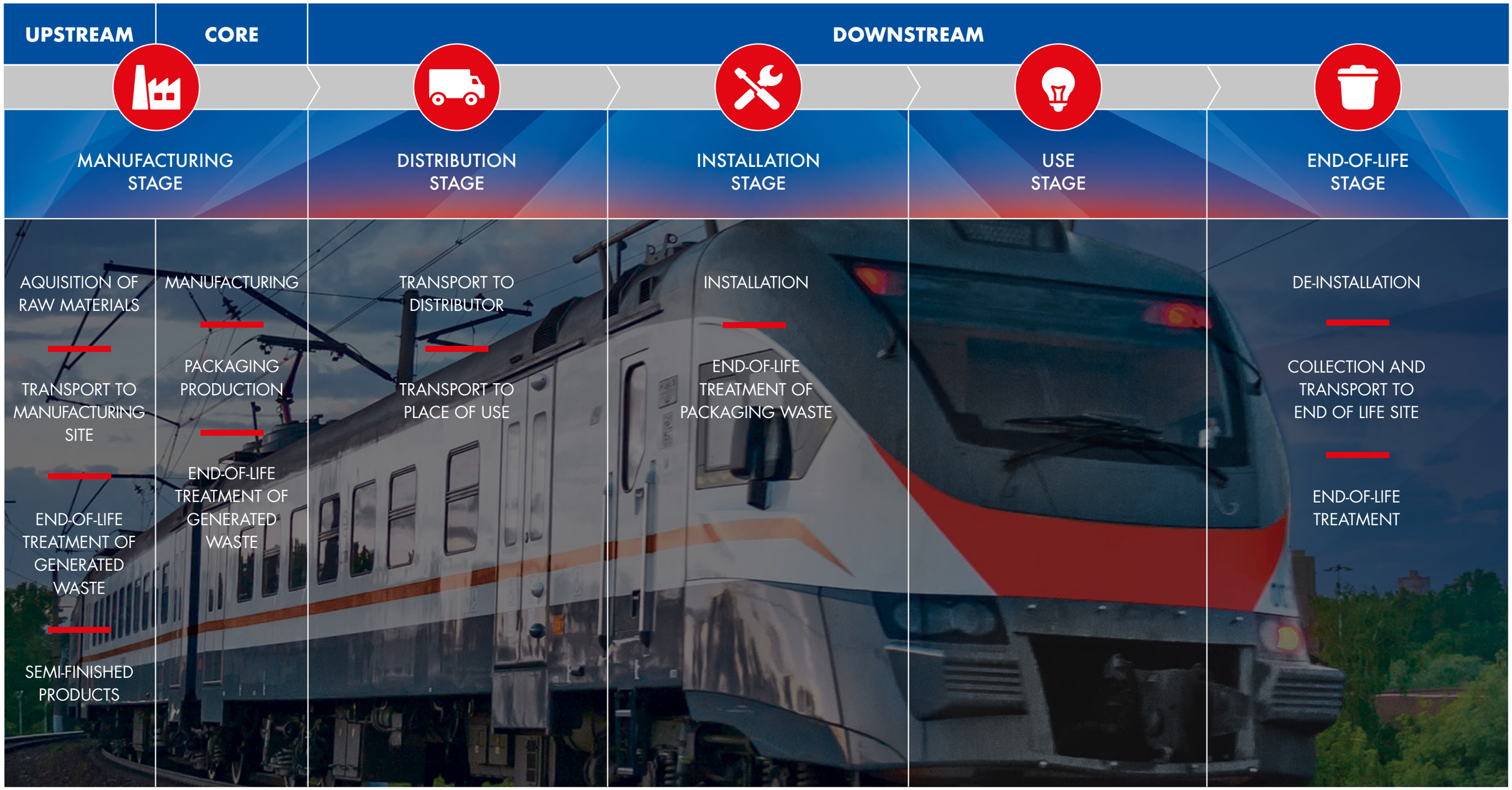
CONTENT DECLARATION

Product covered by this EPD does not contain any substance of very high concern

MATERIAL	MASS SHARE %	IEC62474 code (where applicable)
OTHER FERROUS ALLOYS, NON-STAINLESS STEELS	57	M-119
GLASS	26	M-161
SILICONE	17	M-321

SYSTEM BOUNDARIES

After the manufacturing phase, this product is shipped from CTC factory to the final costume located in Sweden, the final product has the packaging material that can be considered as an installation stage and since the installation is done manually, there might be no machinery work and additional emissions in this phase. The final scenario for this product is De-installation, transportation to the treatment site which is considered 5 km in Sweden, and the process of non-hazardous recycling with recovery.



ENVIRONMENTAL PERFORMANCE

ENVIRONMENTAL IMPACTS

15kV AC CANTILEVER INSULATOR

IMPACT CATEGORY	UNITS / D.U.	UPSTREAM	CORE	DOWNSTREAM				TOTAL
		MANUFACTURING		DISTRIBUTION	INSTALLATION	USE & MAINTENANCE	END-OF-LIFE	
GWP-fossil	kg CO_2 eq	2,93E+01	2,33E+00	1,54E+00	1,78E-03	0,00E+00	3,44E+00	**3,66E+01**
GWP-biogenic	kg CO_2 eq	2,89E-05	-1,14E+00	7,58E-05	1,14E+00	0,00E+00	1,96E-04	**3,01E-04**
GWP-luluc	kg CO_2 eq	2,17E-02	6,24E-05	5,07E-05	6,70E-08	0,00E+00	2,44E-07	**2,18E-02**
GWP total	kg CO_2 eq	2,93E+01	1,19E+00	1,54E+00	1,14E+00	0,00E+00	3,44E+00	**3,66E+01**
ODP	kg CFC-11 eq	1,51E-06	2,84E-09	2,35E-08	2,46E-11	0,00E+00	3,65E-09	**1,54E-06**
AP	mol H+ eq	1,70E-01	1,64E-02	4,54E-02	7,27E-06	0,00E+00	7,72E-04	**2,33E-01**
EP-freshwater	kg P eq	1,09E-03	4,92E-05	1,17E-06	4,67E-09	0,00E+00	6,69E-07	**1,14E-03**
EP-marine*	kg N eq	3,44E-02	2,57E-03	1,14E-02	2,92E-06	0,00E+00	3,73E-04	**4,88E-02**
EP-terrestrial*	mol N eq	2,83E-01	2,83E-02	1,26E-01	3,15E-05	0,00E+00	3,83E-03	**4,41E-01**
POCP	kg NMVOC eq	1,05E-01	7,70E-03	3,35E-02	1,04E-05	0,00E+00	9,66E-04	**1,47E-01**
ADP-min&met	kg Sb eq	6,40E-04	7,56E-08	2,00E-08	1,00E-10	0,00E+00	4,82E-08	**6,40E-04**
ADP-fossil	MJ	3,91E+02	2,30E+01	1,91E+01	2,33E-02	0,00E+00	6,97E-01	**4,34E+02**
WDP	m^3 eq	1,79E+01	2,55E-01	1,70E-02	2,47E-05	0,00E+00	1,53E-01	**1,84E+01**

INDICATORS

GWP, fossil Global Warming Potential, fossil fuel
GWP, biogenic Global Warming Potential, biogenic
GWP, luluc Global Warming Potential, land use & land use change
GWP, total Global Warming Potential, total
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-min&met Abiotic depletion potential for non-fossil resources
ADP-fossil Abiotic depletion for fossil resources potential
WDP Water (user) deprivation potential, deprivation-weighted water consumption
*: This marker identifies optional environmental KPIs which are not mandatory according to reference PCR

ENVIRONMENTAL PERFORMANCE

USE OF RESOURCES

15kV AC CANTILEVER INSULATOR

IMPACT CATEGORY	UNITS / D.U.	UPSTREAM	CORE	DOWNSTREAM				TOTAL
		MANUFACTURING		DISTRIBUTION	INSTALLATION	USE & MAINTENANCE	END-OF-LIFE	
PERE	MJ	3,27E+01	5,02E+00	3,26E-02	4,88E-05	0,00E+00	2,00E-02	**3,78E+01**
PERM	MJ	9,30E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**9,30E+00**
PERT	MJ	4,20E+01	5,02E+00	3,26E-02	4,88E-05	0,00E+00	2,00E-02	**4,71E+01**
PENRE	MJ	4,26E+02	3,33E+01	1,93E+01	2,39E-02	0,00E+00	7,89E-01	**4,79E+02**
PENRM	MJ	4,82E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**4,82E+01**
PENRT	MJ	4,74E+02	3,33E+01	1,93E+01	2,39E-02	0,00E+00	7,89E-01	**5,28E+02**
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
FW	m3	4,53E-01	1,05E-02	7,29E-04	1,04E-06	0,00E+00	4,85E-03	**4,69E-01**

INDICATORS

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 resources
SM Use of secondary material
RSF Use of renewable secondary fuels
NRSF Use of non-renewable secondary fuels
FW Use of net fresh water

ENVIRONMENTAL PERFORMANCE

OUTPUT FLOWS AND WASTE PRODUCTION

15kV AC CANTILEVER INSULATOR

IMPACT CATEGORY	UNITS / D.U.	UPSTREAM	CORE	DOWNSTREAM				TOTAL
		MANUFACTURING		DISTRIBUTION	INSTALLATION	USE & MAINTENANCE	END-OF-LIFE	
HWD	kg	1,06E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,06E-03**
NHWD	kg	2,63E+00	0,00E+00	0,00E+00	1,36E-01	0,00E+00	0,00E+00	**2,77E+00**
RWD	kg	2,68E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**2,68E-04**
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
MFR	kg	0,00E+00	2,87E-02	0,00E+00	4,84E-01	0,00E+00	4,13E+00	**4,65E+00**
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,45E+00	**1,45E+00**
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**

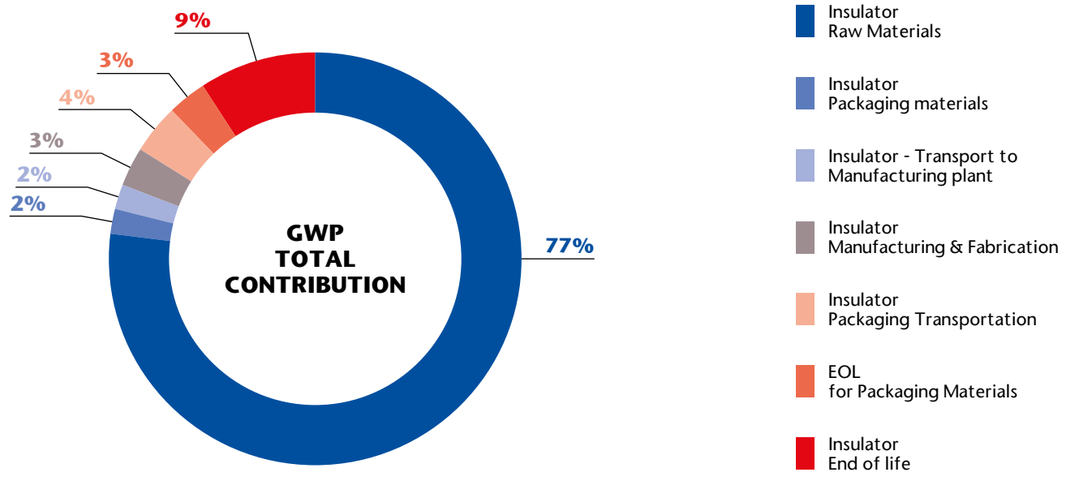
INDICATORS

HWD Hazardous landfill waste
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed
CRU Components for reuse
MFR Material for recycling
MER Materials for energy recovery
EEE Exported electricity energy
ETE Exported thermal energy

ADDITIONAL ENVIRONMENTAL INFORMATION

The main driver in terms of Carbon Footrpint environmental impact is represented by the phase of raw materials; end-fitting, silicone, fiber glass, and steel bolt show high climate change impact which sum is around 77% of the total life cycle impact. The production of end-fitting in particular is associated with high impacts due to the production and processing of cast iron.

End of life shows a 9% contribution in terms of Climate Change, mainly due to the fraction of product going to incineration; this is the second largest share of impact along insulator life cycle after raw material supply. Impacts of distribution and manufacturing phase both present 4% share in carbon dioxide emissions. Between all life cycle phases the transportation of raw materials has the lowest contribution, which is around 2% of total life cycle Carbon Footprint.



In A3 (CORE MODULE) the energy source underlying the electricity used in the manufacturing process and its climate impact is 0.184 kg CO_2 eq./kWh

REFERENCES

This declaration has been produced using the following reference norms:

- EPDItaly Programme Rules - REV. 6 – 30/10/2023
- PCR EPDItaly 007 - REV. 3 13/01/2023: Electronic and electrical products and systems
- PCR EPDItaly 010 - REV. 0 16/03/2020: Insulators
- EN 50693:2019 – 08/30/2019: Product category rules for life cycle assessments of electronic and electrical products and systems
- UNI EN ISO 14040:2021 Environmental management - Life cycle assessment - Principles and framework
- UNI EN ISO 14044:2021 Environmental management - Life cycle assessment - Requirements and guidelines
- UNI EN ISO 14025:2010, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- Report LCA_Mosdorfer_20240426 - 26/04/2024

www.mosdorfer.com