PRODUCT ENVIRONMENTAL PROFILE

Screened Elbow Separable Connector RSES 250A – EN4782-000/EN4950-000

Registration number: RSES-00002-V01.01-EN	**Drafting rules:** PCR-ed4-EN-2021 09 06 **Supplemented by:** PSR-0001-ed4-EN-2022 11 16
Verifier accreditation number: VH26	**Information and reference documents:** www.pep-ecopassport.org
Date of issue: 05-2025	**Validity period:** 5 years
Independent verification of the declaration and data in compliance with ISO 14025:2006	
Internal: ☐	**External:** ☒
The PCR review was conducted by a panel of experts chaired by	
PEPs are compliant with XP C08-100-1:2016 or EN 50693:2019 The components of the present PEP may not be compared with components from any other program	
Document complies with ISO 14025:2006 “Environmental labels and declarations. Type III environmental declarations”	

1 GENERAL INFORMATION

PEP ECOPASSPORT® OWNER
Tyco Electronics Polska Sp. Z o.o. Plant, Kablowa 1, 70-895 Szczecin, Poland

REFERENCE PRODUCT
RSES-VD-525B-E-NO01 (EN4782-000/EN4950-000)

DESCRIPTION OF THE PRODUCT
RSES/RSSS Screened Separable Connectors (Elbow or Straight) are designed for connecting single-core polymeric cables to medium voltage equipment (up to 24 kV, 250 A) with bushings type A (EN 50180/EN 50181). Made of EPDM and silicone rubber, they ensure reliable indoor and outdoor performance, include an earthed conductive screen for safety, and support easy installation with shear bolt lugs across 16–150 mm² cable sizes. Optional features include voltage detection and metal housing for enhanced safety.

FUNTIONAL UNIT
To connect together the power transmission cables, or connect them to equipment, for one unit and its packaging, under operating conditions identical to those of the cable, namely: 1 A during 30 years, with a use rate of 100%, according to the standards in force.

MARKET APPLICABILITY
Global

COMPANY REFERENCE CONTACT
Sustainability Analyst & LCA Specialist: Waleed Qatrameez – waleed.qatrameez@te.com
Sustainability Manager: Łukasz Sadowski – lukasz.sadowski@te.com

PLANTS LOCATION
Environmental impacts have been calculated for the TE Connectivity plants located in France and Poland:

- Tyco Electronics Polska, Sp. Z o.o. Plant Szczecin, Kablowa 1 , 70-895 Szczecin, Poland
- Tyco Electronics Simel SAS, 1 Rue Paul Martin, 21220 Gevrey-Chambertin, France
- TE Connectivity – Tyco Electronics Raychem GmbH, Finsinger Feld 1 · 85521 Ottobrunn, Germany

SOFTWARE USED
iPoint Umberto 11 (version 11.15.2.0)

DATABASE
Ecoinvent 3.11 and Industry data

REFERENCE YEAR
The reference year used for primary data collection and processing is 2024

2 DESCRIPTION OF THE COMPANY

TE is an international group which has its core business in producing highly engineered connectivity, insulating and sensing products covering a large variety of purposes, from global communication infrastructures, utility networks, factories, smart homes and transport sector. For more than 75 years, TE has partnered with customers to produce highly engineered connectivity and sensing products. With approximately 80,000 employees in 107 manufacturing sites around the world, including more than 7,500 engineers, working alongside customers in approximately 140 countries, TE ensures that every connection counts. TE Connectivity consists of the following segments:

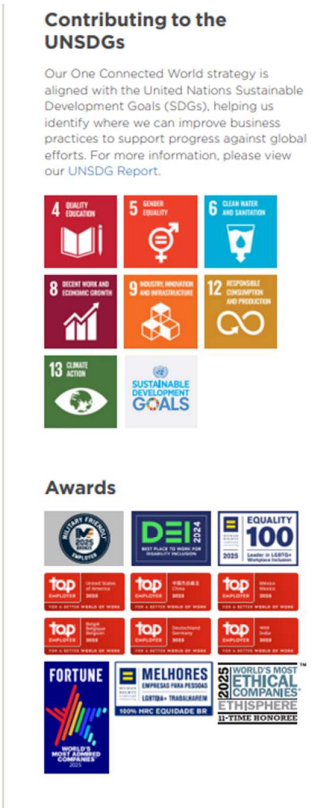
- THE TRANSPORTATION segment consists of: Automotive, Industrial & Commercial Transportation, Sensors, Application Tooling BU's.
- THE INDUSTRIAL segment consists of: Industrial, Aerospace, Defense & Marine, Medical, Energy BU's.
- THE COMMUNICATIONS segment consists of: Appliances, Data & Devices BU's

2.1 ENVIRONMENTAL POLICY AND ACTIONS

TE is committed in a sustainable management of its operations. This includes our ambitions to reduce our GHG emissions by more than 35 percent by 2030 (Scope 1 and Scope 2 emissions on a normalized basis), decreasing our waste disposed and helping 100 percent of our facilities in water-stressed regions meet water reduction targets.

All plants in Szczecin, Gevrey-Chambertin and Ottobrunn owns the following certifications:

- ISO 14001
- ISO 14064 for FY21 period (October 2020 - September 2021)



TE Connectivity Szczecin, Gevrey Chambertin and Ottobrunn plants:

SZCZECIN

GEVREY-CHAMBERTIN

OTTOBRUNN

3 PRODUCT SPECIFICATIONS

TE Connectivity's Raychem RSES (Elbow) and RSSS (Straight) Screened Separable Connectors are designed for connecting single-core polymeric medium voltage cables to gas-insulated switchgears and other equipment with type "A" bushings in accordance with EN 50180/EN 50181. Rated for 250 A continuous current and tested up to 24 kV, the connectors comply with CENELEC HD 629.1 S2 02/2006+A1:2008. Constructed with EPDM outer and modified silicone inner insulation, they are suitable for indoor and outdoor applications in harsh environments. Features include an earthed conductive outer screen, integrated sealing cable adapter for easy installation, mechanical shear bolt lugs supporting 16–150 mm² cable cross-sections, and optional voltage detection or metal housing for enhanced safety.

Technical specifications of the product are reported in the following table:

Conductor cross section Range	16 - 150	mm^2
Diameter over conductor (round, stranded)	4.6 – 15.0	mm
Diameter over conductor (round, solid)	3.5 – 13.8	mm
Cable insulation diameter range	12.7 – 28.5	mm

Maximum system voltage	24	kV
Continuous current rating	250	A
Basic impulse level	125	kV
Partial Discharge at 2 U0	< 3	pC
AC Voltage Withstand (5 min)	57	kV
DC Voltage Withstand (15 min)	76	kV

Total weight of product, packaging and additional elements, as well as the list of **constituent materials**, are provided in the following tables:

Total weight	**Product**	**Packaging**	**Additional elements**	**Unit**
4.677	4.520	0.157	0.0	Kg

Constituent materials	Plastic	6%
	Metals	15%
	Other	79%

4 MANUFACTURING PROCESS

The manufacturing process of the Screened Elbow Separable Connector RSES 250A involves multiple stages at different TE plants. In Gevrey, France, the bolted lug made of aluminum is produced. The lugs are cast and machined to obtain the correct shape and are treated for corrosion resistance. They undergo a surface finishing process and are manually greased before being shipped to TE Stettin for further assembly. In Ottobrunn, Germany, the EPDM body and stress cone adapter are molded separately from EPDM rubber using injection molding machines. These parts are quality checked and then sent to Szczecin for final assembly. At the Szczecin plant, the bolted lugs from Gevrey, along with the inserts and bolts, are manually assembled and greased together. Afterward, the EPDM body and stress cone adapter are manually assembled with the bolted lug, and the entire product is checked for quality. Finally, the product is packed with all necessary kit materials, labeled, and prepared for shipping. The complete kit is then placed on a pallet and dispatched, ready to be shipped to the customer.

5 RESULTS

Environmental impacts are calculated considering a cradle-to-grave system boundary, including the following life cycle stages:

Manufacturing stage		Distribution stage	Installation stage	Use & maintenance stage	End-of-life stage
Upstream	**Core**	**Downstream**			

PRODUCT CATEGORY: screened Separable Elbow Connector for Medium Voltage Networks
INSTALLATION ELEMENTS: steel elements-installation kit provided together with the product
USE SCENARIO: not applicable for the product under study
GEOGRAPHICAL REPRESENTATIVENESS: European market with focus on Norwegian market
TEMPORAL REPRESENTATIVENESS: publication of this PEP is not later than 2 years beyond time validity of Ecoinvent datasets chosen
TECHNOLOGICAL REPRESENTATIVENESS: datasets chosen for modelling product's manufacturing process are representative of the actual production process
ENERGY DATASETS: country-specific energy datasets for manufacturing processes are considered (Polish, French and German)
Results are reported with the same number of significant figures for each impact indicator. Sums may not coincide with totals due to rounding.

5.1 PN: EN4782-000

ENVIRONMENTAL IMPACTS

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
GWP, t	kg CO_2 eq	1.70E+01	7.47E-01	1.27E-01	0.00E+00	6.25E+00	2.41E+01
GWP, f	kg CO_2 eq	1.81E+01	7.46E-01	6.60E-02	0.00E+00	6.25E+00	2.51E+01
GWP, b	kg CO_2 eq	-1.19E+00	4.74E-04	6.08E-02	0.00E+00	4.63E-03	-1.12E+00
GWP, luluc	kg CO_2 eq	1.22E-01	2.49E-04	6.88E-05	0.00E+00	3.96E-05	1.23E-01
AP	kg H+ eq	2.04E-01	2.60E-03	1.26E-04	0.00E+00	1.12E-03	2.08E-01
EPf	kg P eq	1.81E-02	5.08E-05	1.30E-05	0.00E+00	2.56E-05	1.82E-02

EPm	kg N eq	2.03E-02	8.54E-04	1.97E-04	0.00E+00	4.81E-04	2.19E-02
EPt	mol N eq	2.23E-01	9.30E-03	3.02E-04	0.00E+00	4.96E-03	2.38E-01
POCP	kg NMVOC eq	9.23E-02	3.76E-03	1.17E-04	0.00E+00	1.38E-03	9.75E-02
ODP	kg CFC-11 eq	1.30E-04	1.62E-08	4.43E-10	0.00E+00	2.78E-09	1.30E-04
ADPe	kg Sb eq	1.97E-03	2.55E-06	2.55E-07	0.00E+00	5.40E-07	1.97E-03
ADPf	MJ	3.48E+02	1.06E+01	4.33E-01	0.00E+00	1.64E+00	3.61E+02
WDP	m3 depriv.	1.95E+01	5.52E-02	1.34E-02	0.00E+00	3.40E-01	1.99E+01

GWP, t: Global Warming Potential total; GWP, f: Global Warming Potential fossil; GWP, b: Global Warming Potential biogenic; GWP, luluc: Global Warming Potential land use and land use change; GWP, GHG: Global Warming Potential irreversible; ODP: Depletion potential of the stratospheric ozone layer; AP: Acidification potential; EP, f: Eutrophication potential-freshwater; EP, m: Eutrophication potential-marine; EP, t: Eutrophication potential-terrestrial; POCP: Formation potential of tropospheric ozone; ADP, e: Abiotic Depletion for non-fossil resources potential; ADP, f: Abiotic Depletion for non-fossil resources potential, WDP: Water deprivation potential

USE OF RESOURCES

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
PERE	MJ	7.51E+01	1.71E-01	8.85E-02	0.00E+00	6.94E-02	7.54E+01
PERM	MJ	0.000E+00	0.000E+00	0.000E+00	0.00E+00	0.000E+00	0.000E+00
PERT	MJ	7.51E+01	1.71E-01	8.85E-02	0.00E+00	6.94E-02	7.54E+01
PENRE	MJ	3.48E+02	1.06E+01	4.33E-01	0.00E+00	1.64E+00	3.61E+02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.48E+02	1.06E+01	4.33E-01	0.00E+00	1.64E+00	3.61E+02
SM	kg	4.30E-01	4.72E-03	2.38E-04	0.00E+00	3.30E-03	4.39E-01
RSF	MJ	4.56E-01	6.15E-05	2.05E-06	0.00E+00	3.74E-05	4.56E-01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	4.57E-01	1.27E-03	-2.44E-04	0.00E+00	6.31E-03	4.65E-01

PERE: Renewable Primary Energy excluding Primary Energy used as raw material; PERM: Renewable Primary Energy used as raw material; PERT: Total use of Renewable Primary Energy; PENRE: Non-renewable Primary Energy excluding Primary Energy used as raw material; PENRM: Non-renewable Primary Energy used as raw material; PENRT: Total use of Non-renewable Primary Energy; SM: Use of secondary raw materials; RSF: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels; FW: Net use of fresh water.

OUTPUT FLOWS AND WASTE PRODUCTION

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
HWD	kg	2.27E+00	1.52E-02	1.77E-03	0.00E+00	1.07E-01	2.40E+00
NHWD	kg	8.54E+01	3.24E-01	7.28E-01	0.00E+00	3.70E+00	9.01E+01
RWD	kg	7.39E-04	3.09E-06	2.11E-06	0.00E+00	1.17E-06	7.45E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	2.53E-01	2.12E-04	2.67E-01	0.00E+00	2.20E-01	7.41E-01
MER	kg	2.26E-05	6.66E-07	4.29E-07	0.00E+00	8.85E-08	2.38E-05
EE	MJ	4.49E-01	4.59E-03	1.87E-03	0.00E+00	2.75E-01	7.31E-01

HWV: Hazardous waste disposed; NHWD: Non-hazardous waste disposed; RWD: Radioactive waste disposed; CRU: Components for re-use; MFR: Materials for recycling; MER: Materials for energy recovery; EEE: Exported energy – electricity; EET: Exported energy – thermal energy.

INVENTORY FLOW INDICATOR – OTHER INDICATORS

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
Biogenic carbon content in product	Kg C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in packaging	Kg C	1.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-01

5.2 PN: EN4950-000

ENVIRONMENTAL IMPACTS

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
GWP, t	kg CO_2 eq	1.95E+01	9.35E-01	1.70E-01	0.00E+00	7.08E+00	2.76E+01
GWP, f	kg CO_2 eq	2.05E+01	9.35E-01	8.77E-02	0.00E+00	7.07E+00	2.86E+01
GWP, b	kg CO_2 eq	-1.18E+00	2.62E-04	8.27E-02	0.00E+00	6.44E-03	-1.10E+00
GWP, luluc	kg CO_2 eq	1.13E-01	4.20E-04	9.14E-05	0.00E+00	5.28E-05	1.14E-01

AP	kg H+ eq	1.42E-01	3.43E-03	1.62E-04	0.00E+00	1.31E-03	1.47E-01
EPf	kg P eq	1.37E-02	1.02E-04	1.71E-05	0.00E+00	3.38E-05	1.38E-02
EPm	kg N eq	1.95E-02	1.07E-03	2.80E-04	0.00E+00	5.57E-04	2.14E-02
EPt	mol N eq	2.02E-01	1.16E-02	3.92E-04	0.00E+00	5.75E-03	2.20E-01
POCP	kg NMVOC eq	9.32E-02	4.48E-03	1.47E-04	0.00E+00	1.60E-03	9.94E-02
ODP	kg CFC-11 eq	1.30E-04	1.19E-08	5.71E-10	0.00E+00	2.85E-09	1.30E-04
ADPe	kg Sb eq	1.07E-03	3.12E-06	3.18E-07	0.00E+00	6.28E-07	1.07E-03
ADPf	MJ	4.02E+02	1.29E+01	5.60E-01	0.00E+00	1.95E+00	4.18E+02
WDP	m3 depriv.	1.98E+01	6.86E-02	1.76E-02	0.00E+00	3.87E-01	2.03E+01

GWP, t: Global Warming Potential total; GWP, f: Global Warming Potential fossil; GWP, b: Global Warming Potential biogenic; GWP, luluc: Global Warming Potential land use and land use change; GWP, GHG: Global Warming Potential irreversible; ODP: Depletion potential of the stratospheric ozone layer; AP: Acidification potential; EP, f: Eutrophication potential-freshwater; EP, m: Eutrophication potential-marine; EP, t: Eutrophication potential-terrestrial; POCP: Formation potential of tropospheric ozone; ADP, e: Abiotic Depletion for non-fossil resources potential; ADP, f: Abiotic Depletion for non-fossil resources potential, WDP: Water deprivation potential

USE OF RESOURCES

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
PERE	MJ	7.40E+01	1.79E-01	1.14E-01	0.00E+00	7.90E-02	7.44E+01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	7.40E+01	1.79E-01	1.14E-01	0.00E+00	7.90E-02	7.44E+01
PENRE	MJ	4.03E+02	1.29E+01	5.60E-01	0.00E+00	1.95E+00	4.18E+02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	4.03E+02	1.29E+01	5.60E-01	0.00E+00	1.95E+00	4.18E+02
SM	kg	6.77E-01	5.69E-03	2.71E-04	0.00E+00	4.51E-03	6.87E-01
RSF	MJ	4.65E-01	7.30E-05	2.49E-06	0.00E+00	4.37E-05	4.65E-01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FW	m^3	4.52E-01	1.72E-03	-3.24E-04	0.00E+00	7.19E-03	4.61E-01

PERE: Renewable Primary Energy excluding Primary Energy used as raw material; PERM: Renewable Primary Energy used as raw material; PERT: Total use of Renewable Primary Energy; PENRE: Non-renewable Primary Energy excluding Primary Energy used as raw material; PENRM: Non-renewable Primary Energy used as raw material; PENRT: Total use of Non-renewable Primary Energy; SM: Use of secondary raw materials; RSF: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels; FW: Net use of fresh water.

OUTPUT FLOWS AND WASTE PRODUCTION

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
HWD	kg	2.65E+00	2.95E-02	2.24E-03	0.00E+00	1.22E-01	2.80E+00
NHWD	kg	7.47E+01	5.66E-01	9.67E-01	0.00E+00	4.60E+00	8.09E+01
RWD	kg	7.78E-04	2.54E-06	2.78E-06	0.00E+00	1.29E-06	7.85E-04
CRU	kg	0.000E+00	0.000E+00	0.000E+00	0.00E+00	0.000E+00	0.000E+00
MFR	kg	2.10E-01	2.47E-04	2.70E-01	0.00E+00	3.32E-01	8.11E-01
MER	kg	2.55E-05	8.57E-07	5.73E-07	0.00E+00	1.07E-07	2.71E-05
EE	MJ	5.48E-01	2.98E-03	2.40E-03	0.00E+00	3.90E-01	9.44E-01

HWV: Hazardous waste disposed; NHWD: Non-hazardous waste disposed; RWD: Radioactive waste disposed; CRU: Components for re-use; MFR: Materials for recycling; MER: Materials for energy recovery; EEE: Exported energy – electricity; EET: Exported energy – thermal energy.

INVENTORY FLOW INDICATOR – OTHER INDICATORS

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
Biogenic carbon content in product	Kg C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in packaging	Kg C	1.42E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.42E-01

6 CALCULATION RULES

According to reference PCR the main activities are listed and divided in the following stages:

This declaration is a cradle to grave EPD type, based on the application of Life Cycle Assessment (LCA) methodology to the whole life-cycle system. In the whole LCA model, infrastructures and production equipment are not considered.
Customized LCA questionnaires were used to gather primary data about all aspects of the production system (for example manufacturing processes consumptions and efficiencies, waste management), to provide a complete picture of the environmental burden of the system from raw materials supply to final products delivery.
Allocation occurs anytime a system is producing more than a single output. In this case it is necessary to choose a technique to proper split the environmental burdens among the output flows; international standards ISO 14040 and 14044 provide guidelines about how to deal with this issue, that have been implemented in this project as well. Physical allocation - based on total production amount - was adopted to consistently assign plant data (electricity for services, gas and fuel consumption, water supply, waste treatment) and electricity production process data to the product under study.
Below the sub-phases considered in the analysis are reported, per each life cycle stage:

MANUFACTURING STAGE

- Elbow connector raw materials production
- Kit parts production
- Raw materials and kit components transportation to Gevrey plant
- Manufacturing processes from raw materials to semi-finished products at Gevrey plant
- Raw materials and kit components transportation to Ottobrunn plant
- Manufacturing processes from raw materials to semi-finished products at Ottobrunn plant
- Kit parts transportation to Szczecin plant
- Semi-finished product transportation from Gevrey and Ottobrunn to Szczecin plant
- Product kitting at Szczecin plant
- Szczecin, Gevrey and Ottobrunn plants services consumption
- Production of packaging materials for product delivery to customers
- Process waste transportation to treatment sites from Szczecin, Gevrey and Ottobrunn plants
- Treatment of process waste for Szczecin, Gevrey and Ottobrunn plants, according to indications provided by TE

DISTRIBUTION STAGE

- Product delivery to final customer, considering a specific scenario of transportation to Oslo (Norway) by truck and ferry

INSTALLATION STAGE [1]

- Transportation of waste product packaging to treatment site (50 km assumption)
- Treatment of waste product packaging, according to Norwegian scenarios

USE STAGE

- Module not assessed for the product under study, since no energy consumption occurs during product lifetime

END-OF-LIFE STAGE

- Transportation of decommissioned product to treatment site (50 km assumption)
- Treatment of decommissioned product

[1] The product on-site installation procedures were not considered in the LCA model, requiring no relevant inputs in terms of materials and energy.