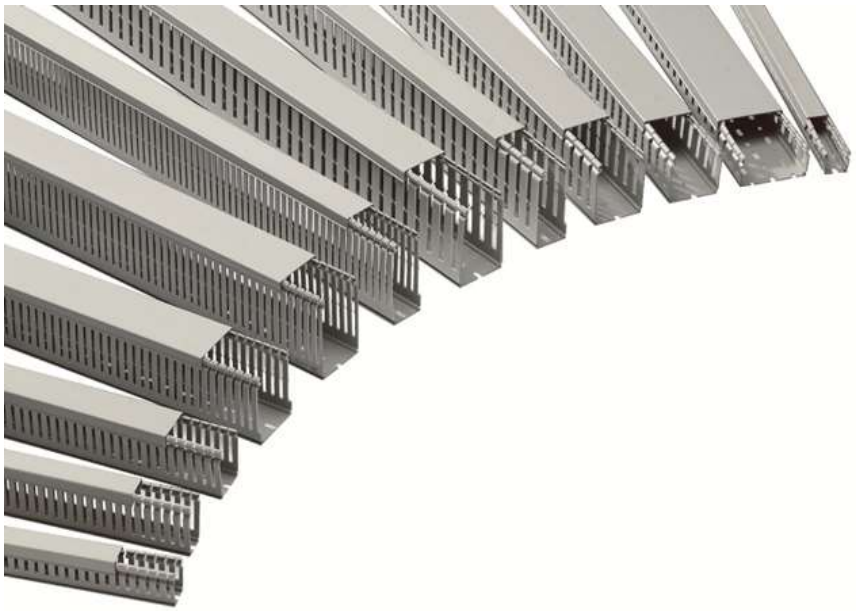
Halogen Free Thermoplastic wiring ducts

PEP ecopassport®
Product Environmental Profile



Registration number:	**ABBG-00954-V01.01-EN**	Drafting rules:	**PCR-ed4-EN-2021 09 06**
PEP Owner:	**oscar.sarmiento-penuela@ch.abb.com**	Supplemented by:	**PSR-0003-ed2.1-EN-2023 12 08**
Verifier accreditation number:	**VH44**	Information and reference documents:	**www.pep-ecopassport.org**
Date of issue:	**September-25**	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"

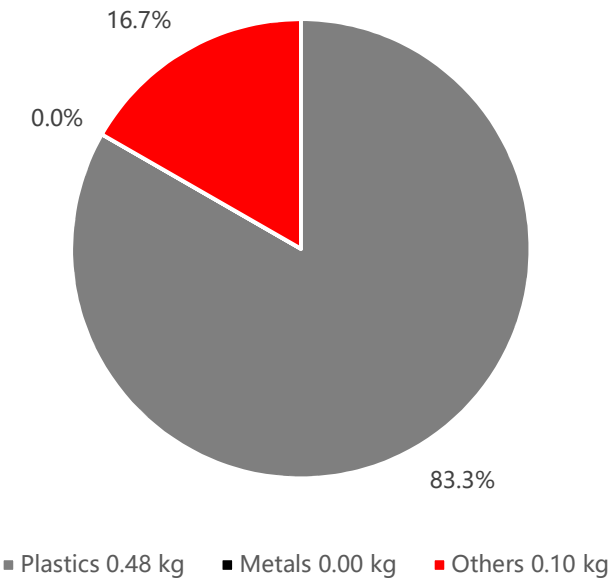
ABB Purpose & Embedding Sustainability

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	1SL9185A00 “WIR DUCT 4/6 HAL FREE-40X80-GREY"
Description of the product	To be able to meet even the most stringent safety standards, ABB trunking product line includes a number of products particularly fit for the wiring needs in dangerous areas, such as areas at risk of fire. Halogen free thermoplastic wiring ducts, can be considered as the optimum solution for all those environments where safety is an absolute "must". These products are made of HALOGEN-FREE thermoplastic material compliant with VDE 0472, Part 815. The material is insulating, anti-shock and self-extinguishing (according to UL 94 V0). It can also resist to extreme temperatures and flame up to 850 °C (glow wire test) according to IEC 695-2-1. Available in Color Grey RAL 7035 with 8/2 mm and 4/6 mm guides.
Functional unit	The functional unit is to Accommodate and protect the wiring along 1 meter for a Reference Service Life of 20 years. Slotted cable trunking systems for cabinets with cross-section 27 mm² include the profile (base and cover) representative of standard use
Other products covered	List of the other products covered in this PEP is presented in the paragraph which concerned the extrapolation rules.
Manufacturing address	Viale Vicenza, 61 Marostica (VI) Italy www.new.abb.com

Constituent Materials



Total weight of reference product and packaging	**0.58**	**kg**

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%
Polycarbonate	83.2			**Cardboard**	9.1
LDPE	0.1			**Wood**	7.5
				Paper	0.1
Plastics Total %	83.3	Metals Total %	0.0	Others Total %	16.7

The total mass of the reference product is 0.48 kg, with an additional 0.1 kg associated with packaging materials.

Additional Information

Manufacturing	The manufacturing stage includes the production of the product and its packaging. Manufacturing processes are conducted at ABB's facility in Marostica (IT).
Distribution	Distribution from production plant to end users is based on product-specific transport data for the reference year. The reference product is distributed in Europe.
Installation	This phase includes the disposal of the product's packaging, as required by PSR-0003-ed2.1-EN-2023 12 08. The cut-off criteria are applied to exclude the rivets used during the product installation phase.
Use	No material or energy consumption occurs during the use phase. The product does not require maintenance.
End of life	The default end-of-life scenario specified in PSR-0003-ed2.1-EN-2023 12 08 has been adopted, assuming 100% incineration without energy recovery.
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.

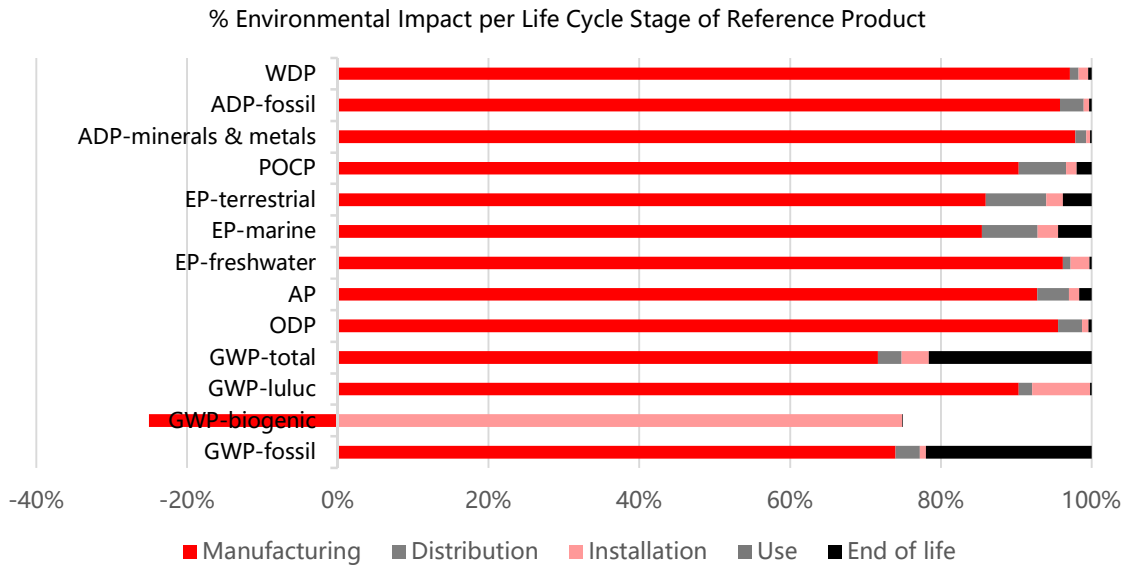
Environmental Impacts

Reference lifetime	20 years
Product category	Trunking systems and conduit systems, Slotted cable trunking systems for cabinets
Installation elements	No additional elements needed during installation.
Use scenario	No material or energy consumption occurs during the use phase. The product does not require maintenance.
Temporal representativeness	2024
Geographical representativeness	European
Technological representativeness	Technological representativeness for primary data refers to the specific production processes. The technological coverage for each secondary process is specified in the metadata section of the ecoinvent database.
Software and database used	SimaPro 10.2 & Ecoinvent 3.10

Energy model used

Manufacturing	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 occurs during the use phase. The product does not require maintenance.
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.	5.34E+00	3.83E+00	1.69E-01	1.95E-01	0.00E+00	1.15E+00	-2.56E-02
GWP-Fossil	kg CO2 eq.	5.24E+00	3.87E+00	1.69E-01	4.19E-02	0.00E+00	1.15E+00	-2.56E-02
GWO-Biogenic	kg CO2 eq.	1.02E-01	-5.11E-02	8.78E-05	1.52E-01	0.00E+00	2.03E-04	-2.49E-05
GWP-Luluc	kg CO2 eq.	3.23E-03	2.92E-03	5.82E-05	2.50E-04	0.00E+00	5.88E-06	-2.52E-05
ODP	kg CFC-11 eq.	1.06E-07	1.01E-07	3.42E-09	8.62E-10	0.00E+00	4.69E-10	-2.32E-10
AP	H+ eq.	1.61E-02	1.50E-02	6.75E-04	2.28E-04	0.00E+00	2.64E-04	-9.53E-05
EP-Freshwater	kg P eq.	1.11E-03	1.07E-03	1.16E-05	2.76E-05	0.00E+00	3.10E-06	-8.02E-06
EP-Marine	kg N eq.	3.43E-03	2.93E-03	2.52E-04	9.35E-05	0.00E+00	1.53E-04	-2.03E-05
EP-Terrestrial	mol N eq.	3.42E-02	2.94E-02	2.75E-03	7.44E-04	0.00E+00	1.31E-03	-2.06E-04
POCP	kg NMVOC eq.	1.70E-02	1.53E-02	1.06E-03	2.38E-04	0.00E+00	3.39E-04	-7.16E-05
ADP-Minerals & Metals	kg SB eq.	3.26E-05	3.19E-05	4.59E-07	1.77E-07	0.00E+00	6.00E-08	-1.05E-08
ADP-Fossil	MJ	7.90E+01	7.57E+01	2.46E+00	6.05E-01	0.00E+00	2.47E-01	-3.53E-01
WDP	m^3 eq. depr.	1.02E+00	9.92E-01	1.18E-02	1.28E-02	0.00E+00	4.91E-03	-3.21E-03

Resource use indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
PERE	MJ	7.72E+00	6.61E+00	3.79E-02	1.06E+00	0.00E+00	1.15E-02	-2.86E-02
PERM	MJ	1.72E+00	1.72E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	9.44E+00	8.33E+00	3.79E-02	1.06E+00	0.00E+00	1.15E-02	-2.86E-02
PENRE	MJ	6.35E+01	6.02E+01	2.46E+00	6.06E-01	0.00E+00	2.47E-01	-3.53E-01
PENRM	MJ	1.55E+01	1.55E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	7.90E+01	7.57E+01	2.46E+00	6.06E-01	0.00E+00	2.47E-01	-3.53E-01

*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	m³	3.33E-02	3.12E-02	3.69E-04	3.87E-04	0.00E+00	1.32E-03	-1.25E-04

Waste category indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
HWD	kg	1.01E-03	9.88E-04	1.62E-05	3.14E-06	0.00E+00	5.13E-06	-9.49E-07
N-HWD	kg	7.63E-01	4.48E-01	2.11E-01	9.21E-02	0.00E+00	1.23E-02	-4.63E-04
RWD	kg	9.32E-05	9.08E-05	7.41E-07	1.46E-06	0.00E+00	1.83E-07	-6.21E-07

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	1.69E-01	1.12E-01	0.00E+00	5.75E-02	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	1.04E-01	0.00E+00	0.00E+00	1.04E-01	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	1.04E-05	1.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon - Packaging	kg of C	5.60E-02	5.60E-02	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	8.84E+01	8.40E+01	2.50E+00	1.67E+00	0.00E+00	2.58E-01	-3.81E-01
Efp	Dise inc	1.70E-07	1.49E-07	1.72E-08	2.77E-09	0.00E+00	1.60E-09	-8.30E-10
IrHH	kBq U-235 eq	3.61E-01	3.52E-01	3.00E-03	5.72E-03	0.00E+00	7.19E-04	-2.54E-03
ETX FW	CTUe	1.57E+02	1.54E+02	5.84E-01	3.10E-01	0.00E+00	2.49E+00	-4.97E-02
HTX CE	CTUh	5.06E-08	4.91E-08	1.05E-09	2.00E-10	0.00E+00	2.25E-10	-3.06E-11
HTX N-CE	CTUh	4.00E-08	3.51E-08	1.59E-09	6.61E-10	0.00E+00	2.67E-09	-1.04E-10
IrLS	Pt	3.74E+01	2.87E+01	2.48E+00	6.11E+00	0.00E+00	1.18E-01	-3.74E-02

*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 was 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 net weight;
- packaging weight related to one product;
- cardboard weight related to one product;
- pallet weight related to one product.

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

- 1SL9185A00

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	Cluster	Product net weight (kg)	Packaging weight (kg)	Cardboard weight (kg)	Pallet weight (kg)
1SL9185A00	Cluster 1	4.84E-01	9.75E-02	5.32E-02	4.34E-02
1SL9193A00	Cluster 1	6.30E-01	2.92E-01	1.60E-01	1.30E-01
1SL9145A00	Cluster 1	2.80E-01	7.65E-02	4.81E-02	2.78E-02
1SL9153A00	Cluster 1	6.45E-01	1.75E-01	9.50E-02	7.81E-02
1SL9119A00	Cluster 1	6.13E-02	2.06E-02	1.62E-02	4.31E-03
1SL9187A00	Cluster 1	5.41E-01	1.32E-01	7.44E-02	5.68E-02
1SL9189A00	Cluster 1	6.06E-01	1.32E-01	7.44E-02	5.68E-02
1SL9183A00	Cluster 1	3.83E-01	1.32E-01	7.44E-02	5.68E-02
1SL9165A00	Cluster 1	3.54E-01	1.32E-01	7.44E-02	5.68E-02
1SL9163A00	Cluster 1	2.90E-01	1.32E-01	7.44E-02	5.68E-02
1SL9191A00	Cluster 1	7.30E-01	1.32E-01	7.44E-02	5.68E-02
1SL9167A00	Cluster 1	4.78E-01	1.32E-01	7.44E-02	5.68E-02
1SL9143A00	Cluster 1	2.35E-01	1.32E-01	7.44E-02	5.68E-02
1SL9169A00	Cluster 1	5.50E-01	1.32E-01	7.44E-02	5.68E-02
1SL9133A00	Cluster 1	2.12E-01	1.32E-01	7.44E-02	5.68E-02
1SL9147A00	Cluster 1	3.63E-01	1.32E-01	7.44E-02	5.68E-02
1SL9171A00	Cluster 1	6.74E-01	1.32E-01	7.44E-02	5.68E-02
1SL9173A00	Cluster 1	8.42E-01	1.32E-01	7.44E-02	5.68E-02
1SL9135A00	Cluster 1	2.46E-01	1.32E-01	7.44E-02	5.68E-02
1SL9149A00	Cluster 1	4.56E-01	1.32E-01	7.44E-02	5.68E-02
1SL9137A00	Cluster 1	3.41E-01	1.32E-01	7.44E-02	5.68E-02
1SL9151A00	Cluster 1	5.74E-01	1.32E-01	7.44E-02	5.68E-02
1SL9085A00	Cluster 2	4.38E-01	1.35E-01	7.57E-02	5.78E-02
1SL9087A00	Cluster 2	5.42E-01	1.35E-01	7.57E-02	5.78E-02
1SL9065A00	Cluster 2	3.41E-01	1.35E-01	7.57E-02	5.78E-02
1SL9073A00	Cluster 2	5.99E-01	2.51E-01	1.37E-01	1.12E-01
1SL9063A00	Cluster 2	3.02E-01	1.35E-01	7.57E-02	5.78E-02
1SL9045A00	Cluster 2	2.71E-01	1.35E-01	7.57E-02	5.78E-02
1SL9096A00	Cluster 2	6.97E-01	1.75E-01	9.50E-02	1.48E-03
1SL9091A00	Cluster 2	7.04E-01	1.35E-01	7.57E-02	5.78E-02
1SL9089A00	Cluster 2	6.20E-01	1.35E-01	7.57E-02	5.78E-02
1SL9095A00	Cluster 2	4.46E-01	1.35E-01	7.57E-02	5.78E-02
1SL9067A00	Cluster 2	4.81E-01	1.35E-01	7.57E-02	5.78E-02
1SL9083A00	Cluster 2	4.19E-01	8.14E-02	5.10E-02	5.65E-04
1SL9047A00	Cluster 2	3.62E-01	1.35E-01	7.57E-02	5.78E-02
1SL9098A00	Cluster 2	8.68E-01	1.35E-01	7.57E-02	5.78E-02
1SL9097A00	Cluster 2	6.72E-01	1.35E-01	7.57E-02	5.78E-02
1SL9069A00	Cluster 2	5.52E-01	1.35E-01	7.57E-02	5.78E-02
1SL9071A00	Cluster 2	6.76E-01	1.35E-01	7.57E-02	5.78E-02
1SL9033A00	Cluster 2	2.16E-01	1.35E-01	7.57E-02	5.78E-02
1SL9093A00	Cluster 2	9.21E-01	1.35E-01	7.57E-02	5.78E-02
1SL9035A00	Cluster 2	2.50E-01	1.35E-01	7.57E-02	5.78E-02

Variables Weights Continued

SKU	Cluster	Product net weight (kg)	Packaging weight (kg)	Cardboard weight (kg)	Pallet weight (kg)
1SL9043A00	Cluster 2	2.36E-01	1.35E-01	7.57E-02	5.78E-02
1SL9019A00	Cluster 2	6.13E-02	2.06E-02	1.62E-02	8.20E-05
1SL9037A00	Cluster 2	3.44E-01	1.35E-01	7.57E-02	5.78E-02
1SL9049A00	Cluster 2	4.59E-01	1.35E-01	7.57E-02	5.78E-02
1SL9051A00	Cluster 2	5.52E-01	1.46E-01	7.98E-02	6.51E-02
1SL9053A00	Cluster 2	6.34E-01	1.35E-01	7.57E-02	5.78E-02
M053300005	Cluster 3	4.52E-01	8.74E-02	4.75E-02	3.91E-02
M053300004	Cluster 3	4.52E-01	3.71E-02	8.70E-03	2.79E-02
M053310008	Cluster 4	6.97E-01	1.51E-01	6.30E-02	8.68E-02
M053310004	Cluster 4	6.97E-01	8.24E-02	1.74E-02	6.38E-02

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 10% 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 (Clusters 1 & 2):** $y = ax1 + bx2 + cx3 + d$

  x1 = Product net weight (kg), x2 = Cardboard weight (kg), x3 = Pallet weight

- **Manufacturing Stage (Clusters 3 & 4):** $y = ax1 + b$

  x1 = Product net weight + Packaging weight (kg)

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

  x1 = Product net weight + Packaging weight (kg)

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

  x1 = Packaging weight (kg)

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

  x1 = Product net weight

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

  x1 = Packaging weight (kg)

The table above can be referenced for the components' weights and all their variants. The coefficients' calculation for the use stage is not performed because this stage is not present in the Life cycle of the product and so there aren't impacts related to this phase.

The following tables report the linear coefficients (a, b) for each life cycle stage. Four groups are identified for manufacturing and installation stages: Cluster1, Cluster2, Cluster 3 and Cluster 4.

Extrapolation Factors

Manufacturing stage – Cluster 1

Indicator	a	b	c	d
GWP-total	6.52E+00	-1.27E+01	1.24E+01	7.49E-01
GWP-fossil	6.44E+00	-1.07E+01	1.33E+01	6.94E-01
GWP-biogenic	7.51E-02	-2.02E+00	-8.67E-01	5.50E-02
GWP-luluc	4.44E-03	-3.01E-03	1.12E-02	4.06E-04
ODP	1.74E-07	-2.87E-07	3.48E-07	1.58E-08
AP	2.52E-02	-4.00E-02	5.20E-02	2.43E-03
EP-freshwater	1.82E-03	-2.86E-03	3.96E-03	1.47E-04
EP-marine	4.83E-03	-7.24E-03	1.08E-02	4.64E-04
EP-terrestrial	4.87E-02	-7.14E-02	1.06E-01	4.60E-03
POCP	2.63E-02	-4.08E-02	5.43E-02	2.17E-03
ADP-minerals & metals	5.92E-05	-1.01E-04	1.17E-04	3.07E-06
ADP-fossil	1.30E+02	-2.16E+02	2.61E+02	1.17E+01
WDP	1.30E+00	-2.01E+00	2.74E+00	3.38E-01
Tot PE	1.38E+02	-2.04E+02	2.98E+02	1.43E+01
PERE	6.56E+00	-1.70E+00	3.66E+00	2.58E+00
PERM	6.37E-01	1.35E+01	1.59E+01	3.59E-04
PERT	7.20E+00	1.18E+01	3.63E+01	2.58E+00
PENRE	1.00E+02	-1.69E+02	2.08E+02	1.07E+01
PENRM	2.99E+01	-4.70E+01	5.28E+01	9.95E-01
PENRT	1.30E+02	-2.16E+02	2.61E+02	1.17E+01
SM	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	1.93E+00	0.00E+00
FW	4.29E-02	-7.01E-02	9.48E-02	9.72E-03
HWD	1.84E-03	-3.03E-03	3.47E-03	9.15E-05
N-HWD	6.44E-01	-2.79E+00	3.66E+00	1.12E-01
RWD	1.41E-04	-2.80E-04	3.53E-04	2.07E-05
CfRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MfR	1.12E-01	-1.78E+00	1.93E+00	6.03E-02
MfER	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Efp	2.60E-07	-4.08E-07	5.64E-07	1.79E-08
IrHH	5.48E-01	-1.09E+00	1.37E+00	7.92E-02
ETX FW	2.96E+02	-4.76E+02	5.28E+02	1.08E+01
HTX CE	9.21E-08	-1.52E-07	1.77E-07	4.20E-09
HTX N-CE	6.15E-08	-1.01E-07	1.31E-07	4.48E-09
IrLS	2.64E+01	1.04E+02	1.85E+02	2.20E+00
Biogenic Carbon-product	0.00E+00	0.00E+00	0.00E+00	1.04E-05
Biogenic Carbon-packaging	2.08E-02	4.47E-01	5.11E-01	6.19E-06

Extrapolation Factors

Manufacturing stage – Cluster 2

Indicator	a	b	c	d
GWP-total	7.20E+00	8.12E-01	-5.89E+00	5.12E-01
GWP-fossil	7.09E+00	2.23E+00	-4.22E+00	4.68E-01
GWP-biogenic	1.05E-01	-1.43E+00	-1.67E+00	4.47E-02
GWP-luluc	4.93E-03	6.78E-03	-2.09E-03	2.35E-04
ODP	1.91E-07	5.34E-08	-1.13E-07	9.81E-09
AP	2.77E-02	1.02E-02	-1.61E-02	1.55E-03
EP-freshwater	2.02E-03	1.01E-03	-1.29E-03	7.94E-05
EP-marine	5.34E-03	2.91E-03	-2.97E-03	2.86E-04
EP-terrestrial	5.36E-02	2.71E-02	-2.79E-02	2.87E-03
POCP	2.89E-02	1.06E-02	-1.53E-02	1.27E-03
ADP-minerals & metals	6.50E-05	1.53E-05	-4.05E-05	1.04E-06
ADP-fossil	1.43E+02	3.92E+01	-8.48E+01	7.24E+00
WDP	1.43E+00	5.63E-01	-7.43E-01	2.93E-01
Tot PE	1.51E+02	6.60E+01	-6.87E+01	9.56E+00
PERE	7.30E+00	1.32E+01	-1.03E+00	2.32E+00
PERM	6.38E-01	1.35E+01	1.59E+01	2.89E-04
PERT	7.94E+00	2.67E+01	1.61E+01	2.32E+00
PENRE	1.11E+02	3.40E+01	-6.69E+01	7.16E+00
PENRM	3.25E+01	5.21E+00	-1.79E+01	8.15E-02
PENRT	1.43E+02	3.92E+01	-8.48E+01	7.24E+00
SM	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	-7.28E-01	0.00E+00
FW	4.74E-02	2.00E-02	-2.73E-02	8.14E-03
HWD	2.01E-03	4.09E-04	-1.19E-03	3.13E-05
N-HWD	8.16E-01	6.68E-01	-1.03E+00	5.11E-02
RWD	1.58E-04	6.73E-05	-1.18E-04	1.47E-05
CfRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MfR	2.09E-01	1.84E-01	-7.28E-01	2.60E-02
MfER	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Efp	2.86E-07	1.18E-07	-1.49E-07	8.69E-09
IrHH	6.16E-01	2.62E-01	-4.59E-01	5.55E-02
ETX FW	3.23E+02	5.71E+01	-1.94E+02	1.49E+00
HTX CE	1.01E-07	2.13E-08	-5.74E-08	1.17E-09
HTX N-CE	6.78E-08	2.68E-08	-4.19E-08	2.24E-09
IrLS	2.87E+01	1.51E+02	1.22E+02	1.38E+00
Biogenic Carbon-product	0.00E+00	0.00E+00	0.00E+00	1.04E-05
Biogenic Carbon-packaging	2.08E-02	4.47E-01	5.11E-01	4.99E-06

Extrapolation Factors

Manufacturing stage – Cluster 3		
Indicator	a	b
GWP-total	-5.60E-01	3.52E+00
GWP-fossil	9.00E-01	2.78E+00
GWP-biogenic	-1.47E+00	7.34E-01
GWP-luluc	4.87E-03	-1.83E-04
ODP	1.92E-08	7.49E-08
AP	4.76E-03	1.00E-02
EP-freshwater	5.33E-04	5.98E-04
EP-marine	1.67E-03	1.55E-03
EP-terrestrial	1.55E-02	1.63E-02
POCP	5.22E-03	1.01E-02
ADP-minerals & metals	3.95E-06	2.44E-05
ADP-fossil	1.38E+01	5.62E+01
WDP	2.94E-01	7.11E-01
Tot PE	3.82E+01	5.05E+01
PERE	1.04E+01	2.50E-01
PERM	1.40E+01	-5.99E+00
PERT	2.44E+01	-5.74E+00
PENRE	1.32E+01	4.36E+01
PENRM	5.60E-01	1.26E+01
PENRT	1.38E+01	5.62E+01
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	1.03E-02	2.15E-02
HWD	8.52E-05	7.78E-04
N-HWD	3.06E-01	1.54E-01
RWD	2.91E-05	5.99E-05
CfRU	0.00E+00	0.00E+00
MfR	0.00E+00	4.89E-02
MfER	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00
Efp	6.19E-08	9.06E-08
IrHH	1.14E-01	2.31E-01
ETX FW	6.16E+00	1.25E+02
HTX CE	5.30E-09	3.80E-08
HTX N-CE	1.25E-08	2.24E-08
IrLS	1.44E+02	-5.26E+01
Biogenic Carbon-product	0.00E+00	1.04E-05
Biogenic Carbon-packaging	4.59E-01	-1.97E-01

Extrapolation Factors

Manufacturing stage – Cluster 4		
Indicator	a	b
GWP-total	-6.18E-01	5.22E+00
GWP-fossil	8.36E-01	4.12E+00
GWP-biogenic	-1.46E+00	1.11E+00
GWP-luluc	4.37E-03	-6.40E-05
ODP	1.79E-08	1.12E-07
AP	4.37E-03	1.50E-02
EP-freshwater	4.74E-04	9.28E-04
EP-marine	1.51E-03	2.37E-03
EP-terrestrial	1.42E-02	2.48E-02
POCP	4.90E-03	1.52E-02
ADP-minerals & metals	3.72E-06	3.75E-05
ADP-fossil	1.30E+01	8.40E+01
WDP	2.80E-01	9.54E-01
Tot PE	3.69E+01	7.43E+01
PERE	9.71E+00	-3.86E-01
PERM	1.42E+01	-9.38E+00
PERT	2.39E+01	-9.77E+00
PENRE	1.23E+01	6.45E+01
PENRM	6.88E-01	1.95E+01
PENRT	1.30E+01	8.40E+01
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	9.61E-03	2.94E-02
HWD	8.41E-05	1.19E-03
N-HWD	2.81E-01	2.39E-01
RWD	2.64E-05	8.71E-05
CfRU	0.00E+00	0.00E+00
MfR	0.00E+00	6.68E-02
MfER	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00
Efp	5.80E-08	1.39E-07
IrHH	1.03E-01	3.37E-01
ETX FW	5.76E+00	1.94E+02
HTX CE	5.44E-09	5.83E-08
HTX N-CE	1.14E-08	3.44E-08
IrLS	1.43E+02	-8.09E+01
Biogenic Carbon-product	0.00E+00	1.04E-05
Biogenic Carbon-packaging	4.65E-01	-3.08E-01

Extrapolation Factors

Distribution stage – All clusters		
Indicator	a	b
GWP-total	2.91E-01	2.13E-12
GWP-fossil	2.91E-01	6.89E-13
GWP-biogenic	1.51E-04	4.34E-13
GWP-luluc	1.00E-04	3.62E-13
ODP	5.88E-09	1.54E-19
AP	1.16E-03	-2.62E-13
EP-freshwater	1.99E-05	3.43E-14
EP-marine	4.34E-04	-2.54E-13
EP-terrestrial	4.73E-03	5.48E-14
POCP	1.83E-03	-2.52E-13
ADP-minerals & metals	7.90E-07	3.14E-13
ADP-fossil	4.24E+00	2.38E-10
WDP	2.02E-02	9.71E-14
Tot PE	4.30E+00	1.36E-10
PERE	6.52E-02	1.67E-12
PERM	0.00E+00	0.00E+00
PERT	6.52E-02	1.67E-12
PENRE	4.24E+00	-1.64E-10
PENRM	0.00E+00	0.00E+00
PENRT	4.24E+00	-1.64E-10
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	6.35E-04	5.06E-13
HWD	2.78E-05	3.76E-13
N-HWD	3.62E-01	-9.73E-13
RWD	1.27E-06	4.36E-14
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	2.96E-08	1.22E-13
IrHH	5.15E-03	-5.45E-13
ETX FW	1.00E+00	8.06E-12
HTX CE	1.81E-09	-2.06E-20
HTX N-CE	2.73E-09	-1.20E-19
IrLS	4.27E+00	-2.17E-10
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

Installation stage – Cluster 1

Indicator	a	b
GWP-total	1.98E+00	4.38E-03
GWP-fossil	4.15E-01	3.42E-03
GWP-biogenic	1.56E+00	9.35E-04
GWP-luluc	2.46E-03	2.36E-05
ODP	8.53E-09	7.49E-11
AP	2.25E-03	1.97E-05
EP-freshwater	2.73E-04	2.49E-06
EP-marine	9.30E-04	6.96E-06
EP-terrestrial	7.37E-03	6.29E-05
POCP	2.36E-03	2.00E-05
ADP-minerals & metals	1.75E-06	1.56E-08
ADP-fossil	5.99E+00	5.21E-02
WDP	1.27E-01	1.19E-03
Tot PE	1.64E+01	1.51E-01
PERE	1.05E+01	9.84E-02
PERM	0.00E+00	0.00E+00
PERT	1.05E+01	9.84E-02
PENRE	6.00E+00	5.22E-02
PENRM	0.00E+00	0.00E+00
PENRT	6.00E+00	5.22E-02
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	3.76E-03	5.03E-05
HWD	3.11E-05	2.61E-07
N-HWD	9.36E-01	2.13E-03
RWD	1.45E-05	1.30E-07
CfRU	0.00E+00	0.00E+00
MfR	5.79E-01	2.53E-03
MfER	0.00E+00	0.00E+00
EE	1.09E+00	-5.76E-03
Efp	2.75E-08	2.31E-10
IrHH	5.65E-02	5.08E-04
ETX FW	3.07E+00	2.76E-02
HTX CE	1.99E-09	1.63E-11
HTX N-CE	6.55E-09	5.45E-11
IrLS	6.03E+01	5.64E-01
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

Installation stage – Cluster 2		
Indicator	a	b
GWP-total	1.97E+00	5.53E-03
GWP-fossil	4.09E-01	4.32E-03
GWP-biogenic	1.56E+00	1.18E-03
GWP-luluc	2.42E-03	2.99E-05
ODP	8.40E-09	9.46E-11
AP	2.22E-03	2.49E-05
EP-freshwater	2.68E-04	3.14E-06
EP-marine	9.18E-04	8.79E-06
EP-terrestrial	7.26E-03	7.94E-05
POCP	2.32E-03	2.52E-05
ADP-minerals & metals	1.72E-06	1.97E-08
ADP-fossil	5.90E+00	6.58E-02
WDP	1.24E-01	1.51E-03
Tot PE	1.62E+01	1.90E-01
PERE	1.03E+01	1.24E-01
PERM	0.00E+00	0.00E+00
PERT	1.03E+01	1.24E-01
PENRE	5.90E+00	6.59E-02
PENRM	0.00E+00	0.00E+00
PENRT	5.90E+00	6.59E-02
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	3.66E-03	6.35E-05
HWD	3.06E-05	3.30E-07
N-HWD	9.32E-01	2.68E-03
RWD	1.42E-05	1.64E-07
CfRU	0.00E+00	0.00E+00
MfR	5.74E-01	3.19E-03
MfER	0.00E+00	0.00E+00
EE	1.10E+00	-7.27E-03
Efp	2.71E-08	2.91E-10
IrHH	5.56E-02	6.42E-04
ETX FW	3.02E+00	3.48E-02
HTX CE	1.96E-09	2.05E-11
HTX N-CE	6.45E-09	6.88E-11
IrLS	5.93E+01	7.12E-01
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

Installation stage – Cluster 3		
Indicator	a	b
GWP-total	2.20E+00	-1.75E-02
GWP-fossil	5.86E-01	-1.38E-02
GWP-biogenic	1.61E+00	-3.67E-03
GWP-luluc	3.62E-03	-9.34E-05
ODP	1.23E-08	-3.01E-10
AP	3.23E-03	-7.92E-05
EP-freshwater	3.97E-04	-1.00E-05
EP-marine	1.28E-03	-2.79E-05
EP-terrestrial	1.05E-02	-2.53E-04
POCP	3.35E-03	-8.04E-05
ADP-minerals & metals	2.52E-06	-6.27E-08
ADP-fossil	8.59E+00	-2.10E-01
WDP	1.86E-01	-4.78E-03
Tot PE	2.40E+01	-6.07E-01
PERE	1.54E+01	-3.97E-01
PERM	0.00E+00	0.00E+00
PERT	1.54E+01	-3.97E-01
PENRE	8.60E+00	-2.10E-01
PENRM	0.00E+00	0.00E+00
PENRT	8.60E+00	-2.10E-01
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	6.25E-03	-2.01E-04
HWD	4.41E-05	-1.05E-06
N-HWD	1.04E+00	-8.57E-03
RWD	2.10E-05	-5.25E-07
CfRU	0.00E+00	0.00E+00
MfR	7.05E-01	-1.02E-02
MfER	0.00E+00	0.00E+00
EE	8.00E-01	2.32E-02
Efp	3.90E-08	-9.29E-10
IrHH	8.19E-02	-2.05E-03
ETX FW	4.43E+00	-1.10E-01
HTX CE	2.80E-09	-6.55E-11
HTX N-CE	9.26E-09	-2.19E-10
IrLS	8.85E+01	-2.28E+00
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

Installation stage – Cluster 4		
Indicator	a	b
GWP-total	2.10E+00	-3.24E-02
GWP-fossil	5.08E-01	-2.54E-02
GWP-biogenic	1.58E+00	-6.73E-03
GWP-luluc	3.08E-03	-1.72E-04
ODP	1.06E-08	-5.56E-10
AP	2.79E-03	-1.46E-04
EP-freshwater	3.40E-04	-1.86E-05
EP-marine	1.12E-03	-5.16E-05
EP-terrestrial	9.08E-03	-4.68E-04
POCP	2.90E-03	-1.49E-04
ADP-minerals & metals	2.17E-06	-1.16E-07
ADP-fossil	7.41E+00	-3.88E-01
WDP	1.59E-01	-8.81E-03
Tot PE	2.06E+01	-1.12E+00
PERE	1.31E+01	-7.34E-01
PERM	0.00E+00	0.00E+00
PERT	1.31E+01	-7.34E-01
PENRE	7.41E+00	-3.89E-01
PENRM	0.00E+00	0.00E+00
PENRT	7.41E+00	-3.89E-01
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	5.10E-03	-3.70E-04
HWD	3.82E-05	-1.94E-06
N-HWD	9.94E-01	-1.58E-02
RWD	1.80E-05	-9.71E-07
CfRU	0.00E+00	0.00E+00
MfR	6.47E-01	-1.88E-02
MfER	0.00E+00	0.00E+00
EE	9.31E-01	4.28E-02
Efp	3.38E-08	-1.72E-09
IrHH	7.04E-02	-3.79E-03
ETX FW	3.81E+00	-2.04E-01
HTX CE	2.43E-09	-1.21E-10
HTX N-CE	8.02E-09	-4.04E-10
IrLS	7.57E+01	-4.21E+00
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

End-of-life stage – All clusters		
Indicator	a	b
GWP-total	2.38E+00	2.65E-04
GWP-fossil	2.38E+00	2.64E-04
GWP-biogenic	4.19E-04	3.65E-07
GWP-luluc	1.21E-05	1.09E-08
ODP	9.67E-10	4.51E-13
AP	5.46E-04	1.14E-07
EP-freshwater	6.39E-06	7.24E-09
EP-marine	3.16E-04	3.93E-08
EP-terrestrial	2.71E-03	4.02E-07
POCP	7.00E-04	1.31E-07
ADP-minerals & metals	1.24E-07	1.04E-10
ADP-fossil	5.10E-01	2.74E-04
WDP	1.02E-02	-5.42E-06
Tot PE	5.33E-01	2.94E-04
PERE	2.36E-02	2.06E-05
PERM	0.00E+00	0.00E+00
PERT	2.36E-02	2.06E-05
PENRE	5.10E-01	2.74E-04
PENRM	0.00E+00	0.00E+00
PENRT	5.10E-01	2.74E-04
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	2.73E-03	2.86E-06
HWD	1.06E-05	9.88E-09
N-HWD	2.53E-02	4.30E-05
RWD	3.78E-07	3.71E-10
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	3.30E-09	1.34E-12
IrHH	1.48E-03	1.42E-06
ETX FW	5.14E+00	4.79E-03
HTX CE	4.65E-10	1.39E-13
HTX N-CE	5.51E-09	3.85E-13
IrLS	2.42E-01	2.01E-04
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

Extrapolation Factors

Benefits & loads – All clusters		
Indicator	a	b
GWP-total	-2.63E-01	6.41E-05
GWP-fossil	-2.62E-01	6.39E-05
GWP-biogenic	-2.56E-04	6.25E-08
GWP-luluc	-2.58E-04	6.32E-08
ODP	-2.38E-09	5.78E-13
AP	-9.77E-04	2.39E-07
EP-freshwater	-8.23E-05	2.01E-08
EP-marine	-2.09E-04	5.10E-08
EP-terrestrial	-2.12E-03	5.17E-07
POCP	-7.35E-04	1.79E-07
ADP-minerals & metals	-1.07E-07	2.62E-11
ADP-fossil	-3.62E+00	8.81E-04
WDP	-3.29E-02	8.04E-06
Tot PE	-3.91E+00	9.53E-04
PERE	-2.93E-01	7.16E-05
PERM	0.00E+00	0.00E+00
PERT	-2.93E-01	7.16E-05
PENRE	-3.62E+00	8.81E-04
PENRM	0.00E+00	0.00E+00
PENRT	-3.62E+00	8.81E-04
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	-1.28E-03	3.12E-07
HWD	-9.74E-06	2.37E-09
N-HWD	-4.75E-03	1.16E-06
RWD	-6.37E-06	1.56E-09
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	-8.52E-09	2.08E-12
IrHH	-2.61E-02	6.38E-06
ETX FW	-5.09E-01	1.24E-04
HTX CE	-3.13E-10	7.63E-14
HTX N-CE	-1.06E-09	2.60E-13
IrLS	-3.84E-01	9.38E-05
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	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-2021_09_06” - Product Category Rules for Electrical, Electronic and HVAC-R Products

[2] PSR “PSR-0003-ed2.1-EN-2023 12 08" Specific rules for cable management solutions

[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
[8] UNI EN 15804:2012+A2:2019: Sustainability of constructions - Environmental product declarations (September 2019)
[9] 2B Srl, LCA report of Halogen Free Thermoplastic wiring ducts