Zhengzhou Xianghe Group Electric Equipment Manufacturing Co. LTD

ENVIRONMENTAL PRODUCT DECLARATION

INSULATORS FOR MEDIUM AND HIGH VOLTAGE POWER LINES

PLANT LOCATION:
No.71, The 3rd Avenue, Zhengzhou National Economic & Technological Development Zone,Zhengzhou, China

in accordance with ISO 14025 and EN 50693

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	ZX_MVHVI_2021
Registration Number	EPDITALY0171

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Valid to	09/12/2026

PRODUCT PICTURE

SECTION B

B1. General information

DECLARATION OWNER:
Zhengzhou Xianghe Group Electric Equipment Manufacturing Co. LTD
Production site location: No.71, The 3rd Avenue, Zhengzhou National Economic & Technological Development Zone, Zhengzhou, China

PROGRAM OPERATOR:
EPDITALY (HTTPS://WWW.EPDITALY.IT/)

IDENTIFICATION OF THE PRODUCTS: it can be found on section C.1.
CPC CODE: 4621

They are included in the category of "Electronic and electrical products and systems- Insulators" according to Sub-PCR EPDItaly010

THE PRODUCT CATEGORY RULES (PCR):

- Sub-PCR EPD Italy 010: "Electronic and Electrical Product and System – Insulator", Rev.0, issue date 16/03/2020, valid until 15/03/2025, CPC 4621, in conformity with EN 50693:2019 and UNI EN 15804:2012+A1:2013+A2:2019 requirements
- PCR EPD Italy 007: "Electronic and electrical product and systems" Rev.1A, issue date 20/01/2020, valid until 19/01/2025, CPC 46, in conformity with EN 50693:2019

This declaration has been developed referring to the EPDItaly, following the "Regolamento di EPDItaly Rev.5, emission date: 01/07/2020"; further information and the document itself are available at: www.epditaly.it. EPD document valid within the following geographical area: Italy and other countries worldwide according to sales market conditions.

Independent verification of the declaration and data carried out according to ISO 14025: 2010
□ INTERNAL ☑ EXTERNAL
Third party verification carried out by: ICMQ SpA, via De Castillia,
1020124 - Milan (www.icmq.it). Accredited by: Accredia.

EPDs relating to the same category of products but belonging to different programs may not be comparable.

Zhengzhou Xianghe Group Electric Equipment Manufacturing Co., Ltd. was founded in 2005 (history back to 1992). Covered area: 89376 m², over 400 employees. Xianghe Electric has become a large production and R&D base for complete sets of intelligent electrical equipment, covering hundreds of electrical products divided into three categories, namely switches, insulators and transformers. Xianghe Electric has won one Science and Technology Progress Award of State Grid Corporation of China, two Science and Technology Progress Award of Henan Province, and more than 100 patents for invention and patents for utility models. Xianghe Electric's products aim at going global. It has developed world-leading organic composite insulators that are exported to Spain, Italy, Argentina, Brazil and other countries and regions.

Zhengzhou Xianghe Group is compromised with environmental protection and has implemented a management system certified according to ISO 14.001:2015, ISO 9.001:2015 and ISO 45.001:2018 (the certifications are available in the company webpage: http://www.xh-electrical.com/).

B.2. Scope and type of EPD

TYPE of EPD and PRODUCT:
This EPD applies to two families of Insulators: a family of 9 insulators for high voltage power lines (HV) and a family of 10 for medium voltage power lines (MV), according to their components and function.
The insulators are manufactured in China, distributed and installed in different world geographical areas, where they are used, treated and/or disposed at the end of life.

Life Cycle Assessment (LCA) supporting this EPD was performed over the 19 products described in the section C, using the software Simapro 9.1.1.1 (PRé Consultants).

Funtional Unit

According to PCR EPDItaly010 – Insulators, the following functional unit was considered:

- a single insulator is used as the declared unit which insulates a current-carrying element from another element during a service life of 20 years.

System boundaries

LCA had a "cradle to grave" scope and considered the following life cycle modules:

Table 1

Life cycle stage	Module	Processes	
Manufacturing	Upstream module	A1. Raw Materials	X
		A2. Raw materials transport	X
	Core module	A3. Insulator Manufacturing	X
Distribution	Downstream Module	A4 Insulator Distribution	X
Installation		A5. Installation	X
Use & Maintainance		B1-7. Use	MND
End-of-life		C1. Dismantling	MND
		C2. Insulator waste transport	X
		C3 Insulator waste treatment	MND
		C4. Insulator disposal	X
		D. Insulator Recycling Benefit	MND
MND: *Modules not declared*			

Scenarios and additional information

Upstream modules

A1- Raw materials: it considers the extraction and production of raw materials for semifinished products received by external supplier and used to produce and assembly the insulator components. Packaging materials are not included. Datasets representing this stage consider the materials processing operations, the bundled energy, the waste treatments, and the emissions arising from these procedures, which are included in Simapro processes.

A2 - Raw materials transport: it considers the transportation of the raw materials from supplier to the manufacturing plant.
Different suppliers of the raw materials are involved in the system.

Core module

A3 - Insulator Manufacturing: it contemplates the manufacture of the final product, considering the production of the auxiliary materials (such as adhesive and alcohol) and the packaging materials (wooden case and cardboard boxes). Water, and electricity consumptions are considered. These consumption values include the processing: silicon compound refining, molding vulcanization, product assembly and packaging operations. Waste and wastewater generation are considered in this stage. The material losses resulting in this stage are considered in terms of waste (scraps). Carton waste and scraps are assumed to be recycled, according to the information regarding waste treatments provided.

The PPP (Polluter Pays Principle) is applied to determine the system boundaries for waste: for recovery and recycling processes, which take place outside the boundaries of the product system, only impacts related to the transport of the waste to the treatment platform are included in the system boundaries. Incineration and disposal processes are included in the system boundaries, at stage A5 (installation) and C4 (Insulator disposal).

Downstream modules

A4 – Insulator distribution includes the impacts related to the distribution of insulators at the installation site.
In order to model the distribution pattern for the average insulator, data for 22 costumers were considered, located in different geographical regions, requiring ship or truck transport.

A5. Installation: Considering that the insulator's installation does not require any relevant inputs in terms of materials and energy, a cut-off on the impacts included in this module was applied (according to EPDItaly 010). Only final treatment for packaging material waste is considered in this stage. Incineration and disposal processes were considered as final treatment, with a precautionary approach. These are included in the system boundaries, at this stage.

B1-7. Use: The insulator is a passive component and does not consume energy. As far as maintenance is concerned, it can be assumed that there are no scheduled interventions during the product's service life. Consequently, a cut-off was applied to these modules (in conformity to EPDItaly 010).

C1. Dismantling: Operations to remove the insulators may be included in the cut-off given their marginal relevance to the environmental impacts of the life cycle (in conformity to EPDItaly010)

C2. Insulator waste transport: the transportation of the recyclable insulator metallic components from the point of waste generation to the treatment platform. This distance is assumed to be 50 Km. For recovery and recycling processes, which take place outside the boundaries of the product system, only impacts related to the transport of the waste to the treatment platform are taken into account, according to EPDItaly 007 (6.3).

C3 Insulator waste treatment: includes collection of waste fractions from the dismantling and waste processing of material flows intended for reuse, recycling, and energy recovery. This module is considered negligible within this study since the insulator rubber and metallic components can be disassembled to be recycled in other systems with manual operations, not requiring electricity.

C4. Insulator disposal: At the end of life (after dismantling), it is assumed that all metal components are recycled, and non-metallic parts are disposed to landfill. The environmental impact derived from final waste treatment processes (landfill) for insulator non-metallic components are considered in this stage.

SECTION C

C.1 Detailed product description

The technical characteristics of the 19 insulators for medium (MV) and high voltage (HV) power lines under study are described in the following table.

Table 2

LCA Study code	Insulator Reference	Max. Voltage (kV)	Specified mechanical load (kN)	Min. Creepage distance (mm)	Min. Arcing distance (mm)	Wet power frequency withstand voltage (kV)	Dry lightning impulse withstand voltage (kV)	Total weight (kg)
HV insulators family, according to GSCH004								
HV1	CS120SB-325/2250 (CS120SB-325/1815)	72.5	120	2250	570	140	325	2,711
HV2	CS120EB-325/2250 (CS120EB-325/1815)	72.5	120	2250	570	140	325	2,56
HV3	CS120SS-550/3813 (CS120SS-550/3075)	123	120	3813	1005	230	550	3,421
HV4	CS160SS-550/3813	123	160	3813	1005	230	550	6,992
HV5	CS120SB-650/4500 (CS120SB-650/3625)	145	120	4500	1195	275	650	4,001
HV6	CS120EB-650/4500 (CS120EB-650/3625)	145	120	4500	1195	275	650	3,85
HV7	CS210SB-650/4500	145	210	4500	1195	275	650	8,69
HV8	CS120SB-1050/7595 (CS120SB-1050/6125)	245	120	7595	1970	460	1050	10,481
HV9	CS160SB-1050/7595	245	160	7595	1970	460	1050	13,57
MV insulator according to GSCC010								
MV1	CS45CE190/744-430 (CS45CE190/560-430)	24	45	744	310	100	190	1,24
MV2	CS70TT125/900-455 (CS70TT125/570-455)	24	70	900	210	50	125	1,5
MV3	CS100EB125/835-455 (CS70EB125/600-455)	24	100	835	350	50	125	2,21
MV4	CS70EB125/835-400	24	70	835	350	50	125	2,15
MV5	CS45CE250/740-525	36	45	740	410	130	250	1,3
MV6	CS100EB170/1250-555 (CS70EB170/900-555)	36	100	1250	450	70	170	2,27
MV7	CS45CE280/900-590	36	45	900	460	145	280	1,64
MV8	CS70EB170/1250-1150	36	70	1250	1000	70	170	2,12
MV9	CLP10-170/720	24	10	720	280	70	170	3
MV10	CLP6-170/760	36	6	760	280	70	170	3,16

The 19 insulators are made from a silicone rubber weather shed, an ECR glass core and different components mainly made from galvanized forged steel and are produced at the same manufacturing plant with the same production process, being the casting shape and the weight the main differences between them.
Packaging materials for distribution consist in a carboard box containing 3 insulators and a wooden case with a base for forklift, containing an average of 60 insulators.

Metal components and semifinished silicone rubber components arrive at Xianghe manufacturing plant. Metal components do not undergo any further transformation while silicone components undergo additional processes of refining and molding vulcanization. All the components are assembled in the final product and packed for distribution in different geographic areas worldwide.

The range of percentages of product's composition for medium and high voltage insulators families are reported below:

Table 3

High Voltage Insulators family		
Material	**Min**	**Max**
Forged steel (different components)	11%	41%
Stainless steel	0%	3%
ERC Glass	12%	20%
HTV Silicon rubber	44%	73%
Aluminum alloy	0%	5%

Table 4

Medium Voltage Insulators family		
Material	**Min**	**Max**
ERC Glass	7%	28%
HTV Silicon rubber	23%	71%
Forged steel (different components)	19%	67%

SECTION D

D1. LCA results

The results of the underlying LCA are provided in this section as range of environmental impacts, resource use and waste categories for the two families. All parameters required by the sub-PCR EPDItaly010 are included and reported in the following tables.

The main general conclusions of the LCA are listed below:

- Raw material production and insulator manufacturing are the stages that most contribute to the overall environmental burden. Insulator distribution results with a minor contribution. The end-of-life stage does not result in any significant environmental impact. Thus, the overall environmental impacts of 1 unit of insulator are largely dependent on insulator weight. Within the MV insulator family, the content of Silicone Rubber is highly variable: the relative contribution of this and other components to the environmental burden differ consequently.

- The environmental impact of the life cycle of the insulator is mainly due to the extraction and processing of the materials in the stage (A1), with the processing of the HTV silicone rubber of the watershed being the main hotspot. It is followed in less proportion by the ECR glass core.

- Electricity consumed at the manufacturing stage is one of the main contributors to environmental impact at stage of manufacturing. Packaging materials, wooden pallet and cardboard have relevant contribution specially in GWP biogenic and GWP land use categories.

HV Insulators
HV1

Table 5. Environmental impacts of the life cycle of the HV1 insulator. Result values in absolute (5A) and relative terms (5B). Resource use per unit of product during the life cycle of the HV1 insulator (5C). Waste production per unit of product during the life cycle of the HV1 insulator (5D).

TABLE 5A. Absolute values HV1 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	Total
GWP-total	kg CO2 eq	7,22E+00	1,89E-01	3,25E+00	8,76E-01	4,37E-02	7,77E-03	1,48E-02	**1,16E+01**
GWP-fossil	kg CO2 eq	7,15E+00	1,89E-01	3,24E+00	8,76E-01	4,36E-02	7,77E-03	1,48E-02	**1,15E+01**
GWP-biogenic	kg CO2 eq	5,72E-02	1,18E-05	4,88E-03	5,35E-05	3,63E-05	4,68E-07	1,15E-06	**6,22E-02**
GWP-luluc	kg CO2 eq	5,80E-03	2,66E-06	3,61E-03	1,15E-05	1,86E-06	1,06E-07	2,58E-07	**9,43E-03**
ODP	kg CFC11 eq	1,98E-06	4,45E-08	1,11E-07	1,96E-07	7,40E-09	1,76E-09	3,30E-09	**2,34E-06**
POFP	kg NMVOC eq	2,89E-02	2,62E-04	1,47E-02	8,98E-03	4,01E-04	1,05E-05	6,93E-05	**5,33E-02**
AP	mol H+ eq	3,95E-02	4,07E-04	1,77E-02	1,14E-02	3,37E-04	1,62E-05	6,38E-05	**6,94E-02**
EP-freshwater	kg P eq	2,67E-04	4,64E-07	9,21E-05	1,69E-06	1,61E-07	1,84E-08	4,03E-08	**3,62E-04**
ADP-fossil	MJ	9,83E+01	2,77E+00	3,75E+01	1,22E+01	5,21E-01	1,10E-01	2,07E-01	**1,52E+02**
ADP-minerals&metals	kg Sb eq	2,66E-03	5,99E-08	2,71E-06	2,04E-07	1,32E-07	2,38E-09	4,97E-09	**2,66E-03**
WDP	m3 depriv.	6,45E+00	9,16E-04	5,14E-01	2,25E-03	-2,15E-02	3,63E-05	6,90E-05	**6,94E+00**

TABLE 5B. Relative values HV1 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	62,24%	1,63%	28,01%	7,55%	0,38%	0,07%	0,13%	**100%**
GWP-fossil	%	62,08%	1,64%	28,11%	7,60%	0,38%	0,07%	0,13%	**100%**
GWP-biogenic	%	92,00%	0,02%	7,84%	0,09%	0,06%	0,00%	0,00%	**100%**
GWP-luluc	%	61,51%	0,03%	38,31%	0,12%	0,02%	0,00%	0,00%	**100%**
ODP	%	84,44%	1,90%	4,75%	8,38%	0,32%	0,08%	0,14%	**100%**
POFP	%	54,19%	0,49%	27,57%	16,85%	0,75%	0,02%	0,13%	**100%**
AP	%	56,88%	0,59%	25,52%	16,42%	0,48%	0,02%	0,09%	**100%**
EP-freshwater	%	73,90%	0,13%	25,45%	0,47%	0,04%	0,01%	0,01%	**100%**
ADP-fossil	%	64,85%	1,83%	24,75%	8,02%	0,34%	0,07%	0,14%	**100%**
ADP-minerals&metals	%	99,88%	0,00%	0,10%	0,01%	0,00%	0,00%	0,00%	**100%**
WDP	%	92,86%	0,01%	7,40%	0,03%	-0,31%	0,00%	0,00%	**100%**

TABLE 5C. Resource use HV1		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	7,50E+00	3,36E-03	8,14E+01	1,51E-02	1,89E-03	1,33E-04	3,87E-04	**8,89E+01**
PERM	MJ	0,00E+00	0,00E+00	5,91E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**5,91E+01**
PERT	MJ	7,50E+00	3,36E-03	1,40E+02	1,51E-02	1,89E-03	1,33E-04	3,87E-04	**1,48E+02**
PENRE	MJ	8,57E+01	2,94E+00	3,97E+01	1,29E+01	5,58E-01	1,17E-01	2,19E-01	**1,42E+02**
PENRM	MJ	1,97E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,97E+01**
PENRT	MJ	1,05E+02	2,94E+00	3,97E+01	1,29E+01	5,58E-01	1,17E-01	2,19E-01	**1,62E+02**
SM	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**
RSF	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**
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	m3	1,68E-01	6,41E-05	1,40E-02	2,19E-04	-4,18E-04	2,54E-06	4,64E-06	**1,82E-01**

TABLE 5D. Waste Production HV1		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	5,44E-04	7,47E-06	2,02E-05	2,61E-05	1,21E-06	2,96E-07	5,47E-07	**6,00E-04**
NHWD	kg	5,07E-01	7,52E-04	2,04E-01	2,66E-03	1,70E+00	2,98E-05	1,58E+00	**3,99E+00**
RWD	kg	1,56E-04	1,96E-05	5,88E-05	8,66E-05	2,88E-06	7,79E-07	1,46E-06	**3,26E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	3,45E-02	0,00E+00	0,00E+00	0,00E+00	1,13E+00	**1,17E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

HV2

Table 6. Environmental impacts of the life cycle of the HV2 insulator. Result values in absolute (6A) and relative terms (6B). Resource use per unit of product during the life cycle of the HV2 insulator (6C). Waste production per unit of product during the life cycle of the HV2 insulator (6D).

TABLE 6A. Absolute values HV2 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	Total
GWP-total	kg CO2 eq	6,97E+00	1,81E-01	3,09E+00	8,39E-01	4,24E-02	6,73E-03	1,48E-02	**1,11E+01**
GWP-fossil	kg CO2 eq	6,91E+00	1,81E-01	3,08E+00	8,39E-01	4,23E-02	6,73E-03	1,48E-02	**1,11E+01**
GWP-biogenic	kg CO2 eq	5,71E-02	1,13E-05	4,73E-03	5,13E-05	3,53E-05	4,05E-07	1,15E-06	**6,19E-02**
GWP-luluc	kg CO2 eq	5,70E-03	2,56E-06	3,50E-03	1,10E-05	1,80E-06	9,16E-08	2,58E-07	**9,21E-03**
ODP	kg CFC11 eq	1,97E-06	4,28E-08	1,08E-07	1,88E-07	7,18E-09	1,53E-09	3,30E-09	**2,32E-06**

POFP	kg NMVOC eq	2,77E-02	2,52E-04	1,40E-02	8,61E-03	3,89E-04	9,13E-06	6,93E-05	**5,10E-02**
AP	mol H+ eq	3,84E-02	3,91E-04	1,69E-02	1,09E-02	3,27E-04	1,41E-05	6,38E-05	**6,70E-02**
EP-freshwater	kg P eq	2,56E-04	4,46E-07	8,80E-05	1,62E-06	1,56E-07	1,60E-08	4,03E-08	**3,46E-04**
ADP-fossil	MJ	9,58E+01	2,66E+00	3,58E+01	1,17E+01	5,06E-01	9,52E-02	2,07E-01	**1,47E+02**
ADP-minerals&metals	kg Sb eq	2,71E-03	5,76E-08	2,59E-06	1,96E-07	1,28E-07	2,06E-09	4,97E-09	**2,71E-03**
WDP	m3 depriv.	6,40E+00	8,81E-04	4,92E-01	2,16E-03	-2,09E-02	3,15E-05	6,90E-05	**6,87E+00**

TABLE 6B. Relative values ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	Total
GWP-total	%	62,54%	1,63%	27,72%	7,53%	0,38%	0,06%	0,13%	**100%**
GWP-fossil	%	62,38%	1,64%	27,83%	7,58%	0,38%	0,06%	0,13%	**100%**
GWP-biogenic	%	92,21%	0,02%	7,63%	0,08%	0,06%	0,00%	0,00%	**100%**
GWP-luluc	%	61,85%	0,03%	37,98%	0,12%	0,02%	0,00%	0,00%	**100%**
ODP	%	84,88%	1,85%	4,64%	8,12%	0,31%	0,07%	0,14%	**100%**
POFP	%	54,21%	0,49%	27,51%	16,87%	0,76%	0,02%	0,14%	**100%**
AP	%	57,33%	0,58%	25,17%	16,31%	0,49%	0,02%	0,10%	**100%**
EP-freshwater	%	73,90%	0,13%	25,44%	0,47%	0,05%	0,00%	0,01%	**100%**
ADP-fossil	%	65,26%	1,81%	24,43%	7,95%	0,34%	0,06%	0,14%	**100%**
ADP-minerals&metals	%	99,89%	0,00%	0,10%	0,01%	0,00%	0,00%	0,00%	**100%**
WDP	%	93,11%	0,01%	7,15%	0,03%	-0,30%	0,00%	0,00%	**100%**

TABLE 6C. Resource use HV2		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	Total
PERE	MJ	7,41E+00	3,23E-03	7,89E+01	1,45E-02	1,84E-03	1,16E-04	3,87E-04	**8,63E+01**
PERM	MJ	0,00E+00	0,00E+00	5,91E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**5,91E+01**
PERT	MJ	7,41E+00	3,23E-03	1,38E+02	1,45E-02	1,84E-03	1,16E-04	3,87E-04	**1,45E+02**
PENRE	MJ	8,30E+01	2,83E+00	3,79E+01	1,24E+01	5,42E-01	1,01E-01	2,19E-01	**1,37E+02**
PENRM	MJ	1,97E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,97E+01**
PENRT	MJ	1,03E+02	2,83E+00	3,79E+01	1,24E+01	5,42E-01	1,01E-01	2,19E-01	**1,57E+02**
SM	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**
RSF	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**
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	m3	1,67E-01	6,17E-05	1,34E-02	2,10E-04	-4,06E-04	2,20E-06	4,64E-06	**1,80E-01**

TABLE 6D. Waste Production		Manufacturing			Distribution	Installation	End of life		
Parameter	Parameter	A1	A2	A3	A4	A5	C2	C4	Total
HWD	HWD	5,30E-04	7,18E-06	1,95E-05	2,51E-05	1,18E-06	2,57E-07	5,47E-07	**5,84E-04**
NHWD	NHWD	4,74E-01	7,23E-04	1,93E-01	2,55E-03	1,65E+00	2,59E-05	1,58E+00	**3,90E+00**
RWD	RWD	1,52E-04	1,89E-05	5,68E-05	8,30E-05	2,80E-06	6,75E-07	1,46E-06	**3,15E-04**
MER	MER	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
MFR	MFR	0,00E+00	0,00E+00	3,26E-02	0,00E+00	0,00E+00	0,00E+00	9,80E-01	**1,01E+00**
CRU	CRU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
ETE	ETE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	EEE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

HV3

Table 7 Environmental impacts of the life cycle of the HV3 insulator. Result values in absolute (7A) and relative terms (7B). Resource use per unit of product during the life cycle of the HV3 insulator (7C). Waste production per unit of product during the life cycle of the HV3 insulator (7D).

TABLE 7A. Absolute values HV3 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	9,86E+00	2,53E-01	4,34E+00	1,24E+00	6,75E-02	5,16E-03	2,49E-02	**1,58E+01**
GWP-fossil	kg CO2 eq	9,76E+00	2,53E-01	4,32E+00	1,24E+00	6,74E-02	5,16E-03	2,49E-02	**1,57E+01**
GWP-biogenic	kg CO2 eq	9,36E-02	1,58E-05	7,46E-03	7,59E-05	5,61E-05	3,11E-07	1,94E-06	**1,01E-01**
GWP-luluc	kg CO2 eq	8,55E-03	3,58E-06	5,51E-03	1,63E-05	2,87E-06	7,02E-08	4,35E-07	**1,41E-02**
ODP	kg CFC11 eq	3,19E-06	5,97E-08	1,68E-07	2,78E-07	1,14E-08	1,17E-09	5,57E-09	**3,72E-06**
POFP	kg NMVOC eq	3,74E-02	3,52E-04	2,04E-02	1,27E-02	6,19E-04	7,00E-06	1,17E-04	**7,16E-02**
AP	mol H+ eq	5,57E-02	5,47E-04	2,38E-02	1,62E-02	5,20E-04	1,08E-05	1,08E-04	**9,68E-02**
EP-freshwater	kg P eq	3,36E-04	6,23E-07	1,28E-04	2,40E-06	2,49E-07	1,22E-08	6,80E-08	**4,67E-04**
ADP-fossil	MJ	1,42E+02	3,72E+00	5,18E+01	1,72E+01	8,05E-01	7,29E-02	3,49E-01	**2,16E+02**
ADP-minerals&metals	kg Sb eq	1,68E-03	8,05E-08	3,75E-06	2,90E-07	2,03E-07	1,58E-09	8,41E-09	**1,68E-03**
WDP	m3 depriv.	1,03E+01	1,23E-03	7,21E-01	3,20E-03	-3,32E-02	2,41E-05	1,17E-04	**1,10E+01**

TABLE 7B. Relative values HV3 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Parameter	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	62,44%	1,60%	27,47%	7,87%	0,43%	0,03%	0,16%	**100%**
GWP-fossil	%	62,25%	1,62%	27,59%	7,92%	0,43%	0,03%	0,16%	**100%**
GWP-biogenic	%	92,48%	0,02%	7,37%	0,07%	0,06%	0,00%	0,00%	**100%**
GWP-luluc	%	60,69%	0,03%	39,15%	0,12%	0,02%	0,00%	0,00%	**100%**
ODP	%	85,91%	1,61%	4,51%	7,48%	0,31%	0,03%	0,15%	**100%**
POFP	%	52,25%	0,49%	28,43%	17,79%	0,86%	0,01%	0,16%	**100%**
AP	%	57,52%	0,56%	24,55%	16,71%	0,54%	0,01%	0,11%	**100%**
EP-freshwater	%	71,94%	0,13%	27,34%	0,51%	0,05%	0,00%	0,01%	**100%**
ADP-fossil	%	65,70%	1,72%	24,00%	8,00%	0,37%	0,03%	0,16%	**100%**
ADP-minerals&metals	%	99,74%	0,00%	0,22%	0,02%	0,01%	0,00%	0,00%	**100%**
WDP	%	93,69%	0,01%	6,57%	0,03%	-0,30%	0,00%	0,00%	**100%**

TABLE 7C. Resource use HV3		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	Total
PERE	MJ	1,17E+01	4,52E-03	1,25E+02	2,15E-02	2,92E-03	8,86E-05	6,54E-04	**1,37E+02**
PERM	MJ	0,00E+00	0,00E+00	9,40E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**9,40E+01**
PERT	MJ	1,17E+01	4,52E-03	2,19E+02	2,15E-02	2,92E-03	8,86E-05	6,54E-04	**2,31E+02**
PENRE	MJ	1,19E+02	3,95E+00	5,48E+01	1,83E+01	8,62E-01	7,74E-02	3,71E-01	**1,98E+02**
PENRM	MJ	3,28E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**3,28E+01**
PENRT	MJ	1,52E+02	3,95E+00	5,48E+01	1,83E+01	8,62E-01	7,74E-02	3,71E-01	**2,31E+02**
SM	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**
RSF	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**
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	m3	2,67E-01	8,61E-05	1,99E-02	3,10E-04	-6,46E-04	1,69E-06	7,83E-06	**2,87E-01**

TABLE 7D. Waste Production HV3		Manufacturing			Distribution	Installation	End of life		
Parameter	Parameter	A1	A2	A3	A4	A5	C2	C4	Total
HWD	kg	3,80E-04	1,00E-05	3,07E-05	3,71E-05	1,88E-06	1,97E-07	9,25E-07	**4,61E-04**
NHWD	kg	5,58E-01	1,01E-03	2,67E-01	3,77E-03	2,63E+00	1,98E-05	2,67E+00	**6,12E+00**
RWD	kg	2,24E-04	2,64E-05	8,77E-05	1,23E-04	4,45E-06	5,17E-07	2,46E-06	**4,68E-04**

MER	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**
MFR	kg	0,00E+00	0,00E+00	4,36E-02	0,00E+00	0,00E+00	0,00E+00	7,51E-01	**7,95E-01**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

HV4

Table 8 Environmental impacts of the life cycle of the HV4 insulator. Result values in absolute (8A) and relative terms (8B). Resource use per unit of product during the life cycle of the HV4 insulator (8C). Waste production per unit of product during the life cycle of the HV4 insulator (8D).

TABLE 8A. Absolute values HV4 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	2,04E+01	5,42E-01	8,53E+00	2,35E+00	1,21E-01	9,21E-03	5,28E-02	**3,20E+01**
GWP-fossil	kg CO2 eq	2,02E+01	5,41E-01	8,51E+00	2,35E+00	1,21E-01	9,21E-03	5,28E-02	**3,18E+01**
GWP-biogenic	kg CO2 eq	2,04E-01	3,38E-05	1,34E-02	1,43E-04	1,00E-04	5,55E-07	4,10E-06	**2,18E-01**
GWP-luluc	kg CO2 eq	1,77E-02	7,65E-06	9,94E-03	3,08E-05	5,12E-06	1,25E-07	9,21E-07	**2,76E-02**
ODP	kg CFC11 eq	6,95E-06	1,28E-07	3,05E-07	5,26E-07	2,04E-08	2,09E-09	1,18E-08	**7,95E-06**
POFP	kg NMVOC eq	7,64E-02	7,51E-04	3,91E-02	2,41E-02	1,11E-03	1,25E-05	2,48E-04	**1,42E-01**
AP	mol H+ eq	1,15E-01	1,17E-03	4,66E-02	3,06E-02	9,30E-04	1,93E-05	2,28E-04	**1,94E-01**
EP-freshwater	kg P eq	6,84E-04	1,33E-06	2,45E-04	4,54E-06	4,45E-07	2,18E-08	1,44E-07	**9,35E-04**
ADP-fossil	MJ	2,96E+02	7,95E+00	9,96E+01	3,26E+01	1,44E+00	1,30E-01	7,39E-01	**4,39E+02**
ADP-minerals&metals	kg Sb eq	2,18E-03	1,72E-07	7,20E-06	5,48E-07	3,64E-07	2,82E-09	1,78E-08	**2,18E-03**
WDP	m3 depriv.	2,22E+01	2,63E-03	1,37E+00	6,04E-03	-5,95E-02	4,31E-05	2,47E-04	**2,36E+01**

TABLE 8B. Relative values HV4 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	63,75%	1,69%	26,66%	7,33%	0,38%	0,03%	0,16%	**100%**
GWP-fossil	%	63,54%	1,70%	26,79%	7,39%	0,38%	0,03%	0,17%	**100%**
GWP-biogenic	%	93,71%	0,02%	6,16%	0,07%	0,05%	0,00%	0,00%	**100%**
GWP-luluc	%	63,90%	0,03%	35,94%	0,11%	0,02%	0,00%	0,00%	**100%**
ODP	%	87,51%	1,61%	3,83%	6,62%	0,26%	0,03%	0,15%	**100%**
POFP	%	53,94%	0,53%	27,57%	16,99%	0,78%	0,01%	0,17%	**100%**
AP	%	59,02%	0,60%	24,02%	15,75%	0,48%	0,01%	0,12%	**100%**
EP-freshwater	%	73,12%	0,14%	26,19%	0,49%	0,05%	0,00%	0,02%	**100%**
ADP-fossil	%	67,53%	1,81%	22,70%	7,43%	0,33%	0,03%	0,17%	**100%**
ADP-minerals&metals	%	99,62%	0,01%	0,33%	0,03%	0,02%	0,00%	0,00%	**100%**
WDP	%	94,39%	0,01%	5,82%	0,03%	-0,25%	0,00%	0,00%	**100%**

Table 8C Resource use HV4		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	2,46E+01	9,65E-03	2,24E+02	4,06E-02	5,23E-03	1,58E-04	1,38E-03	**2,49E+02**
PERM	MJ	0,00E+00	0,00E+00	1,68E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,68E+02**

PERT	MJ	2,46E+01	9,65E-03	3,93E+02	4,06E-02	5,23E-03	1,58E-04	1,38E-03	**4,17E+02**
PENRE	MJ	2,47E+02	8,44E+00	1,05E+02	3,46E+01	1,54E+00	1,38E-01	7,84E-01	**3,98E+02**
PENRM	MJ	7,19E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**7,19E+01**
PENRT	MJ	3,19E+02	8,44E+00	1,05E+02	3,46E+01	1,54E+00	1,38E-01	7,84E-01	**4,69E+02**
SM	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**
RSF	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**
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	m3	5,76E-01	1,84E-04	3,75E-02	5,86E-04	-1,16E-03	3,02E-06	1,66E-05	**6,14E-01**

Table 8D. Waste production HV4		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	5,95E-04	2,14E-05	5,54E-05	7,01E-05	3,36E-06	3,51E-07	1,96E-06	**7,48E-04**
NHWD	kg	1,09E+00	2,16E-03	5,32E-01	7,13E-03	4,70E+00	3,54E-05	5,64E+00	**1,20E+01**
RWD	kg	4,59E-04	5,64E-05	1,60E-04	2,32E-04	7,96E-06	9,24E-07	5,21E-06	**9,22E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	8,93E-02	0,00E+00	0,00E+00	0,00E+00	1,34E+00	**1,43E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

HV5

Table 9 Environmental impacts of the life cycle of the HV9 insulator. Result values in absolute (9A) and relative terms (9B). Resource use per unit of product during the life cycle of the HV5 insulator (9C). Waste production per unit of product during the life cycle of the HV5 insulator (9D).

TABLE 9A. Absolute values HV5 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	1,13E+01	2,95E-01	4,82E+00	1,31E+00	6,60E-02	7,77E-03	2,68E-02	**1,78E+01**
GWP-fossil	kg CO2 eq	1,12E+01	2,95E-01	4,81E+00	1,31E+00	6,59E-02	7,77E-03	2,68E-02	**1,77E+01**
GWP-biogenic	kg CO2 eq	1,03E-01	1,85E-05	7,35E-03	8,00E-05	5,49E-05	4,68E-07	2,08E-06	**1,11E-01**
GWP-luluc	kg CO2 eq	9,55E-03	4,17E-06	5,45E-03	1,72E-05	2,80E-06	1,06E-07	4,68E-07	**1,50E-02**
ODP	kg CFC11 eq	3,53E-06	6,96E-08	1,67E-07	2,93E-07	1,12E-08	1,76E-09	5,99E-09	**4,08E-06**
POFP	kg NMVOC eq	4,34E-02	4,10E-04	2,19E-02	1,34E-02	6,05E-04	1,05E-05	1,26E-04	**7,99E-02**
AP	mol H+ eq	6,29E-02	6,37E-04	2,63E-02	1,70E-02	5,08E-04	1,62E-05	1,16E-04	**1,08E-01**
EP-freshwater	kg P eq	3,95E-04	7,27E-07	1,37E-04	2,53E-06	2,43E-07	1,84E-08	7,31E-08	**5,36E-04**
ADP-fossil	MJ	1,60E+02	4,33E+00	5,59E+01	1,82E+01	7,87E-01	1,10E-01	3,75E-01	**2,40E+02**
ADP-minerals&metals	kg Sb eq	2,72E-03	9,38E-08	4,04E-06	3,06E-07	1,99E-07	2,38E-09	9,04E-09	**2,72E-03**
WDP	m3 depriv.	1,14E+01	1,43E-03	7,67E-01	3,37E-03	-3,25E-02	3,63E-05	1,25E-04	**1,21E+01**

TABLE 9B. Relative values HV5 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	63,35%	1,66%	27,08%	7,35%	0,37%	0,04%	0,15%	**100%**
GWP-fossil	%	63,16%	1,67%	27,20%	7,40%	0,37%	0,04%	0,15%	**100%**
GWP-biogenic	%	93,22%	0,02%	6,64%	0,07%	0,05%	0,00%	0,00%	**100%**

GWP-luluc	%	63,58%	0,03%	36,26%	0,11%	0,02%	0,00%	0,00%	**100%**
ODP	%	86,54%	1,71%	4,10%	7,18%	0,27%	0,04%	0,15%	**100%**
POFP	%	54,35%	0,51%	27,41%	16,80%	0,76%	0,01%	0,16%	**100%**
AP	%	58,49%	0,59%	24,47%	15,85%	0,47%	0,02%	0,11%	**100%**
EP-freshwater	%	73,70%	0,14%	25,63%	0,47%	0,05%	0,00%	0,01%	**100%**
ADP-fossil	%	66,73%	1,81%	23,34%	7,59%	0,33%	0,05%	0,16%	**100%**
ADP-minerals&metals	%	99,83%	0,00%	0,15%	0,01%	0,01%	0,00%	0,00%	**100%**
WDP	%	93,90%	0,01%	6,32%	0,03%	-0,27%	0,00%	0,00%	**100%**

Table 9C Resource use HV5		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	1,29E+01	5,26E-03	1,23E+02	2,26E-02	2,86E-03	1,33E-04	7,03E-04	**1,36E+02**
PERM	MJ	0,00E+00	0,00E+00	9,19E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**9,19E+01**
PERT	MJ	1,29E+01	5,26E-03	2,15E+02	2,26E-02	2,86E-03	1,33E-04	7,03E-04	**2,28E+02**
PENRE	MJ	1,36E+02	4,60E+00	5,91E+01	1,93E+01	8,43E-01	1,17E-01	3,98E-01	**2,20E+02**
PENRM	MJ	3,60E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**3,60E+01**
PENRT	MJ	1,72E+02	4,60E+00	5,91E+01	1,93E+01	8,43E-01	1,17E-01	3,98E-01	**2,56E+02**
SM	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**
RSF	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**
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	m3	2,96E-01	1,00E-04	2,09E-02	3,27E-04	-6,31E-04	2,54E-06	8,42E-06	**3,17E-01**

Table 9D. Waste production HV5		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	5,77E-04	1,17E-05	3,04E-05	3,91E-05	1,83E-06	2,96E-07	9,94E-07	**6,61E-04**
NHWD	kg	6,80E-01	1,18E-03	3,02E-01	3,98E-03	2,57E+00	2,98E-05	2,87E+00	**6,42E+00**
RWD	kg	2,51E-04	3,07E-05	8,85E-05	1,29E-04	4,35E-06	7,79E-07	2,65E-06	**5,07E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	5,10E-02	0,00E+00	0,00E+00	0,00E+00	1,13E+00	**1,18E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

HV6

Table 10 Environmental impacts of the life cycle of the HV6 insulator. Result values in absolute (10A) and relative terms (10B). Resource use per unit of product during the life cycle of the HV6 insulator (10C). Waste production per unit of product during the life cycle of the HV6 insulator (10D).

TABLE 10A. Absolute values HV6 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	1,10E+01	2,88E-01	4,65E+00	1,27E+00	6,40E-02	6,73E-03	2,68E-02	**1,73E+01**
GWP-fossil	kg CO2 eq	1,09E+01	2,88E-01	4,64E+00	1,27E+00	6,40E-02	6,73E-03	2,68E-02	**1,72E+01**
GWP-biogenic	kg CO2 eq	1,03E-01	1,80E-05	7,13E-03	7,73E-05	5,33E-05	4,05E-07	2,08E-06	**1,10E-01**
GWP-luluc	kg CO2 eq	9,45E-03	4,07E-06	5,28E-03	1,66E-05	2,72E-06	9,16E-08	4,68E-07	**1,48E-02**
ODP	kg CFC11 eq	3,52E-06	6,79E-08	1,62E-07	2,83E-07	1,08E-08	1,53E-09	5,99E-09	**4,05E-06**
POFP	kg NMVOC eq	4,22E-02	4,00E-04	2,11E-02	1,30E-02	5,87E-04	9,13E-06	1,26E-04	**7,74E-02**
AP	mol H+ eq	6,18E-02	6,22E-04	2,54E-02	1,65E-02	4,93E-04	1,41E-05	1,16E-04	**1,05E-01**
EP-freshwater	kg P eq	3,83E-04	7,09E-07	1,33E-04	2,45E-06	2,36E-07	1,60E-08	7,31E-08	**5,19E-04**
ADP-fossil	MJ	1,57E+02	4,23E+00	5,40E+01	1,76E+01	7,63E-01	9,52E-02	3,75E-01	**2,34E+02**
ADP-minerals&metals	kg Sb eq	2,77E-03	9,16E-08	3,90E-06	2,95E-07	1,93E-07	2,06E-09	9,04E-09	**2,77E-03**
WDP	m3 depriv.	1,13E+01	1,40E-03	7,41E-01	3,26E-03	-3,15E-02	3,15E-05	1,25E-04	**1,21E+01**

TABLE 10B. Relative values HV6 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	63,65%	1,66%	26,83%	7,30%	0,37%	0,04%	0,15%	**100%**
GWP-fossil	%	63,46%	1,67%	26,95%	7,35%	0,37%	0,04%	0,16%	**100%**
GWP-biogenic	%	93,40%	0,02%	6,46%	0,07%	0,05%	0,00%	0,00%	**100%**
GWP-luluc	%	64,03%	0,03%	35,80%	0,11%	0,02%	0,00%	0,00%	**100%**
ODP	%	86,87%	1,68%	4,00%	7,00%	0,27%	0,04%	0,15%	**100%**
POFP	%	54,49%	0,52%	27,31%	16,75%	0,76%	0,01%	0,16%	**100%**
AP	%	58,91%	0,59%	24,20%	15,70%	0,47%	0,01%	0,11%	**100%**
EP-freshwater	%	73,78%	0,14%	25,55%	0,47%	0,05%	0,00%	0,01%	**100%**
ADP-fossil	%	67,13%	1,80%	23,04%	7,50%	0,33%	0,04%	0,16%	**100%**
ADP-minerals&metals	%	99,84%	0,00%	0,14%	0,01%	0,01%	0,00%	0,00%	**100%**
WDP	%	94,08%	0,01%	6,15%	0,03%	-0,26%	0,00%	0,00%	**100%**

Table 10C Resource use HV6		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	1,28E+01	5,14E-03	1,19E+02	2,19E-02	2,77E-03	1,16E-04	7,03E-04	**1,32E+02**
PERM	MJ	0,00E+00	0,00E+00	8,92E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**8,92E+01**
PERT	MJ	1,28E+01	5,14E-03	2,08E+02	2,19E-02	2,77E-03	1,16E-04	7,03E-04	**2,21E+02**
PENRE	MJ	1,33E+02	4,49E+00	5,71E+01	1,87E+01	8,18E-01	1,01E-01	3,98E-01	**2,14E+02**
PENRM	MJ	3,60E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**3,60E+01**
PENRT	MJ	1,69E+02	4,49E+00	5,71E+01	1,87E+01	8,18E-01	1,01E-01	3,98E-01	**2,50E+02**
SM	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**
RSF	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**
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	m3	2,95E-01	9,79E-05	2,02E-02	3,16E-04	-6,13E-04	2,20E-06	8,42E-06	**3,15E-01**

Table 10D. Waste production HV6		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	5,63E-04	1,14E-05	2,95E-05	3,78E-05	1,78E-06	2,57E-07	9,94E-07	**6,44E-04**
NHWD	kg	6,47E-01	1,15E-03	2,91E-01	3,85E-03	2,49E+00	2,59E-05	2,87E+00	**6,30E+00**
RWD	kg	2,47E-04	3,00E-05	8,57E-05	1,25E-04	4,22E-06	6,75E-07	2,65E-06	**4,95E-04**

MER	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**
MFR	kg	0,00E+00	0,00E+00	4,91E-02	0,00E+00	0,00E+00	0,00E+00	9,80E-01	**1,03E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

HV7

Table 11 Environmental impacts of the life cycle of the HV7 insulator. Result values in absolute (11A) and relative terms (11B). Resource use per unit of product during the life cycle of the HV7 insulator (11C). Waste production per unit of product during the life cycle of the HV7 insulator (11D).

TABLE 11A. Absolute values HV7 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	2,36E+01	6,27E-01	1,02E+01	2,66E+00	1,27E-01	1,98E-02	5,42E-02	**3,73E+01**
GWP-fossil	kg CO2 eq	2,34E+01	6,27E-01	1,01E+01	2,66E+00	1,27E-01	1,98E-02	5,42E-02	**3,70E+01**
GWP-biogenic	kg CO2 eq	2,11E-01	3,92E-05	1,42E-02	1,63E-04	1,06E-04	1,19E-06	4,21E-06	**2,26E-01**
GWP-luluc	kg CO2 eq	1,95E-02	8,85E-06	1,06E-02	3,49E-05	5,39E-06	2,70E-07	9,46E-07	**3,01E-02**
ODP	kg CFC11 eq	7,24E-06	1,48E-07	3,27E-07	5,96E-07	2,15E-08	4,51E-09	1,21E-08	**8,35E-06**
POFP	kg NMVOC eq	9,15E-02	8,70E-04	4,51E-02	2,73E-02	1,16E-03	2,69E-05	2,54E-04	**1,66E-01**
AP	mol H+ eq	1,30E-01	1,35E-03	5,53E-02	3,46E-02	9,77E-04	4,15E-05	2,34E-04	**2,23E-01**
EP-freshwater	kg P eq	8,33E-04	1,54E-06	2,83E-04	5,15E-06	4,68E-07	4,70E-08	1,48E-07	**1,12E-03**
ADP-fossil	MJ	3,32E+02	9,20E+00	1,16E+02	3,69E+01	1,51E+00	2,81E-01	7,58E-01	**4,96E+02**
ADP-minerals&metals	kg Sb eq	4,22E-03	1,99E-07	8,33E-06	6,21E-07	3,82E-07	6,08E-09	1,83E-08	**4,23E-03**
WDP	m3 depriv.	2,33E+01	3,04E-03	1,57E+00	6,85E-03	-6,25E-02	9,29E-05	2,53E-04	**2,49E+01**

TABLE 11B. Relative values HV7 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	63,37%	1,68%	27,26%	7,14%	0,34%	0,05%	0,15%	**100%**
GWP-fossil	%	63,19%	1,69%	27,39%	7,19%	0,34%	0,05%	0,15%	**100%**
GWP-biogenic	%	93,55%	0,02%	6,31%	0,07%	0,05%	0,00%	0,00%	**100%**
GWP-luluc	%	64,81%	0,03%	35,02%	0,12%	0,02%	0,00%	0,00%	**100%**
ODP	%	86,73%	1,77%	3,92%	7,13%	0,26%	0,05%	0,14%	**100%**
POFP	%	55,04%	0,52%	27,16%	16,41%	0,70%	0,02%	0,15%	**100%**
AP	%	58,44%	0,61%	24,84%	15,55%	0,44%	0,02%	0,11%	**100%**
EP-freshwater	%	74,18%	0,14%	25,17%	0,46%	0,04%	0,00%	0,01%	**100%**
ADP-fossil	%	66,91%	1,85%	23,28%	7,44%	0,30%	0,06%	0,15%	**100%**
ADP-minerals&metals	%	99,77%	0,00%	0,20%	0,01%	0,01%	0,00%	0,00%	**100%**
WDP	%	93,90%	0,01%	6,31%	0,03%	-0,25%	0,00%	0,00%	**100%**

Table 11C Resource use HV7		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	2,64E+01	1,12E-02	2,37E+02	4,60E-02	5,50E-03	3,41E-04	1,42E-03	**2,63E+02**
PERM	MJ	0,00E+00	0,00E+00	1,77E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,77E+02**

PERT	MJ	2,64E+01	1,12E-02	4,13E+02	4,60E-02	5,50E-03	3,41E-04	1,42E-03	**4,40E+02**
PENRE	MJ	2,83E+02	9,76E+00	1,22E+02	3,92E+01	1,62E+00	2,98E-01	8,05E-01	**4,57E+02**
PENRM	MJ	7,35E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**7,35E+01**
PENRT	MJ	3,56E+02	9,76E+00	1,22E+02	3,92E+01	1,62E+00	2,98E-01	8,05E-01	**5,30E+02**
SM	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**
RSF	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**
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	m3	6,06E-01	2,13E-04	4,24E-02	6,64E-04	-1,21E-03	6,50E-06	1,70E-05	**6,49E-01**

Table 11D. Waste production HV7		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	1,07E-03	2,48E-05	5,90E-05	7,94E-05	3,53E-06	7,57E-07	2,01E-06	**1,24E-03**
NHWD	kg	1,48E+00	2,50E-03	6,42E-01	8,08E-03	4,94E+00	7,63E-05	5,79E+00	**1,29E+01**
RWD	kg	5,21E-04	6,52E-05	1,74E-04	2,63E-04	8,36E-06	1,99E-06	5,35E-06	**1,04E-03**
MER	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**
MFR	kg	0,00E+00	0,00E+00	1,11E-01	0,00E+00	0,00E+00	0,00E+00	2,89E+00	**3,00E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

HV8

Table 12 Environmental impacts of the life cycle of the HV8 insulator. Result values in absolute (12A) and relative terms (12B). Resource use per unit of product during the life cycle of the HV8 insulator (12C). Waste production per unit of product during the life cycle of the HV8 insulator (12D).

TABLE 12A. Absolute values HV8 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	3,42E+01	8,94E-01	1,25E+01	3,33E+00	1,64E-01	1,12E-02	8,27E-02	**5,11E+01**
GWP-fossil	kg CO2 eq	3,38E+01	8,94E-01	1,24E+01	3,33E+00	1,64E-01	1,12E-02	**8,27E-02**	**5,07E+01**
GWP-biogenic	kg CO2 eq	3,55E-01	5,59E-05	1,84E-02	2,04E-04	1,37E-04	6,74E-07	**6,42E-06**	**3,73E-01**
GWP-luluc	kg CO2 eq	3,77E-02	1,26E-05	1,36E-02	4,37E-05	6,98E-06	1,52E-07	1,44E-06	**5,13E-02**
ODP	kg CFC11 eq	1,19E-05	2,11E-07	4,20E-07	7,47E-07	2,78E-08	2,54E-09	1,85E-08	**1,33E-05**
POFP	kg NMVOC eq	1,22E-01	1,24E-03	5,61E-02	3,42E-02	1,51E-03	1,52E-05	3,88E-04	**2,16E-01**
AP	mol H+ eq	1,91E-01	1,93E-03	6,80E-02	4,34E-02	1,27E-03	2,34E-05	3,57E-04	**3,06E-01**
EP-freshwater	kg P eq	1,14E-03	2,20E-06	3,52E-04	6,45E-06	6,06E-07	2,66E-08	2,26E-07	**1,50E-03**
ADP-fossil	MJ	4,96E+02	1,31E+01	1,43E+02	4,63E+01	1,96E+00	1,58E-01	1,16E+00	**7,02E+02**
ADP-minerals&metals	kg Sb eq	4,42E-03	2,84E-07	1,04E-05	7,79E-07	4,96E-07	3,43E-09	2,79E-08	**4,44E-03**
WDP	m3 depriv.	3,79E+01	4,34E-03	1,96E+00	8,58E-03	-8,10E-02	5,24E-05	3,87E-04	**3,98E+01**

TABLE 12B. Relative values HV8 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	66,84%	1,75%	24,38%	6,52%	0,32%	0,02%	0,16%	**100%**
GWP-fossil	%	66,63%	1,76%	24,52%	6,57%	0,32%	0,02%	0,16%	**100%**
GWP-biogenic	%	94,97%	0,01%	4,92%	0,05%	0,04%	0,00%	0,00%	**100%**

GWP-luluc	%	73,35%	0,02%	26,52%	0,09%	0,01%	0,00%	0,00%	**100%**
ODP	%	89,31%	1,58%	3,15%	5,60%	0,21%	0,02%	0,14%	**100%**
POFP	%	56,69%	0,57%	26,00%	15,85%	0,70%	0,01%	0,18%	**100%**
AP	%	62,47%	0,63%	22,19%	14,17%	0,41%	0,01%	0,12%	**100%**
EP-freshwater	%	75,91%	0,15%	23,46%	0,43%	0,04%	0,00%	0,02%	**100%**
ADP-fossil	%	70,64%	1,87%	20,43%	6,59%	0,28%	0,02%	0,16%	**100%**
ADP-minerals&metals	%	99,73%	0,01%	0,23%	0,02%	0,01%	0,00%	0,00%	**100%**
WDP	%	95,25%	0,01%	4,92%	0,02%	-0,20%	0,00%	0,00%	**100%**

Table 12C Resource use HV8		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	4,34E+01	1,59E-02	3,06E+02	5,76E-02	7,12E-03	1,92E-04	2,17E-03	**3,50E+02**
PERM	MJ	0,00E+00	0,00E+00	2,29E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**2,29E+02**
PERT	MJ	4,34E+01	1,59E-02	5,35E+02	5,76E-02	7,12E-03	1,92E-04	2,**17E-03**	**5,79E+02**
PENRE	MJ	4,11E+02	1,39E+01	1,52E+02	4,92E+01	2,10E+00	1,68E-01	1,23E+00	**6,29E+02**
PENRM	MJ	1,23E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,23E+02**
PENRT	MJ	5,33E+02	1,39E+01	1,52E+02	4,92E+01	2,10E+00	1,68E-01	1,23E+00	**7,51E+02**
SM	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**
RSF	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**
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	m3	9,90E-01	3,04E-04	5,33E-02	8,33E-04	-1,57E-03	3,67E-06	2,60E-05	**1,04E+00**

Table 12D. Waste production HV8		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	2,03E-03	3,54E-05	7,60E-05	9,96E-05	4,57E-06	4,27E-07	3,07E-06	**2,25E-03**
NHWD	kg	1,98E+00	3,56E-03	7,84E-01	1,01E-02	6,40E+00	4,30E-05	8,84E+00	**1,80E+01**
RWD	kg	7,68E-04	9,30E-05	2,23E-04	3,30E-04	1,08E-05	1,12E-06	8,16E-06	**1,43E-03**
MER	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**
MFR	kg	0,00E+00	0,00E+00	1,34E-01	0,00E+00	0,00E+00	0,00E+00	1,63E+00	**1,77E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

HV9

Table 13 Environmental impacts of the life cycle of the HV9 insulator. Result values in absolute (13A) and relative terms (13B). Resource use per unit of product during the life cycle of the HV9 insulator (13C). Waste production per unit of product during the life cycle of the HV9 insulator (13D).

TABLE 13A. Absolute values HV9 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	4,20E+01	1,05E+00	1,60E+01	4,21E+00	2,03E-01	1,87E-02	1,01E-01	**6,36E+01**
GWP-fossil	kg CO2 eq	4,16E+01	1,05E+00	1,59E+01	4,21E+00	2,03E-01	1,87E-02	1,01E-01	**6,31E+01**
GWP-biogenic	kg CO2 eq	4,03E-01	6,53E-05	2,28E-02	2,57E-04	1,69E-04	1,12E-06	7,87E-06	**4,26E-01**
GWP-luluc	kg CO2 eq	4,45E-02	1,48E-05	1,69E-02	5,52E-05	8,63E-06	2,54E-07	1,77E-06	**6,14E-02**
ODP	kg CFC11 eq	1,36E-05	2,47E-07	5,23E-07	9,44E-07	3,44E-08	4,24E-09	2,26E-08	**1,54E-05**
POFP	kg NMVOC eq	1,54E-01	1,45E-03	7,12E-02	4,32E-02	1,86E-03	2,53E-05	4,76E-04	**2,73E-01**
AP	mol H+ eq	2,38E-01	2,26E-03	8,69E-02	5,48E-02	1,57E-03	3,90E-05	4,38E-04	**3,84E-01**
EP-freshwater	kg P eq	1,42E-03	2,57E-06	4,46E-04	8,15E-06	7,50E-07	4,43E-08	2,76E-07	**1,88E-03**
ADP-fossil	MJ	6,02E+02	1,53E+01	1,82E+02	5,85E+01	2,42E+00	2,64E-01	1,42E+00	**8,63E+02**
ADP-minerals&metals	kg Sb eq	5,22E-03	3,32E-07	1,31E-05	9,83E-07	6,13E-07	5,72E-09	3,42E-08	**5,23E-03**
WDP	m3 depriv.	4,37E+01	5,08E-03	2,48E+00	1,08E-02	-1,00E-01	8,74E-05	4,74E-04	**4,61E+01**

TABLE 13B. Relative values HV9 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	66,12%	1,64%	25,11%	6,62%	0,32%	0,03%	0,16%	**100%**
GWP-fossil	%	65,92%	1,66%	25,24%	6,68%	0,32%	0,03%	0,16%	**100%**
GWP-biogenic	%	94,54%	0,02%	5,34%	0,06%	0,04%	0,00%	0,00%	**100%**
GWP-luluc	%	72,38%	0,02%	27,49%	0,09%	0,01%	0,00%	0,00%	**100%**
ODP	%	88,47%	1,60%	3,40%	6,13%	0,22%	0,03%	0,15%	**100%**
POFP	%	56,62%	0,53%	26,14%	15,84%	0,68%	0,01%	0,17%	**100%**
AP	%	61,95%	0,59%	22,65%	14,28%	0,41%	0,01%	0,11%	**100%**
EP-freshwater	%	75,64%	0,14%	23,74%	0,43%	0,04%	0,00%	0,01%	**100%**
ADP-fossil	%	69,83%	1,78%	21,14%	6,78%	0,28%	0,03%	0,16%	**100%**
ADP-minerals&metals	%	99,71%	0,01%	0,25%	0,02%	0,01%	0,00%	0,00%	**100%**
WDP	%	94,80%	0,01%	5,38%	0,02%	-0,22%	0,00%	0,00%	**100%**

Table 13C Resource use HV9		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	5,18E+01	1,86E-02	3,79E+02	7,28E-02	8,81E-03	3,21E-04	2,66E-03	**4,31E+02**
PERM	MJ	0,00E+00	0,00E+00	2,83E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**2,83E+02**
PERT	MJ	5,18E+01	1,86E-02	6,63E+02	7,28E-02	8,81E-03	3,21E-04	2,66E-03	**7,14E+02**
PENRE	MJ	5,08E+02	1,63E+01	1,93E+02	6,21E+01	2,60E+00	2,80E-01	1,51E+00	**7,83E+02**
PENRM	MJ	1,39E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,39E+02**
PENRT	MJ	6,47E+02	1,63E+01	1,93E+02	6,21E+01	2,60E+00	2,80E-01	1,51E+00	**9,23E+02**
SM	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**
RSF	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**
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	m3	1,14E+00	3,55E-04	6,72E-02	1,05E-03	-1,95E-03	6,12E-06	3,18E-05	**1,21E+00**

Table 13D. Waste production HV9		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	2,31E-03	4,14E-05	9,44E-05	1,26E-04	5,65E-06	7,12E-07	3,76E-06	**2,58E-03**
NHWD	kg	2,56E+00	4,17E-03	1,01E+00	1,28E-02	7,91E+00	7,18E-05	1,08E+01	**2,23E+01**

RWD	kg	9,61E-04	1,09E-04	2,78E-04	4,17E-04	1,34E-05	1,87E-06	1,00E-05	**1,79E-03**
MER	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**
MFR	kg	0,00E+00	0,00E+00	1,73E-01	0,00E+00	0,00E+00	0,00E+00	2,72E+00	**2,89E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV Insulators
MV1

Table 14 Environmental impacts of the life cycle of the MV1 insulator. Result values in absolute (14A) and relative terms (14B). Resource use per unit of product during the life cycle of the MV1 insulator (14C). Waste production per unit of product during the life cycle of the MV1 insulator (14D).

TABLE 14A. Absolute values MV1 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	3,29E+00	8,49E-02	2,74E+00	6,63E-01	5,63E-02	3,98E-03	6,17E-03	**6,84E+00**
GWP-fossil	kg CO2 eq	3,26E+00	8,49E-02	2,66E+00	6,63E-01	5,62E-02	3,98E-03	6,16E-03	**6,74E+00**
GWP-biogenic	kg CO2 eq	2,42E-02	5,31E-06	6,96E-02	4,05E-05	8,01E-05	2,40E-07	4,79E-07	**9,40E-02**
GWP-luluc	kg CO2 eq	2,63E-03	1,20E-06	3,22E-03	8,70E-06	5,22E-06	5,42E-08	1,08E-07	**5,87E-03**
ODP	kg CFC11 eq	8,38E-07	2,00E-08	1,54E-07	1,49E-07	8,71E-09	9,05E-10	1,38E-09	**1,17E-06**
POFP	kg NMVOC eq	1,34E-02	1,18E-04	1,07E-02	6,80E-03	4,78E-04	5,40E-06	2,89E-05	**3,15E-02**
AP	mol H+ eq	1,80E-02	1,83E-04	1,38E-02	8,63E-03	4,22E-04	8,32E-06	2,66E-05	**4,10E-02**
EP-freshwater	kg P eq	1,26E-04	2,09E-07	1,08E-04	1,28E-06	2,57E-07	9,44E-09	1,68E-08	**2,36E-04**
ADP-fossil	MJ	4,39E+01	1,25E+00	3,22E+01	9,21E+00	5,87E-01	5,63E-02	8,63E-02	**8,73E+01**
ADP-minerals&metals	kg Sb eq	1,96E-03	2,70E-08	4,18E-06	1,55E-07	2,64E-07	1,22E-09	2,08E-09	**1,97E-03**
WDP	m3 depriv.	2,76E+00	4,12E-04	5,84E-01	1,71E-03	1,54E-02	1,86E-05	2,88E-05	**3,36E+00**

TABLE 14B. Relative values MV1 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	48,06%	1,24%	40,03%	9,70%	0,82%	0,06%	0,09%	**100%**
GWP-fossil	%	48,37%	1,26%	39,54%	9,84%	0,83%	0,06%	0,09%	**100%**
GWP-biogenic	%	25,79%	0,01%	74,07%	0,04%	0,09%	0,00%	0,00%	**100%**
GWP-luluc	%	44,81%	0,02%	54,93%	0,15%	0,09%	0,00%	0,00%	**100%**
ODP	%	71,53%	1,71%	13,15%	12,68%	0,74%	0,08%	0,12%	**100%**
POFP	%	42,47%	0,37%	33,95%	21,58%	1,52%	0,02%	0,09%	**100%**
AP	%	43,76%	0,45%	33,64%	21,05%	1,03%	0,02%	0,06%	**100%**
EP-freshwater	%	53,50%	0,09%	45,74%	0,54%	0,11%	0,00%	0,01%	**100%**
ADP-fossil	%	50,31%	1,43%	36,88%	10,55%	0,67%	0,06%	0,10%	**100%**
ADP-minerals&metals	%	99,76%	0,00%	0,21%	0,01%	0,01%	0,00%	0,00%	**100%**
WDP	%	82,12%	0,01%	17,35%	0,05%	0,46%	0,00%	0,00%	**100%**

Table 14C Resource use MV1		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	3,28E+00	1,51E-03	4,96E+01	1,15E-02	5,71E-03	6,84E-05	1,62E-04	**5,29E+01**
PERM	MJ	0,00E+00	0,00E+00	6,20E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**6,20E+01**
PERT	MJ	3,28E+00	1,51E-03	1,12E+02	1,15E-02	5,71E-03	6,84E-05	1,62E-04	**1,15E+02**
PENRE	MJ	3,88E+01	1,32E+00	3,44E+01	9,78E+00	6,30E-01	5,98E-02	9,16E-02	**8,51E+01**
PENRM	MJ	8,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**8,20E+00**
PENRT	MJ	4,70E+01	1,32E+00	3,44E+01	9,78E+00	6,30E-01	5,98E-02	9,16E-02	**9,33E+01**
SM	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**
RSF	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**
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	m3	7,22E-02	2,89E-05	1,80E-02	1,66E-04	6,95E-04	1,30E-06	1,94E-06	**9,12E-02**

Table 14D. Waste production MV1		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	3,54E-04	3,36E-06	2,44E-05	1,98E-05	1,33E-06	1,52E-07	2,29E-07	**4,03E-04**
NHWD	kg	2,46E-01	3,39E-04	1,35E-01	2,02E-03	1,71E+00	1,53E-05	6,59E-01	**2,75E+00**
RWD	kg	7,06E-05	8,84E-06	5,44E-05	6,56E-05	3,09E-06	3,99E-07	6,08E-07	**2,04E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	1,57E-02	0,00E+00	0,00E+00	0,00E+00	5,80E-01	**5,96E-01**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV2

Table 15 Environmental impacts of the life cycle of the MV2 insulator. Result values in absolute (15A) and relative terms (15B). Resource use per unit of product during the life cycle of the MV2 insulator (15C). Waste production per unit of product during the life cycle of the MV2 insulator (15D).

TABLE 15A. Absolute values MV2 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	4,47E+00	1,28E-01	3,52E+00	8,56E-01	7,48E-02	1,92E-03	1,14E-02	**9,06E+00**
GWP-fossil	kg CO2 eq	4,42E+00	1,28E-01	3,42E+00	8,56E-01	7,46E-02	1,92E-03	1,14E-02	**8,91E+00**
GWP-biogenic	kg CO2 eq	4,86E-02	8,01E-06	9,39E-02	5,23E-05	1,07E-04	1,16E-07	8,85E-07	**1,43E-01**
GWP-luluc	kg CO2 eq	3,85E-03	1,81E-06	4,24E-03	1,12E-05	6,99E-06	2,62E-08	1,99E-07	**8,11E-03**
ODP	kg CFC11 eq	1,65E-06	3,02E-08	2,04E-07	1,92E-07	1,15E-08	4,37E-10	2,55E-09	**2,09E-06**
POFP	kg NMVOC eq	1,64E-02	1,78E-04	1,37E-02	8,78E-03	6,33E-04	2,61E-06	5,35E-05	**3,98E-02**
AP	mol H+ eq	2,46E-02	2,77E-04	1,77E-02	1,11E-02	5,60E-04	4,02E-06	4,92E-05	**5,43E-02**
EP-freshwater	kg P eq	1,49E-04	3,15E-07	1,41E-04	1,66E-06	3,42E-07	4,56E-09	3,11E-08	**2,93E-04**
ADP-fossil	MJ	6,57E+01	1,88E+00	4,16E+01	1,19E+01	7,78E-01	2,72E-02	1,59E-01	**1,22E+02**
ADP-minerals&metals	kg Sb eq	9,05E-04	4,07E-08	5,51E-06	2,00E-07	3,53E-07	5,89E-10	3,84E-09	**9,11E-04**
WDP	m3 depriv.	5,23E+00	6,23E-04	7,65E-01	2,20E-03	2,15E-02	9,00E-06	5,33E-05	**6,02E+00**

TABLE 15B. Relative values MV2 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	49,35%	1,42%	38,81%	9,45%	0,83%	0,02%	0,13%	**100%**
GWP-fossil	%	49,60%	1,44%	38,37%	9,61%	0,84%	0,02%	0,13%	**100%**
GWP-biogenic	%	34,07%	0,01%	65,81%	0,04%	0,08%	0,00%	0,00%	**100%**
GWP-luluc	%	47,50%	0,02%	52,25%	0,14%	0,09%	0,00%	0,00%	**100%**
ODP	%	78,90%	1,45%	9,78%	9,18%	0,55%	0,02%	0,12%	**100%**
POFP	%	41,30%	0,45%	34,47%	22,05%	1,59%	0,01%	0,13%	**100%**
AP	%	45,29%	0,51%	32,54%	20,53%	1,03%	0,01%	0,09%	**100%**
EP-freshwater	%	51,02%	0,11%	48,18%	0,57%	0,12%	0,00%	0,01%	**100%**
ADP-fossil	%	53,85%	1,54%	34,08%	9,74%	0,64%	0,02%	0,13%	**100%**
ADP-minerals&metals	%	99,33%	0,00%	0,61%	0,02%	0,04%	0,00%	0,00%	**100%**
WDP	%	86,89%	0,01%	12,70%	0,04%	0,36%	0,00%	0,00%	**100%**

Table 15C Resource use MV2		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	5,49E+00	2,28E-03	6,45E+01	1,48E-02	7,66E-03	3,30E-05	2,99E-04	**7,00E+01**
PERM	MJ	0,00E+00	0,00E+00	8,19E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**8,19E+01**
PERT	MJ	5,49E+00	2,28E-03	1,46E+02	1,48E-02	7,66E-03	3,30E-05	2,99E-04	**1,52E+02**
PENRE	MJ	5,36E+01	2,00E+00	4,45E+01	1,26E+01	8,35E-01	2,89E-02	1,69E-01	**1,14E+02**
PENRM	MJ	1,71E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,71E+01**
PENRT	MJ	7,07E+01	2,00E+00	4,45E+01	1,26E+01	8,35E-01	2,89E-02	1,69E-01	**1,31E+02**
SM	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**
RSF	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**
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	m3	1,35E-01	4,36E-05	2,37E-02	2,14E-04	9,51E-04	6,30E-07	3,58E-06	**1,60E-01**

Table 15D. Waste production MV2		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	1,83E-04	5,08E-06	3,23E-05	2,56E-05	1,76E-06	7,33E-08	4,23E-07	**2,49E-04**
NHWD	kg	2,25E-01	5,11E-04	1,71E-01	2,60E-03	2,26E+00	7,39E-06	1,22E+00	**3,88E+00**
RWD	kg	9,82E-05	1,33E-05	7,13E-05	8,47E-05	4,09E-06	1,93E-07	1,12E-06	**2,73E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	1,92E-02	0,00E+00	0,00E+00	0,00E+00	2,80E-01	**2,99E-01**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV3

Table 16 Environmental impacts of the life cycle of the MV3 insulator. Result values in absolute (16A) and relative terms (16B). Resource use per unit of product during the life cycle of the MV3 insulator (16C). Waste production per unit of product during the life cycle of the MV3 insulator (16D).

TABLE 16A. Absolute values MV3 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	5,86E+00	1,62E-01	4,57E+00	1,08E+00	8,91E-02	7,00E-03	1,11E-02	**1,18E+01**
GWP-fossil	kg CO2 eq	5,80E+00	1,62E-01	4,45E+00	1,08E+00	8,90E-02	7,00E-03	1,11E-02	**1,16E+01**
GWP-biogenic	kg CO2 eq	4,73E-02	1,01E-05	1,13E-01	6,60E-05	1,28E-04	4,22E-07	8,63E-07	**1,60E-01**
GWP-luluc	kg CO2 eq	4,57E-03	2,29E-06	5,07E-03	1,42E-05	8,37E-06	9,53E-08	1,94E-07	**9,67E-03**
ODP	kg CFC11 eq	1,63E-06	3,82E-08	2,46E-07	2,42E-07	1,37E-08	1,59E-09	2,48E-09	**2,18E-06**
POFP	kg NMVOC eq	2,35E-02	2,25E-04	1,76E-02	1,11E-02	7,54E-04	9,50E-06	5,22E-05	**5,32E-02**
AP	mol H+ eq	3,13E-02	3,50E-04	2,31E-02	1,41E-02	6,67E-04	1,46E-05	4,80E-05	**6,95E-02**
EP-freshwater	kg P eq	2,21E-04	3,99E-07	1,77E-04	2,09E-06	4,09E-07	1,66E-08	3,03E-08	**4,00E-04**
ADP-fossil	MJ	7,93E+01	2,38E+00	5,30E+01	1,50E+01	9,26E-01	9,90E-02	1,56E-01	**1,51E+02**
ADP-minerals&metals	kg Sb eq	2,68E-03	5,15E-08	6,84E-06	2,52E-07	4,22E-07	2,14E-09	3,75E-09	**2,69E-03**
WDP	m3 depriv.	5,30E+00	7,87E-04	9,53E-01	2,78E-03	2,62E-02	3,28E-05	5,20E-05	**6,28E+00**

TABLE 16B. Relative values MV3 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	49,72%	1,38%	38,82%	9,17%	0,76%	0,06%	0,09%	**100%**
GWP-fossil	%	50,00%	1,40%	38,38%	9,30%	0,77%	0,06%	0,10%	**100%**
GWP-biogenic	%	29,53%	0,01%	70,35%	0,04%	0,08%	0,00%	0,00%	**100%**
GWP-luluc	%	47,29%	0,02%	52,46%	0,15%	0,09%	0,00%	0,00%	**100%**
ODP	%	75,03%	1,75%	11,30%	11,10%	0,63%	0,07%	0,11%	**100%**
POFP	%	44,14%	0,42%	33,11%	20,79%	1,42%	0,02%	0,10%	**100%**
AP	%	45,05%	0,50%	33,18%	20,22%	0,96%	0,02%	0,07%	**100%**
EP-freshwater	%	55,13%	0,10%	44,14%	0,52%	0,10%	0,00%	0,01%	**100%**
ADP-fossil	%	52,54%	1,58%	35,16%	9,94%	0,61%	0,07%	0,10%	**100%**
ADP-minerals&metals	%	99,72%	0,00%	0,25%	0,01%	0,02%	0,00%	0,00%	**100%**
WDP	%	84,36%	0,01%	15,16%	0,04%	0,42%	0,00%	0,00%	**100%**

Table 16C Resource use MV3		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	5,94E+00	2,89E-03	7,64E+01	1,87E-02	9,17E-03	1,20E-04	2,91E-04	**8,24E+01**
PERM	MJ	0,00E+00	0,00E+00	9,74E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**9,74E+01**
PERT	MJ	5,94E+00	2,89E-03	1,74E+02	1,87E-02	9,17E-03	1,20E-04	2,91E-04	**1,80E+02**
PENRE	MJ	6,87E+01	2,53E+00	5,67E+01	1,59E+01	9,94E-01	1,05E-01	1,65E-01	**1,45E+02**
PENRM	MJ	1,62E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,62E+01**
PENRT	MJ	8,49E+01	2,53E+00	5,67E+01	1,59E+01	9,94E-01	1,05E-01	1,65E-01	**1,61E+02**
SM	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**
RSF	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**
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	m3	1,38E-01	5,51E-05	2,93E-02	2,70E-04	1,15E-03	2,29E-06	3,49E-06	**1,69E-01**

Table 16D. Waste production MV3		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	5,25E-04	6,42E-06	3,88E-05	3,22E-05	2,10E-06	2,67E-07	4,12E-07	**6,05E-04**
NHWD	kg	4,19E-01	6,47E-04	2,30E-01	3,28E-03	2,69E+00	2,69E-05	1,19E+00	**4,53E+00**
RWD	kg	1,22E-04	1,69E-05	8,66E-05	1,07E-04	4,87E-06	7,02E-07	1,10E-06	**3,39E-04**

MER	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**
MFR	kg	0,00E+00	0,00E+00	2,81E-02	0,00E+00	0,00E+00	0,00E+00	1,02E+00	**1,05E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV4

Table 17 Environmental impacts of the life cycle of the MV4 insulator. Result values in absolute (17A) and relative terms (17B). Resource use per unit of product during the life cycle of the MV4 insulator (17C). Waste production per unit of product during the life cycle of the MV4 insulator (17D).

TABLE 17A. Absolute values MV4 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	5,70E+00	1,61E-01	4,47E+00	1,06E+00	8,74E-02	6,87E-03	1,07E-02	**1,15E+01**
GWP-fossil	kg CO2 eq	5,64E+00	1,61E-01	4,35E+00	1,06E+00	8,73E-02	6,87E-03	1,07E-02	**1,13E+01**
GWP-biogenic	kg CO2 eq	4,71E-02	1,01E-05	1,11E-01	6,45E-05	1,26E-04	4,13E-07	8,34E-07	**1,58E-01**
GWP-luluc	kg CO2 eq	4,41E-03	2,27E-06	4,98E-03	1,39E-05	8,21E-06	9,34E-08	1,88E-07	**9,41E-03**
ODP	kg CFC11 eq	1,63E-06	3,80E-08	2,41E-07	2,37E-07	1,35E-08	1,56E-09	2,40E-09	**2,16E-06**
POFP	kg NMVOC eq	2,28E-02	2,23E-04	1,72E-02	1,08E-02	7,40E-04	9,32E-06	5,04E-05	**5,19E-02**
AP	mol H+ eq	3,02E-02	3,47E-04	2,25E-02	1,38E-02	6,54E-04	1,43E-05	4,64E-05	**6,76E-02**
EP-freshwater	kg P eq	2,14E-04	3,96E-07	1,73E-04	2,04E-06	4,01E-07	1,63E-08	2,93E-08	**3,90E-04**
ADP-fossil	MJ	7,73E+01	2,36E+00	5,19E+01	1,47E+01	9,09E-01	9,71E-02	1,50E-01	**1,47E+02**
ADP-minerals&metals	kg Sb eq	2,52E-03	5,12E-08	6,69E-06	2,47E-07	4,14E-07	2,10E-09	3,62E-09	**2,53E-03**
WDP	m3 depriv.	5,25E+00	7,82E-04	9,33E-01	2,72E-03	2,56E-02	3,21E-05	5,02E-05	**6,21E+00**

TABLE 17B. Relative values MV4 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	49,58%	1,40%	38,90%	9,20%	0,76%	0,06%	0,09%	**100%**
GWP-fossil	%	49,86%	1,42%	38,46%	9,33%	0,77%	0,06%	0,09%	**100%**
GWP-biogenic	%	29,84%	0,01%	70,04%	0,04%	0,08%	0,00%	0,00%	**100%**
GWP-luluc	%	46,88%	0,02%	52,86%	0,15%	0,09%	0,00%	0,00%	**100%**
ODP	%	75,29%	1,76%	11,18%	10,96%	0,62%	0,07%	0,11%	**100%**
POFP	%	43,91%	0,43%	33,24%	20,89%	1,43%	0,02%	0,10%	**100%**
AP	%	44,73%	0,51%	33,35%	20,35%	0,97%	0,02%	0,07%	**100%**
EP-freshwater	%	54,92%	0,10%	44,34%	0,52%	0,10%	0,00%	0,01%	**100%**
ADP-fossil	%	52,44%	1,60%	35,21%	9,96%	0,62%	0,07%	0,10%	**100%**
ADP-minerals&metals	%	99,71%	0,00%	0,26%	0,01%	0,02%	0,00%	0,00%	**100%**
WDP	%	84,52%	0,01%	15,01%	0,04%	0,41%	0,00%	0,00%	**100%**

Table 17C Resource use MV4		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	5,79E+00	2,87E-03	7,50E+01	1,83E-02	8,99E-03	1,18E-04	2,82E-04	**8,08E+01**
PERM	MJ	0,00E+00	0,00E+00	9,56E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**9,56E+01**

PERT	MJ	5,79E+00	2,87E-03	1,71E+02	1,83E-02	8,99E-03	1,18E-04	2,82E-04	**1,76E+02**
PENRE	MJ	6,67E+01	2,51E+00	5,54E+01	1,56E+01	9,75E-01	1,03E-01	1,60E-01	**1,41E+02**
PENRM	MJ	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,61E+01**
PENRT	MJ	8,28E+01	2,51E+00	5,54E+01	1,56E+01	9,75E-01	1,03E-01	1,60E-01	**1,58E+02**
SM	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**
RSF	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**
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	m3	1,36E-01	5,47E-05	2,87E-02	2,64E-04	1,13E-03	2,25E-06	3,37E-06	**1,66E-01**

Table 17D. Waste production MV4		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	5,01E-04	6,37E-06	3,80E-05	3,16E-05	2,06E-06	2,62E-07	3,98E-07	**5,80E-04**
NHWD	kg	4,04E-01	6,42E-04	2,25E-01	3,21E-03	2,64E+00	2,64E-05	1,15E+00	**4,42E+00**
RWD	kg	1,17E-04	1,68E-05	8,49E-05	1,05E-04	4,77E-06	6,89E-07	1,06E-06	**3,30E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	2,73E-02	0,00E+00	0,00E+00	0,00E+00	1,00E+00	**1,03E+00**
CRU	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**
ETE	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**
EEE	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**

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV5

Table 18 Environmental impacts of the life cycle of the MV5 insulator. Result values in absolute (18A) and relative terms (18B). Resource use per unit of product during the life cycle of the MV5 insulator (18C). Waste production per unit of product during the life cycle of the MV5 insulator (18D).

TABLE 18A. Absolute values MV5 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	3,46E+00	8,50E-02	2,87E+00	6,96E-01	5,91E-02	3,98E-03	6,73E-03	**7,18E+00**
GWP-fossil	kg CO2 eq	3,43E+00	8,50E-02	2,80E+00	6,96E-01	5,90E-02	3,98E-03	6,73E-03	**7,07E+00**
GWP-biogenic	kg CO2 eq	2,45E-02	5,31E-06	7,31E-02	4,25E-05	8,41E-05	2,40E-07	5,22E-07	**9,77E-02**
GWP-luluc	kg CO2 eq	2,81E-03	1,20E-06	3,39E-03	9,13E-06	5,48E-06	5,42E-08	1,17E-07	**6,22E-03**
ODP	kg CFC11 eq	8,49E-07	2,00E-08	1,62E-07	1,56E-07	9,15E-09	9,05E-10	1,50E-09	**1,20E-06**
POFP	kg NMVOC eq	1,41E-02	1,18E-04	1,12E-02	7,14E-03	5,02E-04	5,40E-06	3,16E-05	**3,31E-02**
AP	mol H+ eq	1,92E-02	1,83E-04	1,45E-02	9,07E-03	4,43E-04	8,32E-06	2,91E-05	**4,34E-02**
EP-freshwater	kg P eq	1,32E-04	2,09E-07	1,13E-04	1,35E-06	2,70E-07	9,44E-09	1,83E-08	**2,47E-04**
ADP-fossil	MJ	4,62E+01	1,25E+00	3,38E+01	9,67E+00	6,17E-01	5,63E-02	9,41E-02	**9,16E+01**
ADP-minerals&metals	kg Sb eq	1,97E-03	2,70E-08	4,39E-06	1,63E-07	2,77E-07	1,22E-09	2,27E-09	**1,98E-03**
WDP	m3 depriv.	2,82E+00	4,13E-04	6,13E-01	1,79E-03	1,62E-02	1,86E-05	3,14E-05	**3,45E+00**

TABLE 18B. Relative values MV5 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	48,14%	1,18%	40,00%	9,70%	0,82%	0,06%	0,09%	**100%**
GWP-fossil	%	48,46%	1,20%	39,51%	9,84%	0,83%	0,06%	0,10%	**100%**
GWP-biogenic	%	25,09%	0,01%	74,78%	0,04%	0,09%	0,00%	0,00%	**100%**

GWP-luluc	%	45,26%	0,02%	54,48%	0,15%	0,09%	0,00%	0,00%	**100%**
ODP	%	70,85%	1,67%	13,50%	13,02%	0,76%	0,08%	0,13%	**100%**
POFP	%	42,59%	0,36%	33,88%	21,54%	1,51%	0,02%	0,10%	**100%**
AP	%	44,22%	0,42%	33,36%	20,89%	1,02%	0,02%	0,07%	**100%**
EP-freshwater	%	53,44%	0,08%	45,81%	0,55%	0,11%	0,00%	0,01%	**100%**
ADP-fossil	%	50,37%	1,36%	36,88%	10,55%	0,67%	0,06%	0,10%	**100%**
ADP-minerals&metals	%	99,75%	0,00%	0,22%	0,01%	0,01%	0,00%	0,00%	**100%**
WDP	%	81,70%	0,01%	17,76%	0,05%	0,47%	0,00%	0,00%	**100%**

Table 18C Resource use MV5		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	3,47E+00	1,51E-03	5,21E+01	1,20E-02	6,00E-03	6,84E-05	1,76E-04	**5,56E+01**
PERM	MJ	0,00E+00	0,00E+00	6,51E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**6,51E+01**
PERT	MJ	3,47E+00	1,51E-03	1,17E+02	1,20E-02	6,00E-03	6,84E-05	1,76E-04	**1,21E+02**
PENRE	MJ	4,12E+01	1,32E+00	3,61E+01	1,03E+01	6,62E-01	5,98E-02	9,99E-02	**8,97E+01**
PENRM	MJ	8,30E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**8,30E+00**
PENRT	MJ	4,95E+01	1,32E+00	3,61E+01	1,03E+01	6,62E-01	5,98E-02	9,99E-02	**9,80E+01**
SM	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**
RSF	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**
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	m3	7,39E-02	2,89E-05	1,89E-02	1,74E-04	7,29E-04	1,30E-06	2,11E-06	**9,38E-02**

Table 18D. Waste production MV5		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	3,56E-04	3,36E-06	2,56E-05	2,08E-05	1,40E-06	1,52E-07	2,49E-07	**4,08E-04**
NHWD	kg	2,60E-01	3,39E-04	1,42E-01	2,12E-03	1,80E+00	1,53E-05	7,19E-01	**2,92E+00**
RWD	kg	7,59E-05	8,85E-06	5,71E-05	6,89E-05	3,25E-06	3,99E-07	6,64E-07	**2,15E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	1,65E-02	0,00E+00	0,00E+00	0,00E+00	5,80E-01	**5,97E-01**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV6

Table 19 Environmental impacts of the life cycle of the MV6 insulator. Result values in absolute (19A) and relative terms (19B). Resource use per unit of product during the life cycle of the MV6 insulator (19C). Waste production per unit of product during the life cycle of the MV6 insulator (19D).

TABLE 19A. Absolute values MV6 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	6,02E+00	1,62E-01	4,72E+00	1,12E+00	9,23E-02	7,00E-03	1,17E-02	**1,21E+01**
GWP-fossil	kg CO2 eq	5,96E+00	1,62E-01	4,60E+00	1,12E+00	9,21E-02	7,00E-03	1,17E-02	**1,19E+01**
GWP-biogenic	kg CO2 eq	4,76E-02	1,01E-05	1,17E-01	6,82E-05	1,33E-04	4,22E-07	9,07E-07	**1,64E-01**
GWP-luluc	kg CO2 eq	4,73E-03	2,29E-06	5,25E-03	1,46E-05	8,67E-06	9,53E-08	2,04E-07	**1,00E-02**

ODP	kg CFC11 eq	1,64E-06	3,82E-08	2,55E-07	2,50E-07	1,42E-08	1,59E-09	2,61E-09	**2,21E-06**
POFP	kg NMVOC eq	2,42E-02	2,25E-04	1,82E-02	1,14E-02	7,81E-04	9,50E-06	5,48E-05	**5,49E-02**
AP	mol H+ eq	3,25E-02	3,50E-04	2,38E-02	1,45E-02	6,91E-04	1,46E-05	5,05E-05	**7,19E-02**
EP-freshwater	kg P eq	2,26E-04	3,99E-07	1,83E-04	2,16E-06	4,23E-07	1,66E-08	3,19E-08	**4,11E-04**
ADP-fossil	MJ	8,14E+01	2,38E+00	5,48E+01	1,55E+01	9,60E-01	9,90E-02	1,63E-01	**1,55E+02**
ADP-minerals&metals	kg Sb eq	2,54E-03	5,15E-08	7,07E-06	2,60E-07	4,37E-07	2,14E-09	3,94E-09	**2,55E-03**
WDP	m3 depriv.	5,35E+00	7,88E-04	9,85E-01	2,87E-03	2,70E-02	3,28E-05	5,46E-05	**6,37E+00**

TABLE 19B. Relative values MV6 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	49,63%	1,34%	38,92%	9,20%	0,76%	0,06%	0,10%	**100%**
GWP-fossil	%	49,91%	1,36%	38,47%	9,34%	0,77%	0,06%	0,10%	**100%**
GWP-biogenic	%	28,92%	0,01%	70,95%	0,04%	0,08%	0,00%	0,00%	**100%**
GWP-luluc	%	47,27%	0,02%	52,47%	0,15%	0,09%	0,00%	0,00%	**100%**
ODP	%	74,55%	1,73%	11,55%	11,33%	0,65%	0,07%	0,12%	**100%**
POFP	%	44,06%	0,41%	33,16%	20,84%	1,42%	0,02%	0,10%	**100%**
AP	%	45,16%	0,49%	33,10%	20,20%	0,96%	0,02%	0,07%	**100%**
EP-freshwater	%	54,89%	0,10%	44,38%	0,52%	0,10%	0,00%	0,01%	**100%**
ADP-fossil	%	52,41%	1,53%	35,29%	9,98%	0,62%	0,06%	0,11%	**100%**
ADP-minerals&metals	%	99,69%	0,00%	0,28%	0,01%	0,02%	0,00%	0,00%	**100%**
WDP	%	84,05%	0,01%	15,47%	0,05%	0,42%	0,00%	0,00%	**100%**

Table 19C Resource use MV6		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	6,12E+00	2,89E-03	7,92E+01	1,93E-02	9,50E-03	1,20E-04	3,06E-04	**8,54E+01**
PERM	MJ	0,00E+00	0,00E+00	1,01E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,01E+02**
PERT	MJ	6,12E+00	2,89E-03	1,80E+02	1,93E-02	9,50E-03	1,20E-04	3,06E-04	**1,86E+02**
PENRE	MJ	7,09E+01	2,53E+00	5,85E+01	1,64E+01	1,03E+00	1,05E-01	1,73E-01	**1,50E+02**
PENRM	MJ	1,63E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,63E+01**
PENRT	MJ	8,72E+01	2,53E+00	5,85E+01	1,64E+01	1,03E+00	1,05E-01	1,73E-01	**1,66E+02**
SM	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**
RSF	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**
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	m3	1,39E-01	5,51E-05	3,03E-02	2,79E-04	1,19E-03	2,29E-06	3,67E-06	**1,71E-01**

Table 19D. Waste production MV6		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	5,08E-04	6,42E-06	4,01E-05	3,33E-05	2,17E-06	2,67E-07	4,33E-07	**5,91E-04**
NHWD	kg	4,31E-01	6,47E-04	2,37E-01	3,39E-03	2,78E+00	2,69E-05	1,25E+00	**4,70E+00**
RWD	kg	1,27E-04	1,69E-05	8,97E-05	1,10E-04	5,04E-06	7,02E-07	1,15E-06	**3,51E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	2,89E-02	0,00E+00	0,00E+00	0,00E+00	1,02E+00	**1,05E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV7

Table 20 Environmental impacts of the life cycle of the MV7 insulator. Result values in absolute (20A) and relative terms (20B). Resource use per unit of product during the life cycle of the MV7 insulator (20C). Waste production per unit of product during the life cycle of the MV7 insulator (20D).

TABLE 20A. Absolute values MV7 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	4,54E+00	1,17E-01	3,53E+00	8,46E-01	7,11E-02	3,98E-03	9,90E-03	**9,12E+00**
GWP-fossil	kg CO2 eq	4,50E+00	1,17E-01	3,44E+00	8,46E-01	7,10E-02	3,98E-03	9,90E-03	**8,99E+00**
GWP-biogenic	kg CO2 eq	3,81E-02	7,31E-06	8,91E-02	5,17E-05	1,02E-04	2,40E-07	7,69E-07	**1,27E-01**
GWP-luluc	kg CO2 eq	3,79E-03	1,65E-06	4,05E-03	1,11E-05	6,64E-06	5,42E-08	1,73E-07	**7,87E-03**
ODP	kg CFC11 eq	1,31E-06	2,76E-08	1,95E-07	1,89E-07	1,10E-08	9,05E-10	2,21E-09	**1,73E-06**
POFP	kg NMVOC eq	1,79E-02	1,62E-04	1,37E-02	8,67E-03	6,02E-04	5,40E-06	4,65E-05	**4,11E-02**
AP	mol H+ eq	2,52E-02	2,52E-04	1,78E-02	1,10E-02	5,32E-04	8,32E-06	4,28E-05	**5,49E-02**
EP-freshwater	kg P eq	1,66E-04	2,88E-07	1,38E-04	1,64E-06	3,26E-07	9,44E-09	2,70E-08	**3,06E-04**
ADP-fossil	MJ	6,29E+01	1,72E+00	4,13E+01	1,17E+01	7,40E-01	5,63E-02	1,39E-01	**1,19E+02**
ADP-minerals&metals	kg Sb eq	1,98E-03	3,72E-08	5,36E-06	1,97E-07	3,35E-07	1,22E-09	3,34E-09	**1,99E-03**
WDP	m3 depriv.	4,26E+00	5,68E-04	7,47E-01	2,18E-03	2,03E-02	1,86E-05	4,63E-05	**5,03E+00**

TABLE 20B. Relative values MV7 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	49,80%	1,28%	38,72%	9,27%	0,78%	0,04%	0,11%	**100%**
GWP-fossil	%	50,08%	1,30%	38,26%	9,41%	0,79%	0,04%	0,11%	**100%**
GWP-biogenic	%	29,91%	0,01%	69,96%	0,04%	0,08%	0,00%	0,00%	**100%**
GWP-luluc	%	48,22%	0,02%	51,53%	0,14%	0,08%	0,00%	0,00%	**100%**
ODP	%	75,39%	1,59%	11,27%	10,93%	0,63%	0,05%	0,13%	**100%**
POFP	%	43,56%	0,39%	33,36%	21,10%	1,47%	0,01%	0,11%	**100%**
AP	%	45,99%	0,46%	32,43%	20,06%	0,97%	0,02%	0,08%	**100%**
EP-freshwater	%	54,11%	0,09%	45,15%	0,53%	0,11%	0,00%	0,01%	**100%**
ADP-fossil	%	53,02%	1,45%	34,84%	9,91%	0,62%	0,05%	0,12%	**100%**
ADP-minerals&metals	%	99,70%	0,00%	0,27%	0,01%	0,02%	0,00%	0,00%	**100%**
WDP	%	84,69%	0,01%	14,86%	0,04%	0,40%	0,00%	0,00%	**100%**

Table 20C Resource use MV7		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	4,93E+00	2,08E-03	6,17E+01	1,46E-02	7,28E-03	6,84E-05	2,60E-04	**6,66E+01**
PERM	MJ	0,00E+00	0,00E+00	7,80E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**7,80E+01**
PERT	MJ	4,93E+00	2,08E-03	1,40E+02	1,46E-02	7,28E-03	6,84E-05	2,60E-04	**1,45E+02**
PENRE	MJ	5,43E+01	1,82E+00	4,41E+01	1,25E+01	7,94E-01	5,98E-02	1,47E-01	**1,14E+02**
PENRM	MJ	1,31E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,31E+01**
PENRT	MJ	6,74E+01	1,82E+00	4,41E+01	1,25E+01	7,94E-01	5,98E-02	1,47E-01	**1,27E+02**
SM	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**
RSF	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**
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	m3	1,11E-01	3,98E-05	2,30E-02	2,11E-04	9,00E-04	1,30E-06	3,11E-06	**1,35E-01**

Table 20D. Waste production MV7		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	3,64E-04	4,63E-06	3,09E-05	2,53E-05	1,68E-06	1,52E-07	3,67E-07	**4,27E-04**
NHWD	kg	3,01E-01	4,66E-04	1,76E-01	2,57E-03	2,15E+00	1,53E-05	1,06E+00	**3,69E+00**
RWD	kg	1,00E-04	1,22E-05	6,88E-05	8,36E-05	3,89E-06	3,99E-07	9,77E-07	**2,70E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	2,09E-02	0,00E+00	0,00E+00	0,00E+00	5,80E-01	**6,01E-01**
CRU	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**
ETE	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**
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV8

Table 21 Environmental impacts of the life cycle of the MV8 insulator. Result values in absolute (21A) and relative terms (21B). Resource use per unit of product during the life cycle of the MV8 insulator (21C). Waste production per unit of product during the life cycle of the MV8 insulator (21D).

TABLE 21A. Absolute values MV8 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	5,53E+00	1,15E-01	4,72E+00	1,13E+00	9,71E-02	6,32E-03	1,12E-02	**1,16E+01**
GWP-fossil	kg CO2 eq	5,49E+00	1,15E-01	4,60E+00	1,13E+00	9,69E-02	6,32E-03	1,12E-02	**1,15E+01**
GWP-biogenic	kg CO2 eq	3,12E-02	7,16E-06	1,23E-01	6,93E-05	1,40E-04	3,80E-07	8,70E-07	**1,54E-01**
GWP-luluc	kg CO2 eq	4,59E-03	1,62E-06	5,50E-03	1,49E-05	9,11E-06	8,60E-08	1,96E-07	**1,01E-02**
ODP	kg CFC11 eq	1,10E-06	2,70E-08	2,67E-07	2,54E-07	1,50E-08	1,44E-09	2,50E-09	**1,67E-06**
POFP	kg NMVOC eq	2,32E-02	1,59E-04	1,83E-02	1,16E-02	8,22E-04	8,57E-06	5,26E-05	**5,42E-02**
AP	mol H+ eq	3,19E-02	2,47E-04	2,38E-02	1,48E-02	7,27E-04	1,32E-05	4,84E-05	**7,15E-02**
EP-freshwater	kg P eq	2,12E-04	2,82E-07	1,87E-04	2,19E-06	4,45E-07	1,50E-08	3,06E-08	**4,02E-04**
ADP-fossil	MJ	7,23E+01	1,68E+00	5,55E+01	1,58E+01	1,01E+00	8,93E-02	1,57E-01	**1,46E+02**
ADP-minerals&metals	kg Sb eq	2,58E-03	3,64E-08	7,28E-06	2,65E-07	4,59E-07	1,93E-09	3,78E-09	**2,59E-03**
WDP	m3 depriv.	3,78E+00	5,56E-04	1,01E+00	2,92E-03	2,84E-02	2,96E-05	5,24E-05	**4,82E+00**

TABLE 21B. Relative values MV8 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	47,58%	0,99%	40,67%	9,77%	0,84%	0,05%	0,10%	**100%**
GWP-fossil	%	47,95%	1,00%	40,14%	9,91%	0,85%	0,06%	0,10%	**100%**
GWP-biogenic	%	20,27%	0,00%	79,59%	0,04%	0,09%	0,00%	0,00%	**100%**
GWP-luluc	%	45,37%	0,02%	54,37%	0,15%	0,09%	0,00%	0,00%	**100%**
ODP	%	65,97%	1,62%	16,01%	15,27%	0,90%	0,09%	0,15%	**100%**
POFP	%	42,77%	0,29%	33,83%	21,48%	1,52%	0,02%	0,10%	**100%**
AP	%	44,65%	0,35%	33,24%	20,66%	1,02%	0,02%	0,07%	**100%**
EP-freshwater	%	52,76%	0,07%	46,50%	0,55%	0,11%	0,00%	0,01%	**100%**
ADP-fossil	%	49,36%	1,15%	37,87%	10,76%	0,69%	0,06%	0,11%	**100%**
ADP-minerals&metals	%	99,69%	0,00%	0,28%	0,01%	0,02%	0,00%	0,00%	**100%**

WDP	%	78,39%	0,01%	20,95%	0,06%	0,59%	0,00%	0,00%	**100%**

Table 21C Resource use MV8		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	5,37E+00	2,04E-03	8,32E+01	1,96E-02	9,99E-03	1,08E-04	2,94E-04	**8,86E+01**
PERM	MJ	0,00E+00	0,00E+00	1,06E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,06E+02**
PERT	MJ	5,37E+00	2,04E-03	1,89E+02	1,96E-02	9,99E-03	1,08E-04	2,94E-04	**1,95E+02**
PENRE	MJ	6,69E+01	1,78E+00	5,93E+01	1,67E+01	1,08E+00	9,48E-02	1,67E-01	**1,46E+02**
PENRM	MJ	1,05E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,05E+01**
PENRT	MJ	7,74E+01	1,78E+00	5,93E+01	1,67E+01	1,08E+00	9,48E-02	1,67E-01	**1,57E+02**
SM	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**
RSF	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**
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	m3	1,00E-01	3,89E-05	3,13E-02	2,83E-04	1,25E-03	2,07E-06	3,52E-06	**1,33E-01**

Table 21D. Waste production MV8		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	4,96E-04	4,53E-06	4,21E-05	3,39E-05	2,29E-06	2,41E-07	4,16E-07	**5,79E-04**
NHWD	kg	4,42E-01	4,57E-04	2,33E-01	3,45E-03	2,93E+00	2,43E-05	1,20E+00	**4,80E+00**
RWD	kg	1,27E-04	1,19E-05	9,32E-05	1,12E-04	5,30E-06	6,33E-07	1,11E-06	**3,52E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	2,68E-02	0,00E+00	0,00E+00	0,00E+00	9,20E-01	**9,47E-01**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV9

Table 22 Environmental impacts of the life cycle of the MV9 insulator. Result values in absolute (22A) and relative terms (22B). Resource use per unit of product during the life cycle of the MV9 insulator (22C). Waste production per unit of product during the life cycle of the MV9 insulator (22D).

TABLE 22A. Absolute values MV9 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	7,01E+00	1,84E-01	5,99E+00	1,40E+00	1,13E-01	1,37E-02	9,34E-03	**1,47E+01**
GWP-fossil	kg CO2 eq	6,97E+00	1,84E-01	5,84E+00	1,40E+00	1,13E-01	1,37E-02	9,34E-03	**1,45E+01**
GWP-biogenic	kg CO2 eq	3,54E-02	1,15E-05	1,44E-01	8,54E-05	1,63E-04	8,27E-07	7,25E-07	**1,80E-01**
GWP-luluc	kg CO2 eq	4,74E-03	2,59E-06	6,44E-03	1,83E-05	1,07E-05	1,87E-07	1,63E-07	**1,12E-02**
ODP	kg CFC11 eq	1,28E-06	4,33E-08	3,14E-07	3,13E-07	1,75E-08	3,12E-09	2,09E-09	**1,98E-06**
POFP	kg NMVOC eq	3,05E-02	2,55E-04	2,30E-02	1,43E-02	9,58E-04	1,86E-05	4,38E-05	**6,91E-02**
AP	mol H+ eq	3,63E-02	3,96E-04	3,02E-02	1,82E-02	8,48E-04	2,87E-05	4,04E-05	**8,61E-02**
EP-freshwater	kg P eq	2,87E-04	4,52E-07	2,29E-04	2,70E-06	5,20E-07	3,26E-08	2,55E-08	**5,19E-04**
ADP-fossil	MJ	8,64E+01	2,69E+00	6,90E+01	1,94E+01	1,18E+00	1,94E-01	1,31E-01	**1,79E+02**
ADP-minerals&metals	kg Sb eq	2,60E-03	5,83E-08	8,83E-06	3,26E-07	5,37E-07	4,20E-09	3,15E-09	**2,61E-03**
WDP	m3 depriv.	4,32E+00	8,92E-04	1,23E+00	3,60E-03	3,39E-02	6,43E-05	4,37E-05	**5,59E+00**

TABLE 22B. Relative values MV9 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	47,62%	1,25%	40,71%	9,50%	0,77%	0,09%	0,06%	**100%**
GWP-fossil	%	47,97%	1,26%	40,20%	9,62%	0,78%	0,09%	0,06%	**100%**
GWP-biogenic	%	19,66%	0,01%	80,20%	0,05%	0,09%	0,00%	0,00%	**100%**
GWP-luluc	%	42,25%	0,02%	57,47%	0,16%	0,10%	0,00%	0,00%	**100%**
ODP	%	64,93%	2,19%	15,89%	15,84%	0,88%	0,16%	0,11%	**100%**
POFP	%	44,16%	0,37%	33,25%	20,75%	1,39%	0,03%	0,06%	**100%**
AP	%	42,22%	0,46%	35,12%	21,13%	0,98%	0,03%	0,05%	**100%**
EP-freshwater	%	55,27%	0,09%	44,01%	0,52%	0,10%	0,01%	0,00%	**100%**
ADP-fossil	%	48,28%	1,51%	38,54%	10,84%	0,66%	0,11%	0,07%	**100%**
ADP-minerals&metals	%	99,63%	0,00%	0,34%	0,01%	0,02%	0,00%	0,00%	**100%**
WDP	%	77,30%	0,02%	22,02%	0,06%	0,61%	0,00%	0,00%	**100%**

Table 22C Resource use MV9		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	5,53E+00	3,27E-03	9,65E+01	2,41E-02	1,17E-02	2,36E-04	2,45E-04	**1,02E+02**
PERM	MJ	0,00E+00	0,00E+00	1,24E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,24E+02**
PERT	MJ	5,53E+00	3,27E-03	2,20E+02	2,41E-02	1,17E-02	2,36E-04	2,45E-04	**2,26E+02**
PENRE	MJ	8,06E+01	2,86E+00	7,37E+01	2,06E+01	1,26E+00	2,06E-01	1,39E-01	**1,79E+02**
PENRM	MJ	1,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,16E+01**
PENRT	MJ	9,23E+01	2,86E+00	7,37E+01	2,06E+01	1,26E+00	2,06E-01	1,39E-01	**1,91E+02**
SM	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**
RSF	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**
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	m3	1,14E-01	6,24E-05	3,77E-02	3,49E-04	1,48E-03	4,50E-06	2,93E-06	**1,53E-01**

Table 22D. Waste production MV9		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	6,65E-04	7,27E-06	4,94E-05	4,17E-05	2,66E-06	5,24E-07	3,47E-07	**7,67E-04**
NHWD	kg	6,46E-01	7,32E-04	3,05E-01	4,25E-03	3,41E+00	5,28E-05	9,99E-01	**5,36E+00**
RWD	kg	1,36E-04	1,91E-05	1,11E-04	1,38E-04	6,18E-06	1,38E-06	9,22E-07	**4,13E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	3,79E-02	0,00E+00	0,00E+00	0,00E+00	2,00E+00	**2,04E+00**
CRU	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**
ETE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

MV10

Table 23 Environmental impacts of the life cycle of the MV10 insulator. Result values in absolute (23A) and relative terms (23B). Resource use per unit of product during the life cycle of the MV10 insulator (23C). Waste production per unit of product during the life cycle of the MV10 insulator (23D).

TABLE 23A. Absolute values MV10 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	kg CO2 eq	7,47E+00	1,94E-01	6,29E+00	1,47E+00	1,19E-01	1,37E-02	1,08E-02	**1,56E+01**
GWP-fossil	kg CO2 eq	7,43E+00	1,94E-01	6,14E+00	1,47E+00	1,19E-01	1,37E-02	1,08E-02	**1,54E+01**
GWP-biogenic	kg CO2 eq	4,00E-02	1,21E-05	1,51E-01	8,96E-05	1,71E-04	8,27E-07	8,41E-07	**1,92E-01**
GWP-luluc	kg CO2 eq	5,14E-03	2,74E-06	6,75E-03	1,92E-05	1,12E-05	1,87E-07	1,89E-07	**1,19E-02**
ODP	kg CFC11 eq	1,44E-06	4,58E-08	3,29E-07	3,29E-07	1,83E-08	3,12E-09	2,42E-09	**2,17E-06**
POFP	kg NMVOC eq	3,22E-02	2,70E-04	2,41E-02	1,50E-02	1,00E-03	1,86E-05	5,08E-05	**7,27E-02**
AP	mol H+ eq	3,91E-02	4,19E-04	3,18E-02	1,91E-02	8,88E-04	2,87E-05	4,68E-05	**9,13E-02**
EP-freshwater	kg P eq	3,00E-04	4,78E-07	2,40E-04	2,84E-06	5,46E-07	3,26E-08	2,96E-08	**5,44E-04**
ADP-fossil	MJ	9,34E+01	2,85E+00	7,25E+01	2,04E+01	1,23E+00	1,94E-01	1,52E-01	**1,91E+02**
ADP-minerals&metals	kg Sb eq	2,17E-03	6,17E-08	9,27E-06	3,42E-07	5,64E-07	4,20E-09	3,65E-09	**2,18E-03**
WDP	m3 depriv.	4,82E+00	9,44E-04	1,29E+00	3,77E-03	3,57E-02	6,43E-05	5,07E-05	**6,16E+00**

TABLE 23B. Relative values MV10 ENVIRONMENTAL IMPACTS		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
GWP-total	%	47,98%	1,25%	40,43%	9,42%	0,76%	0,09%	0,07%	**100%**
GWP-fossil	%	48,33%	1,26%	39,93%	9,54%	0,77%	0,09%	0,07%	**100%**
GWP-biogenic	%	20,84%	0,01%	79,01%	0,05%	0,09%	0,00%	0,00%	**100%**
GWP-luluc	%	43,10%	0,02%	56,62%	0,16%	0,09%	0,00%	0,00%	**100%**
ODP	%	66,46%	2,11%	15,19%	15,14%	0,84%	0,14%	0,11%	**100%**
POFP	%	44,29%	0,37%	33,17%	20,69%	1,38%	0,03%	0,07%	**100%**
AP	%	42,78%	0,46%	34,80%	20,91%	0,97%	0,03%	0,05%	**100%**
EP-freshwater	%	55,20%	0,09%	44,08%	0,52%	0,10%	0,01%	0,01%	**100%**
ADP-fossil	%	48,98%	1,50%	38,01%	10,69%	0,65%	0,10%	0,08%	**100%**
ADP-minerals&metals	%	99,53%	0,00%	0,42%	0,02%	0,03%	0,00%	0,00%	**100%**
WDP	%	78,35%	0,02%	20,99%	0,06%	0,58%	0,00%	0,00%	**100%**

Table 23C Resource use MV10		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
PERE	MJ	6,12E+00	3,46E-03	1,01E+02	2,53E-02	1,23E-02	2,36E-04	2,84E-04	**1,07E+02**
PERM	MJ	0,00E+00	0,00E+00	1,10E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,10E+02**
PERT	MJ	6,12E+00	3,46E-03	2,11E+02	2,53E-02	1,23E-02	2,36E-04	2,84E-04	**2,17E+02**
PENRE	MJ	8,64E+01	3,03E+00	7,74E+01	2,16E+01	1,32E+00	2,06E-01	1,61E-01	**1,90E+02**
PENRM	MJ	1,33E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,33E+01**
PENRT	MJ	9,97E+01	3,03E+00	7,74E+01	2,16E+01	1,32E+00	2,06E-01	1,61E-01	**2,03E+02**
SM	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**
RSF	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**
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	m3	1,27E-01	6,60E-05	3,96E-02	3,66E-04	1,56E-03	4,50E-06	3,40E-06	**1,68E-01**

Table 23D. Waste production MV10		Manufacturing			Distribution	Installation	End of life		
Parameter	Unit	A1	A2	A3	A4	A5	C2	C4	**Total**
HWD	kg	6,14E-04	7,69E-06	5,18E-05	4,38E-05	2,79E-06	5,24E-07	4,02E-07	**7,21E-04**
NHWD	kg	6,67E-01	7,75E-04	3,20E-01	4,46E-03	3,57E+00	5,28E-05	1,16E+00	**5,72E+00**

RWD	kg	1,47E-04	2,02E-05	1,16E-04	1,45E-04	6,47E-06	1,38E-06	1,07E-06	**4,37E-04**
MER	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**
MFR	kg	0,00E+00	0,00E+00	4,00E-02	0,00E+00	0,00E+00	0,00E+00	2,00E+00	**2,04E+00**
CRU	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**
ETE	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**
EEE	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**

ENVIRONMENTAL IMPACTS: Ozone depletion (ODP), Photochemical ozone formation (POFP), Acidification (AP), Eutrophication, freshwater (EP-freshwater), Resource use, fossils (ADP-fossil), Resource use, minerals and metals (ADP-minerals&metals), Water use (WDP).

RESOURCES USE PARAMETERS: Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw material (PENRE), Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE), Use of non-renewable primary energy resources used as raw material (PENRM), Use of renewable primary energy resources used as raw material (PERM), Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT), Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT), Net use of fresh water (FW), Use of secondary materials (MS), Use of renewable secondary fuels (RSF), Use of non-renewable secondary fuels (NRSF).

WASTE PRODUCTION PARAMETERS: Hazardous waste disposed (HWD), Non-hazardous waste disposed (NHWD), Radioactive waste disposed (RWD), Materials for energy recovery (MER), Material for recycling (MFR), Components for reuse (CRU), Exported thermal energy (ETE), Exported electricity energy (EEE).

SECTION E

E.1 Calculation rules

Declared functional unit

According to PCR EPDItaly010 – Insulators, the following functional unit was considered:

- a single insulator is used as the declared unit which insulates a current-carrying element from another element during a service life of 20 years.

Data source quality and allocation

Primary data were collected from different departments from the manufacturing plant of Xianghe for the reference year 2020. Data used for upstream and downstream systems beyond the manufacturer's influence were taken from the Ecoinvent 3.6 database set.

Data quality requirement established by ISO 14025 standards have been considered. The criteria of Integrity, Consistency, Reproducibility, Representativity were applied, and data quality is high.

The allocation for the energetic, auxiliary, and packaging material consumptions and for the waste treatment was done using mass allocation method based on inventory data.

Assumptions and considerations

- Production of the finished product's packaging is considered in the Manufacturing stage. Plastic film used as a support in intermediate rubber transformation was excluded.
- Waste scrap (rubber) and cardboard from manufacturing stage (A3) are assumed to be recycled in other systems.
- The electricity consumption is modelled as "medium voltage", and for the Chinese mix provided by Ecoinvent v3.6.
- For distribution, transport was considered to be EURO IV category vehicle, in absence of primary data on the fleet of vehicle used, as a precautionary approach following PCR 010 (4.2.3.3).
- For distribution, an average distribution profile has been considered. The number of units sold to 22 customers in different countries and distributed by shipping or truck were provided by Xianghe. The weighted average values of distances covered by truck and ship were calculated, based on these data.
- Packaging material waste generated in installation stage (A5) is considered to end in landfill (50%) or incineration (50%), as a precautionary approach.
- For the end of life (after dismantling), it is considered that all metal components are recycled, and non-metallic parts are disposed to landfill in other systems.
- Waste treatment (recycling) of metallic parts is not included, as PPP principle is applied.

Cut-off rules

According to the EPDItaly Regulations and PCR EPDItaly007, the following flows and operations were cut-off:

- Production, use and disposal of the packaging of components and semi-finished intermediates (e.g., plastic film used as a support in intermediate rubber transformation).
- Material and energy flows related to the installation stage.
- Any extraordinary maintenance done on the insulator.
- Material and energy flows related to the insulator's removal from the installation site.

REFERENCES

- ISO 14040:2006 – Environmental management – Life Cycle Assessment – Principles and framework
- ISO 14044:2006 – Environmental management – Life Cycle Assessment – Requirements
- ISO 14025:2006- Labels and environmental declarations.
- ISO/TR 14047: 2003 – Gestión Medioambiental – Análisis del cicle de vida – Ejemplos de aplicación de LCI (Inventario del Ciclo de Vida)
- ISO/TS 14048: 2003 – Environmental management – Life Cycle Assessment – Data inventory

- ISO/TR 14049: 2000 – Environmental management – Life Cycle Assessment – Objectives, scope and inventory interpretation
- EN 15804:2012+A2:2020
- REGULATIONS OF THE EPDItaly PROGRAMME rev 5, 01/07/2020
- LCA report: LIFE CYCLE ASSESSMENT OF INSULATORS PRODUCED BY ZHENGZHOU XIANGHE GROUP ACCORDING TO UNE-EN 50693:2020 (October 2021, v3 revised after auditing)
- Sub-PCR EPD Italy 010: "Electronic and Electrical Product and System – Insulator", Rev.0, issue date 16/03/2020, valid until 15/03/2025, CPC 4621, in conformity with EN 50693:2019 and UNI EN 15804:2012+A1:2013+A2:2019 requirements
- PCR EPD Italy 007: "Electronic and electrical product and systems" Rev.2, issue date 20/10/2020, valid until 19/01/2025, CPC 46, in conformity with EN 50693:2019