Sta-Kon® nylon insulated power accessories – brass and silver

PEP ecopassport®
Product Environmental Profile

Registration number:	**ABBG-00962-V01.01-EN**	Drafting rules:	**PCR-ed4-EN-2021 09 06**
PEP Owner:	**oscar.sarmiento-penuela@ch.abb.com**	Supplemented by:	**PSR-0001-ed4-EN-2022 11 16**
Verifier accreditation number:	**VH44**	Information and reference documents:	**www.pep-ecopassport.org**
Date of issue:	**11-2025**	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 Julie Orgelet (Ddemain)

PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022
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"

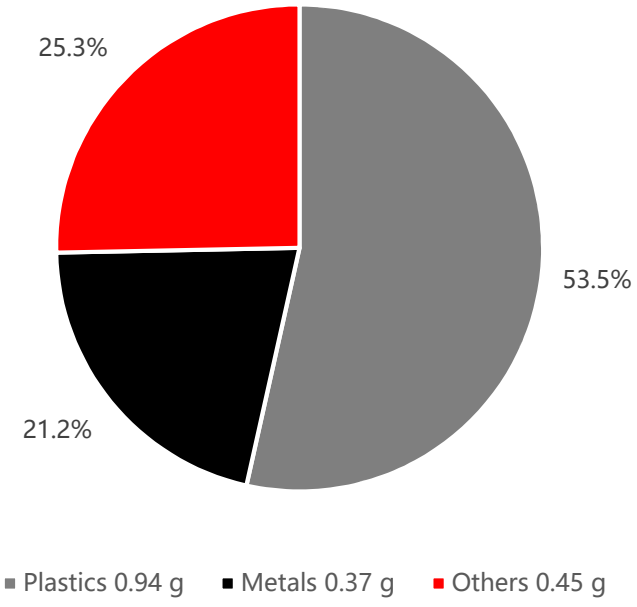
ABB Purpose & Embedding Sustainability

ABB is dedicated to advancing sustainability through comprehensive Life Cycle Assessments (LCA), third-party verified Environmental Product Declarations (EPDs), and a circularity-focused evaluation of its product portfolio. LCA provides a holistic view of a product's environmental impact across its entire life cycle, from raw material extraction and manufacturing to transportation, usage, and end-of-life. These assessments support the creation of transparent EPDs, identify opportunities for environmental performance improvements, and guide strategic planning for a circularity approach.

General information

Reference product	RB4-TB
Description of the product	Sta-Kon® power accessories family offer a complete line of installing tools engineered to match tool with terminal. Sta-Kon® disconnects and mal tabs – nylon open top insulated 90° flag and nylon fully insulated are tools engineered to match tool with terminal, their internal barrel serrations and long barrel provide for maximum tensile strength.
Functional unit	The functional unit is 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 70%, according to the standards in force.
Other products covered	List of the other products covered in this PEP is presented in the paragraph which concerned the extrapolation rules.
Manufacturing address	Cabo Caribe Industrial Park Lot 32-34 Vega Baja PR 00693 www.new.abb.com

Constituent Materials



Total weight of reference product and packaging	**1.761**	**g**

Plastics as % of weight		**Metals as % of weight**		**Others as % of weight**	
Name and CAS number	Weight%	Name and CAS number	Weight%	Name and CAS number	Weight%
PA	52.1	**Brass**	20.8	**Cardboard**	23.1
PE	1.4	**Silver**	0.4	**Wood**	2.2
Plastics Total %	53.5	Metals Total %	21.2	Others Total %	25.3

The total weight of the reference product is 1.29 g, with an additional 0.471 g associated with packaging materials.

Additional Information

Manufacturing	The manufacturing stage includes the production of the product and its packaging, as well as transportation to the manufacturer’s final logistic platform. Manufacturing processes are conducted at ABB’s facility in Vega Baja, Puerto Rico.
Distribution	Transportation from ABB’s warehouses to final customers is considered. The distribution is based on product-specific transport data for the reference year. The reference product is distributed all over the world.
Installation	This phase includes the packaging disposal as described in annex D of PCR-4-ed4-EN-2021 09 06.
Use	PSR-0001-ed4-EN-2022 11 16 reported that for power connection accessories, the environmental impacts of the use stage are considerable negligible, with the exception of the power consumption, which is expressed by the Joule losses over the use time. The following formula is applied: $E=R*I^2*\Delta t$, where: "E" is the power consumption expressed in J; "R" is the resistance of the conducting part of the reference product for the power connection accessory, expressed in Ω; "I" is the intensity in A; "Δt" is time of use in s.
End of life	This phase includes the landfill disposal of the product.
Benefits and loads beyond the system boundaries	Net benefits and loads beyond the system boundaries are modeled according to PCR-ed4-EN-2021 09 06 and EN 50693 standards.

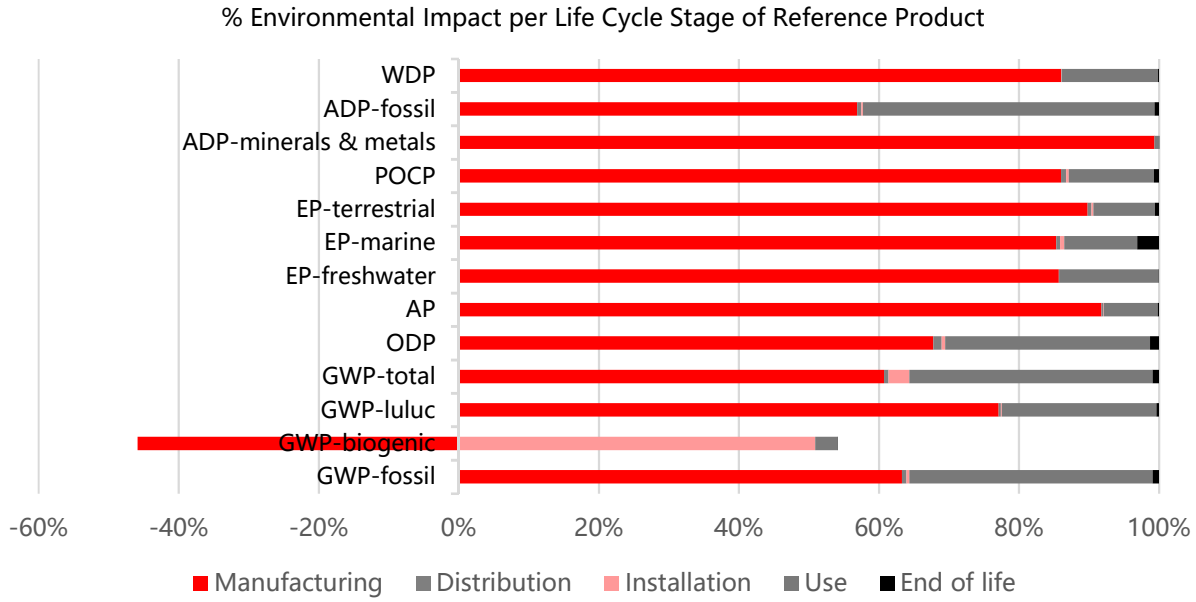
Environmental Impacts

Reference lifetime	30 years
Product category	Category: Power connection accessories Application: Building, Residential/tertiary/industrial except LAN
Installation elements	No additional elements needed during installation.
Use scenario	The Joule losses are considered during the use stage. No maintenance phase is planned for the the product.
Temporal representativeness	2022
Geographical representativeness	Global
Technological representativeness	Technological representativeness refers to the specific production process for primary data.
Software and database used	SimaPro 10.2.0.2 & Ecoinvent 3.10

Energy model used

Manufacturing	Hydroelectric energy from Renewable Energy Certificate (REC). The energy related processes used are those included in the ecoinvent datasets.
Installation	The energy-related processes used are those included in the ecoinvent datasets.
Use	No energy consumption occur during the use stage.
End of life	The energy-related processes used are those included in the ecoinvent datasets.

Common Base of Mandatory Indicators



Environmental impact indicators based on functional unit

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
GWP-Total	kg CO2 eq.	3.81E-02	2.32E-02	2.44E-04	1.13E-03	1.33E-02	3.40E-04	-1.30E-04
GWP-Fossil	kg CO2 eq.	3.79E-02	2.40E-02	2.44E-04	1.43E-04	1.32E-02	3.39E-04	-1.30E-04
GWO-Biogenic	kg CO2 eq.	1.60E-04	-8.90E-04	6.59E-09	9.87E-04	6.26E-05	9.52E-08	-1.27E-07
GWP-Luluc	kg CO2 eq.	3.09E-05	2.39E-05	9.99E-08	4.31E-08	6.83E-06	1.09E-07	-1.28E-07
ODP	kg CFC-11 eq.	3.15E-10	2.13E-10	3.79E-12	1.55E-12	9.20E-11	4.07E-12	-1.18E-12
AP	H+ eq.	5.65E-04	5.18E-04	1.26E-06	5.02E-07	4.35E-05	1.15E-06	-4.84E-07
EP-Freshwater	kg P eq.	6.00E-05	5.15E-05	1.87E-08	9.26E-09	8.53E-06	2.12E-08	-4.08E-08
EP-Marine	kg N eq.	7.51E-05	6.41E-05	4.25E-07	4.61E-07	7.83E-06	2.32E-06	-1.03E-07
EP-Terrestrial	mol N eq.	7.94E-04	7.13E-04	4.64E-06	1.95E-06	6.99E-05	4.56E-06	-1.05E-06
POCP	kg NMVOC eq.	2.24E-04	1.93E-04	1.63E-06	7.38E-07	2.73E-05	1.60E-06	-3.64E-07
ADP-Minerals & Metals	kg SB eq.	1.77E-05	1.76E-05	6.51E-10	3.18E-10	1.10E-07	8.40E-10	-5.32E-11
ADP-Fossil	MJ	5.82E-01	3.31E-01	3.53E-03	1.43E-03	2.42E-01	3.83E-03	-1.79E-03
WDP	m³ eq. depr.	2.12E-02	1.82E-02	1.78E-05	1.54E-05	2.90E-03	2.92E-05	-1.63E-05

Resource use indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
PERE	MJ	9.79E-02	6.79E-02	4.42E-05	2.13E-05	2.98E-02	4.91E-05	-1.45E-04
PERM	MJ	5.84E-03	5.84E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.04E-01	7.38E-02	4.42E-05	2.13E-05	2.98E-02	4.91E-05	-1.45E-04
PENRE	MJ	5.52E-01	3.01E-01	3.53E-03	1.43E-03	2.42E-01	3.83E-03	-1.79E-03
PENRM	MJ	3.05E-02	3.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.82E-01	3.31E-01	3.53E-03	1.43E-03	2.42E-01	3.83E-03	-1.79E-03

*Total not incuding Benefits and Loads

Common Base of Mandatory Indicators

Use of secondary materials, water, and energy resources

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	5.47E-04	4.53E-04	5.27E-07	4.85E-07	9.19E-05	7.98E-07	-6.34E-07

Waste category indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
HWD	kg	6.16E-06	5.55E-06	2.36E-08	1.00E-08	5.54E-07	2.65E-08	-4.82E-09
N-HWD	kg	5.38E-03	3.12E-03	2.91E-04	3.01E-04	5.79E-04	1.10E-03	-2.35E-06
RWD	kg	1.55E-06	3.89E-07	7.51E-10	3.46E-10	1.16E-06	7.88E-10	-3.15E-09

Output flow indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
CfRu	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MfR	kg	9.88E-04	9.88E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MfER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	1.68E-03	1.78E-04	0.00E+00	1.50E-03	0.00E+00	0.00E+00	0.00E+00

Other indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
Biogenic Carbon - Product	kg of C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon - Packaging	kg of C	1.93E-04	1.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Optional indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
Tot PE	MJ	6.86E-01	4.05E-01	3.58E-03	1.45E-03	2.72E-01	3.88E-03	-1.94E-03
Efp	Dise inc	2.42E-09	2.15E-09	2.42E-11	8.58E-12	2.12E-10	2.26E-11	-4.22E-12
IrHH	kBq U-235 eq	6.66E-03	1.55E-03	3.07E-06	1.41E-06	5.10E-03	3.22E-06	-1.29E-05
ETX FW	CTUe	1.17E+00	1.11E+00	8.42E-04	9.43E-03	3.97E-02	5.60E-03	-2.52E-04
HTX CE	CTUh	1.47E-10	1.21E-10	1.21E-12	5.85E-13	2.34E-11	1.53E-12	-1.55E-13
HTX N-CE	CTUh	4.47E-09	4.32E-09	2.23E-12	2.78E-12	1.36E-10	1.00E-11	-5.28E-13
IrLS	Pt	3.81E-01	3.32E-01	3.45E-03	9.29E-04	4.18E-02	2.89E-03	-1.90E-04

*Total not incuding Benefits and Loads

Extrapolation Rules Approach for Homogeneous Family

The PEP can cover products belonging to a homogeneous environmental family, even though they differ from the reference product. Therefore, the group of products must satisfy the following characteristics:

- Same function;
- Same product standard;
- Similar manufacturing technology: the same type of materials and same manufacturing processes.

The product family satisfies these conditions, so extrapolation rules are applied following the PCR guidelines to assess the environmental impact of the products belonging to the family. The extrapolation rules are defined by the following steps:

- Analyse the products covered by the PEP belonging to the same homogenous family;
- Perform the LCA of a representative product of the homogeneous family;
- Identify and quantify the product parameters that vary between the various products of the homogeneous environmental family (i.e. dimensions, the weight of parts, materials, energy consumption, etc.).

Lastly, a sensitivity analysis is performed for each life cycle stage to identify which parameters of the ones selected are sensitive to environmental impacts to create extrapolation rules.

The parameters identified are listed below:

- Product weight;
- Packaging weight;
- Product composition;
- Packaging composition;
- Power consumption.

The representative product considered for the calculation of the extrapolation rules is

- RB4-TB

This product is most representative for the sales.

The results of the sensitivity analysis show that all the parameters considered are sensitive.

The products included in the product family and considered for the application of the extrapolation rules are presented in the following table.

Variable Weights

SKU	Product weight (kg)	Packaging weight (kg)	Power consumption (J)	Brass weight (kg)	Silver weight (kg)	Wood weight (kg)	Nylon weight (kg)	Cardboard weight (kg)
14RB-2577	2.19E-03	2.23E-03	3.34E+05	1.07E-03	8.40E-06	1.27E-04	1.11E-03	1.63E-03
18RA-2577	2.04E-03	2.23E-03	3.34E+05	9.31E-04	8.00E-06	1.27E-04	1.10E-03	1.63E-03
RB2577F	2.79E-03	9.42E-04	3.34E+05	1.36E-03	1.80E-05	7.94E-05	1.41E-03	8.14E-04
RB4-TB	1.29E-03	4.71E-04	9.92E+04	3.68E-04	7.77E-06	3.97E-05	9.19E-04	4.07E-04
RC55	1.29E-03	4.71E-04	9.92E+04	3.68E-04	7.77E-06	3.97E-05	9.19E-04	4.07E-04
RA18-250A	2.79E-03	2.23E-03	3.34E+05	1.36E-03	1.80E-05	1.27E-04	1.11E-03	1.63E-03
RB14-250A	2.79E-03	2.23E-03	3.34E+05	1.36E-03	1.80E-05	1.27E-04	1.11E-03	1.63E-03
RC10-250A	2.79E-03	2.23E-03	3.34E+05	1.36E-03	1.80E-05	1.27E-04	1.11E-03	1.63E-03
RC10-250F	2.19E-03	2.23E-03	3.34E+05	1.07E-03	8.40E-06	1.27E-04	1.11E-03	1.63E-03
RB44	1.29E-03	4.71E-04	9.92E+04	3.68E-04	7.77E-06	3.97E-05	9.19E-04	4.07E-04
RP12	1.29E-03	2.23E-03	9.92E+04	3.68E-04	7.77E-06	1.27E-04	9.19E-04	1.63E-03
RA18-250F	2.04E-03	2.23E-03	3.34E+05	9.31E-04	8.00E-06	1.27E-04	1.10E-03	1.63E-03
RB14-250F	2.19E-03	2.23E-03	3.34E+05	1.07E-03	8.40E-06	1.27E-04	1.11E-03	1.63E-03
RA2577F	2.79E-03	9.42E-04	3.34E+05	1.36E-03	1.80E-05	7.94E-05	1.41E-03	8.14E-04
RC6	1.29E-03	4.71E-04	9.92E+04	3.68E-04	7.77E-06	3.97E-05	9.19E-04	4.07E-04
RC2577F	2.79E-03	9.42E-04	3.34E+05	1.36E-03	1.80E-05	7.94E-05	1.41E-03	8.14E-04
RC250	2.19E-03	9.42E-04	3.34E+05	1.07E-03	8.40E-06	7.94E-05	1.11E-03	8.14E-04
RP7	1.29E-03	4.71E-04	9.92E+04	3.68E-04	7.77E-06	3.97E-05	9.19E-04	4.07E-04
RA2573	2.04E-03	4.71E-04	3.34E+05	9.31E-04	8.00E-06	3.97E-05	1.10E-03	4.07E-04
RB2573	2.19E-03	4.71E-04	3.34E+05	1.07E-03	8.40E-06	3.97E-05	1.11E-03	4.07E-04
RB250	2.19E-03	4.71E-04	3.34E+05	1.07E-03	8.40E-06	3.97E-05	1.11E-03	4.07E-04

Extrapolation Rules

The extrapolation rules are calculated based on the LCIA results of all the products (reference product + variants), and the sensitivity analysis carried out for the extrapolation rules.

A multiple linear correlation model is developed to estimate the LCIA impacts of all the variants, using the parameters defined in the equations below. The most appropriate equation is selected based on SimaPro results and variable influence for each life cycle stage, enabling impact estimation for each SKU with an average error below 30% across mandatory impact categories. Data processing is performed using Excel and Python. The environmental indicators are calculated using the following formulas. The table above can be referenced for the components' weights for all the products considered.

- **Manufacturing Stage:** $y = ax1 + bx2 + c$

  x1 = brass weight (kg), x2 = silver weight (kg)

- **Distribution Stage:** $y = ax1 + b$

  x1 = product weight + packaging weight (kg)

- **Installation Stage:** $y = ax1 + bx2 + c$

  x1 = PP weight (kg), x2 = cardboard weight (kg)

- **Use Stage:** $y = ax1 + b$

  x1 = power consumption (J)

- **End-of-Life Stage:** $y = ax1 + b$

  x1 =product weight (kg)

- **Benefits-and-Loads Stage:** $y = ax1 + bx2 + c$

  x1 = cardboard weight (kg), x2 = wood weight (kg)

The table above can be referenced for the components' weights and all their variants.

The following tables report the linear coefficients (a, b, ...) for each life cycle stage.

Extrapolation Factors

Manufacturing stage

Indicator	a	b	c
GWP-total	5.94E+01	-5.94E+02	5.82E-03
GWP-fossil	6.38E+01	-9.60E+02	7.98E-03
GWP-biogenic	-4.47E+00	3.68E+02	-2.16E-03
GWP-luluc	9.60E-02	-1.71E+00	1.40E-06
ODP	7.26E-07	-1.94E-05	1.00E-10
AP	3.14E+00	-5.82E+01	-2.09E-04
EP-freshwater	2.41E-01	-2.62E+00	-1.86E-05
EP-marine	1.86E-01	-1.29E+00	4.77E-06
EP-terrestrial	2.40E+00	-1.53E+01	-6.38E-05
POCP	6.97E-01	-7.51E+00	-9.22E-06
ADP-minerals & metals	4.15E-02	7.34E-01	-3.64E-06
ADP-fossil	8.54E+02	-1.61E+04	1.42E-01
WDP	5.97E+01	-1.19E+03	5.19E-03
Tot PE	1.09E+03	-2.27E+04	1.79E-01
PERE	2.11E+02	-4.40E+03	9.78E-04
PERM	2.77E+01	-2.15E+03	1.27E-02
PERT	2.39E+02	-6.55E+03	3.68E-02
PENRE	7.97E+02	-1.22E+04	1.02E-01
PENRM	5.74E+01	-3.93E+03	4.05E-02
PENRT	8.55E+02	-1.61E+04	1.42E-01
SM	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	1.39E-04
FW	1.46E+00	-2.70E+01	1.19E-04
HWD	1.96E-02	-1.50E-01	-6.04E-07
N-HWD	1.30E+01	-3.49E+02	9.78E-04
RWD	1.44E-03	-1.36E-02	-4.13E-08
CfRU	0.00E+00	0.00E+00	0.00E+00
MfR	3.69E+00	-6.86E+01	1.39E-04
MfER	0.00E+00	0.00E+00	0.00E+00
EE	3.92E+00	-3.67E+02	1.63E-03
Efp	8.57E-06	-1.37E-04	3.56E-11
IrHH	5.58E+00	-5.15E+01	-1.35E-04
ETX FW	4.22E+03	-2.11E+04	-3.08E-01
HTX CE	6.16E-07	-1.14E-05	-2.08E-11
HTX N-CE	3.29E-05	-6.84E-04	-2.72E-09
IrLS	1.51E+03	-4.67E+04	1.37E-01
Biogenic Carbon-product	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon-packaging	9.16E-01	-7.10E+01	4.18E-04

Extrapolation Factors

Distribution stage		
Indicator	a	b
GWP-total	1.38E-01	2.77E-13
GWP-fossil	1.38E-01	1.27E-13
GWP-biogenic	3.73E-06	1.23E-13
GWP-luluc	5.66E-05	-3.55E-13
ODP	2.15E-09	-6.65E-22
AP	7.11E-04	-1.84E-13
EP-freshwater	1.06E-05	-5.36E-13
EP-marine	2.41E-04	-1.19E-13
EP-terrestrial	2.63E-03	7.78E-15
POCP	9.21E-04	-9.32E-13
ADP-minerals & metals	3.69E-07	2.34E-19
ADP-fossil	2.00E+00	-7.03E-13
WDP	1.01E-02	4.36E-13
Tot PE	2.03E+00	4.33E-16
PERE	2.50E-02	-1.20E-13
PERM	0.00E+00	0.00E+00
PERT	2.50E-02	-1.20E-13
PENRE	2.00E+00	1.21E-13
PENRM	0.00E+00	0.00E+00
PENRT	2.00E+00	1.21E-13
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	2.98E-04	-1.27E-14
HWD	1.34E-05	-4.54E-13
N-HWD	1.65E-01	5.99E-13
RWD	4.26E-07	-3.05E-19
CfRU	0.00E+00	0.00E+00
MfR	0.00E+00	0.00E+00
MfER	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00
Efp	1.37E-08	-1.19E-21
IrHH	1.74E-03	1.11E-13
ETX FW	4.77E-01	-7.23E-14
HTX CE	6.85E-10	5.75E-22
HTX N-CE	1.26E-09	-3.18E-22
IrLS	1.95E+00	6.56E-13
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

Installation stage

Indicator	a	b	c
GWP-total	1.56E+00	2.78E+00	0.00E+00
GWP-fossil	1.71E+00	3.51E-01	-1.00E-12
GWP-biogenic	-1.51E-01	2.43E+00	0.00E+00
GWP-luluc	2.63E-04	1.06E-04	0.00E+00
ODP	5.18E-09	3.80E-09	0.00E+00
AP	1.91E-03	1.23E-03	0.00E+00
EP-freshwater	6.73E-05	2.27E-05	1.56E-13
EP-marine	1.14E-03	1.13E-03	-1.00E-12
EP-terrestrial	6.64E-03	4.79E-03	1.00E-12
POCP	2.20E-03	1.81E-03	1.00E-12
ADP-minerals & metals	1.61E-06	7.82E-07	0.00E+00
ADP-fossil	5.30E+00	3.51E+00	0.00E+00
WDP	6.69E-02	3.78E-02	-1.00E-12
Tot PE	5.51E+00	3.56E+00	0.00E+00
PERE	2.12E-01	5.24E-02	-1.00E-12
PERM	0.00E+00	0.00E+00	0.00E+00
PERT	2.12E-01	5.24E-02	0.00E+00
PENRE	5.30E+00	3.51E+00	1.00E-12
PENRM	0.00E+00	0.00E+00	0.00E+00
PENRT	5.30E+00	3.51E+00	1.00E-12
SM	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	0.00E+00
FW	2.03E-03	1.19E-03	0.00E+00
HWD	3.61E-05	2.47E-05	-1.00E-12
N-HWD	8.64E-01	7.39E-01	-1.00E-12
RWD	2.47E-06	8.50E-07	0.00E+00
CfRU	0.00E+00	0.00E+00	0.00E+00
MfR	2.00E-01	0.00E+00	0.00E+00
MfER	0.00E+00	0.00E+00	0.00E+00
EE	5.81E+00	3.68E+00	0.00E+00
Efp	3.58E-08	2.11E-08	0.00E+00
IrHH	9.81E-03	3.46E-03	0.00E+00
ETX FW	3.79E+00	2.32E+01	4.00E-12
HTX CE	2.34E-09	1.44E-09	0.00E+00
HTX N-CE	6.98E-09	6.82E-09	0.00E+00
IrLS	3.19E+00	2.28E+00	1.00E-12
Biogenic Carbon-product	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00	0.00E+00

Extrapolation Factors

Use stage		
Indicator	a	b
GWP-total	1.34E-07	1.80E-12
GWP-fossil	1.33E-07	2.94E-12
GWP-biogenic	6.31E-10	6.02E-15
GWP-luluc	6.88E-11	6.95E-13
ODP	9.27E-16	2.31E-20
AP	4.39E-10	3.71E-13
EP-freshwater	8.60E-11	-4.32E-13
EP-marine	7.90E-11	4.75E-13
EP-terrestrial	7.05E-10	3.19E-13
POCP	2.75E-10	2.23E-13
ADP-minerals & metals	1.11E-12	4.30E-14
ADP-fossil	2.44E-06	-1.04E-11
WDP	2.92E-08	-6.59E-13
Tot PE	2.74E-06	-4.68E-12
PERE	3.01E-07	-1.21E-11
PERM	0.00E+00	0.00E+00
PERT	3.01E-07	-1.21E-11
PENRE	2.44E-06	7.46E-12
PENRM	0.00E+00	0.00E+00
PENRT	2.44E-06	7.46E-12
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	9.27E-10	-1.35E-13
HWD	5.59E-12	-5.68E-13
N-HWD	5.84E-09	-2.04E-14
RWD	1.17E-11	4.05E-13
CfRU	0.00E+00	0.00E+00
MfR	0.00E+00	0.00E+00
MfER	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00
Efp	2.14E-15	-4.66E-20
IrHH	5.15E-08	2.09E-12
ETX FW	4.00E-07	1.17E-11
HTX CE	2.36E-16	-3.04E-21
HTX N-CE	1.37E-15	6.00E-20
IrLS	4.22E-07	1.16E-11
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

End-of-Life stage		
Indicator	a	b
GWP-total	2.29E-01	4.01E-05
GWP-fossil	2.29E-01	4.00E-05
GWP-biogenic	3.99E-05	4.02E-08
GWP-luluc	8.33E-05	1.01E-09
ODP	3.10E-09	5.28E-14
AP	8.71E-04	1.63E-08
EP-freshwater	1.61E-05	2.51E-10
EP-marine	9.88E-04	9.70E-07
EP-terrestrial	3.47E-03	6.21E-08
POCP	1.21E-03	3.01E-08
ADP-minerals & metals	6.46E-07	3.61E-12
ADP-fossil	2.92E+00	4.62E-05
WDP	2.20E-02	7.22E-07
Tot PE	2.96E+00	4.69E-05
PERE	3.73E-02	7.83E-07
PERM	0.00E+00	0.00E+00
PERT	3.73E-02	7.83E-07
PENRE	2.92E+00	4.62E-05
PENRM	0.00E+00	0.00E+00
PENRT	2.92E+00	4.62E-05
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	6.02E-04	1.85E-08
HWD	2.03E-05	2.63E-10
N-HWD	4.60E-01	4.63E-04
RWD	5.96E-07	1.48E-11
CfRU	0.00E+00	0.00E+00
MfR	0.00E+00	0.00E+00
MfER	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00
Efp	1.72E-08	3.31E-13
IrHH	2.43E-03	6.06E-08
ETX FW	3.15E+00	1.00E-03
HTX CE	1.31E-09	-1.60E-13
HTX N-CE	1.29E-08	-6.16E-12
IrLS	2.26E+00	-2.96E-05
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

Benefits & Loads

Indicator	a	b	c
GWP-total	-7.39E-01	1.48E-01	7.37E-05
GWP-fossil	-7.38E-01	1.48E-01	7.37E-05
GWP-biogenic	-1.07E-04	-7.21E-05	-3.60E-08
GWP-luluc	-6.05E-04	1.02E-04	5.11E-08
ODP	-9.90E-09	2.47E-09	1.23E-12
AP	-2.69E-03	5.31E-04	2.65E-07
EP-freshwater	-2.13E-04	3.99E-05	1.99E-08
EP-marine	-5.59E-04	1.08E-04	5.37E-08
EP-terrestrial	-5.71E-03	1.11E-03	5.52E-07
POCP	-2.32E-03	5.04E-04	2.52E-07
ADP-minerals & metals	-1.64E-06	5.32E-07	2.65E-10
ADP-fossil	-1.23E+01	2.79E+00	1.39E-03
WDP	-1.18E-01	2.76E-02	1.38E-05
Tot PE	-1.30E+01	2.91E+00	1.45E-03
PERE	-6.93E-01	1.19E-01	2.07E-06
PERM	0.00E+00	0.00E+00	0.00E+00
PERT	-6.93E-01	1.19E-01	5.92E-05
PENRE	-1.23E+01	2.79E+00	1.39E-03
PENRM	0.00E+00	0.00E+00	0.00E+00
PENRT	-1.23E+01	2.79E+00	1.39E-03
SM	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	0.00E+00
FW	-3.91E-03	8.31E-04	4.15E-07
HWD	-9.72E-05	3.01E-05	1.50E-08
N-HWD	-1.76E-02	4.16E-03	2.07E-06
RWD	-1.43E-05	2.32E-06	1.16E-09
CfRU	0.00E+00	0.00E+00	0.00E+00
MfR	0.00E+00	0.00E+00	0.00E+00
MfER	0.00E+00	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00	0.00E+00
Efp	-2.66E-08	5.71E-09	2.85E-12
IrHH	-5.87E-02	9.50E-03	4.74E-06
ETX FW	-3.47E+00	1.01E+00	5.02E-04
HTX CE	-1.21E-09	2.92E-10	1.46E-13
HTX N-CE	-3.63E-09	8.22E-10	4.10E-13
IrLS	-1.32E+00	3.02E-01	1.51E-04
Biogenic Carbon-product	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00	0.00E+00

Comparability

EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows PEP comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.

Applicable product standards

Product technical and Certification specifications can be found in the product catalogue on ABB's website.

Glossary

Environmental impact Indicators

GWP-total	Global Warming Potential total (Climate change)
GWP-fossil	Global Warming Potential fossil
GWP-biogenic	Global Warming Potential biogenic
GWP-luluc	Global Warming Potential land use and land use change
ODP	Depletion potential of the stratospheric ozone layer
AP	Acidification potential
EP-freshwater	Eutrophication potential - freshwater compartment
EP-marine	Eutrophication potential - fraction of nutrients reachin marine end compartment
EP-terrestrial	Eutrophication potential - Accumulated Exceedance
POCP	Tropospheric ozone creation potential
ADP-m&m	Abiotic Depletion for non-fossil resources potential
ADP-fossil	Abiotic Depletion for fossil resources potential
WDP	Water deprivation potential

Resource indicators

PENRE	Use of non-renewable primary energy excluding renewable primary energy resources used as raw material
PENRM	Use of non-renewable primary energy resources used as raw material
PENRT	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials
PERE	Use of renewable primary energy excluding non-renewable primary energy resources used as raw material.
PERM	Use of renewable primary energy resources used as raw material
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)

Secondary materials, water and energy resources		Waste category indicators	
SM	Use of secondary materials	HWD	Hazardous waste disposed
RSF	Use of renewable secondary fuels	N-HWD	Non-hazardous waste disposed
NRSF	Use of non-renewable secondary fuels	RWD	Radioactive waste disposed
FW	Net use of fresh water		

Output flow indicators		Optional indicators	
CfRu	Components for re-use	Tot PE	Total use of primary energy during the life cycle
MfR	Materials for recycling		
MfER	Materials for energy recovery	Efp	Emissions of Fine particles
EE	Exported Energy	IrHH	Ionizing radiation, human health
		ETX FW	Ecotoxicity, freshwater
		HTX CE	Human toxicity, carcinogenic effects
		HTX N-CE	Human toxicity, non-carcinogenic effects
		IrLS	Impact related to Land use / soil quality

References

[1] PCR “PEP-PCR-ed4-EN-2022_09_06” - Product Category Rules for Electrical, Electronic and HVAC-R Products (published: 6th September 2022)

[2] PSR “PSR-0001-ed4-EN-2022 11 16” - SPECIFIC RULES FOR Wires, Cables and Accessories

[3] EN 50693:2019 - Product category rules for life cycle assessments of electronic and electrical products and systems
[4] ISO 14040:2006 - Environmental management -Life cycle assessment - Principles and framework
[5] ISO 14044:2006 - Environmental management - Life cycle assessment - Requirements and guidelines
[6] ecoinvent v3.10 (2023). ecoinvent database version 3.10 - (https://ecoinvent.org/)
[7] SimaPro Software version 10.2.0.2 - PRé Sustainability
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