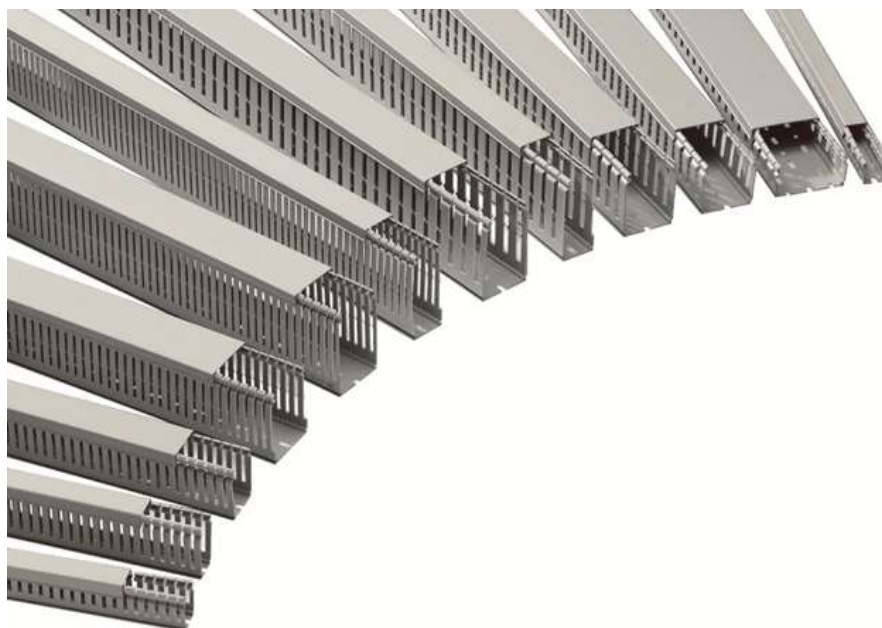



Thermoplastic wiring ducts (PVC wiring ducts)

# PEP ecopassport®

## Product Environmental Profile



Registration number:	ABBG-00955-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
<b>Independent verification of the declaration and data in compliance with ISO 14025: 2006</b>			
Internal:	<input type="checkbox"/>	External:	<input checked="" type="checkbox"/>
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (Ddomain)			
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.

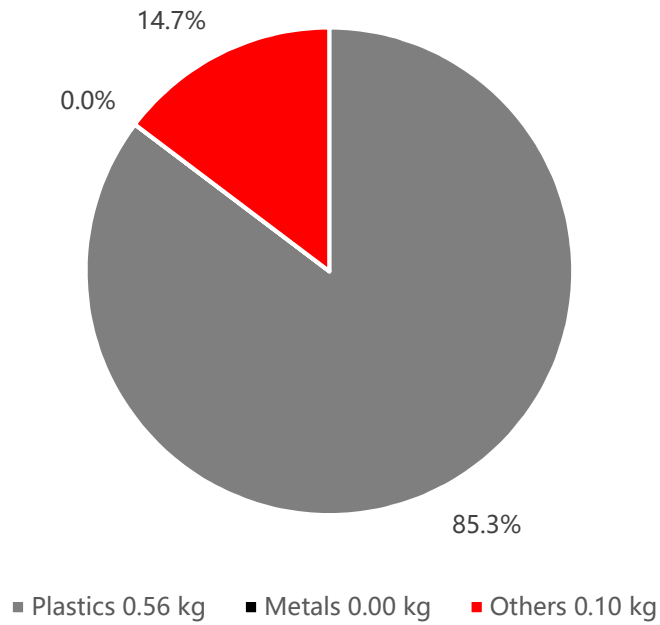


## General information

Reference product	M051850000 "WIRING DUCT PVC 40X80 4/6"
Description of the product	The thermoplastic wiring ducts with vertical slots, available in two slot sizes (4 mm and 8 mm), are primarily designed to accommodate and protect electrical cables. The PVC wiring ducts are made of insulating, shock-proof, and self-extinguishing plastic material in RAL 7030 grey. They are compliant with the UL 94 V0 standard and resistant to abnormal heat and fire up to 960 °C, according to the IEC 695-2-1 glow wire test. These ducts are suitable for storage and transport at temperatures as low as -5 °C, can be installed and used from -15 °C, and support continuous operation up to 60 °C. They are also resistant to acids, oils, and greases and are compliant with the RoHS Directive, and meet the requirements of the European Standard EN 50085-2-3.
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 mm <sup>2</sup> 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

0.66

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%
PVC	85.2			Cardboard	8.1
LDPE	0.1			Wood	6.6
				Paper	<0.1
Plastics Total %	85.3	Metals Total %	0.0	Others Total %	14.7

The total mass of the reference product is 0.56 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

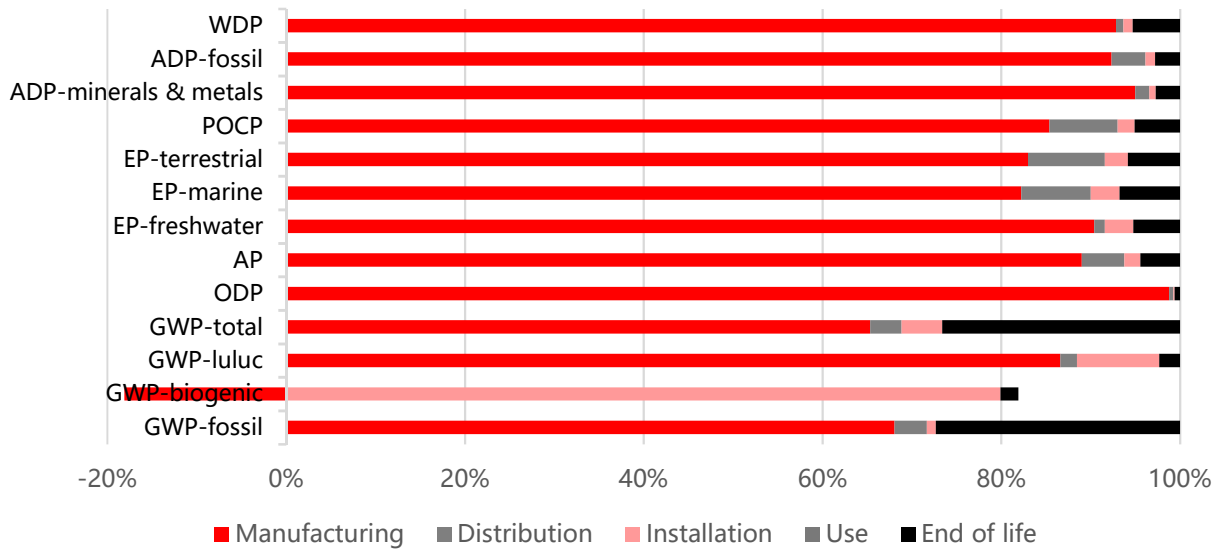
Reference lifetime	20 years
Product category	Trunking systems and conduit systems, Slotted cable trunking systems for cabinets
Installation elements	No additional elements needed during installation.
Use scenario	No material or energy consumption occurs during the use phase. The product does not require 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 per Life Cycle Stage of Reference Product



## Environmental impact indicators based on functional unit

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
GWP-Total	kg CO2 eq.	4.32E+00	2.82E+00	1.52E-01	1.96E-01	0.00E+00	1.15E+00	-2.57E-02
GWP-Fossil	kg CO2 eq.	4.20E+00	2.86E+00	1.52E-01	4.20E-02	0.00E+00	1.15E+00	-2.56E-02
GWO-Biogenic	kg CO2 eq.	1.22E-01	-3.47E-02	7.90E-05	1.53E-01	0.00E+00	3.80E-03	-2.50E-05
GWP-Luluc	kg CO2 eq.	2.80E-03	2.43E-03	5.24E-05	2.57E-04	0.00E+00	6.56E-05	-2.52E-05
ODP	kg CFC-11 eq.	6.25E-07	6.18E-07	3.08E-09	8.68E-10	0.00E+00	3.72E-09	-2.32E-10
AP	H+ eq.	1.28E-02	1.14E-02	6.07E-04	2.29E-04	0.00E+00	5.67E-04	-9.55E-05
EP-Freshwater	kg P eq.	8.72E-04	7.88E-04	1.04E-05	2.77E-05	0.00E+00	4.56E-05	-8.04E-06
EP-Marine	kg N eq.	2.92E-03	2.40E-03	2.27E-04	9.42E-05	0.00E+00	1.97E-04	-2.04E-05
EP-Terrestrial	mol N eq.	2.89E-02	2.40E-02	2.47E-03	7.47E-04	0.00E+00	1.69E-03	-2.07E-04
POCP	kg NMVOC eq.	1.26E-02	1.07E-02	9.57E-04	2.39E-04	0.00E+00	6.37E-04	-7.18E-05
ADP-Minerals & Metals	kg SB eq.	2.61E-05	2.48E-05	4.13E-07	1.78E-07	0.00E+00	7.13E-07	-1.05E-08
ADP-Fossil	MJ	5.84E+01	5.39E+01	2.22E+00	6.08E-01	0.00E+00	1.64E+00	-3.53E-01
WDP	m³ eq. depr.	1.27E+00	1.18E+00	1.06E-02	1.30E-02	0.00E+00	6.73E-02	-3.22E-03

## Resource use indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
PERE	MJ	6.85E+00	5.54E+00	3.41E-02	1.06E+00	0.00E+00	2.15E-01	-2.86E-02
PERM	MJ	1.77E+00	1.77E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	8.62E+00	7.31E+00	3.41E-02	1.06E+00	0.00E+00	2.15E-01	-2.86E-02
PENRE	MJ	4.24E+01	3.80E+01	2.22E+00	6.08E-01	0.00E+00	1.64E+00	-3.53E-01
PENRM	MJ	1.60E+01	1.60E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.84E+01	5.39E+01	2.22E+00	6.08E-01	0.00E+00	1.64E+00	-3.53E-01

\*Total not including 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 <sup>3</sup>	6.03E-02	2.48E-02	3.32E-04	3.95E-04	0.00E+00	3.47E-02	-1.25E-04

## Waste category indicators

Indicator	Unit	Total*	Manufacturing	Distribution	Installation	Use	End of life	Benefits & Loads
HWD	kg	1.01E-03	9.51E-04	1.46E-05	3.15E-06	0.00E+00	4.65E-05	-9.52E-07
N-HWD	kg	8.70E-01	5.02E-01	1.90E-01	9.24E-02	0.00E+00	8.64E-02	-4.64E-04
RWD	kg	6.52E-05	5.99E-05	6.67E-07	1.47E-06	0.00E+00	3.16E-06	-6.22E-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	2.50E-01	1.92E-01	0.00E+00	5.77E-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	5.77E-02	5.77E-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	6.70E+01	6.12E+01	2.25E+00	1.67E+00	0.00E+00	1.86E+00	-3.82E-01
Efp	Dise inc	1.34E-07	1.12E-07	1.55E-08	2.79E-09	0.00E+00	4.53E-09	-8.33E-10
IrHH	kBq U-235 eq	2.54E-01	2.33E-01	2.69E-03	5.73E-03	0.00E+00	1.23E-02	-2.55E-03
ETX FW	CTUe	8.94E+01	1.94E+01	5.25E-01	3.14E-01	0.00E+00	6.91E+01	-4.98E-02
HTX CE	CTUh	1.40E-08	1.21E-08	9.46E-10	2.01E-10	0.00E+00	7.22E-10	-3.06E-11
HTX N-CE	CTUh	3.36E-08	2.75E-08	1.43E-09	6.66E-10	0.00E+00	4.00E-09	-1.04E-10
IrLS	Pt	3.56E+01	2.66E+01	2.23E+00	6.11E+00	0.00E+00	6.84E-01	-3.75E-02

\*Total not including 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

- M051850000

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)	PE film weight (kg)
M051850000	Cluster 1	5.61E-01	9.78E-02	5.32E-02	4.34E-02	8.25E-04
M051990000	Cluster 1	1.56E+00	4.38E-01	2.38E-01	1.95E-01	3.71E-03
M051910000	Cluster 1	1.01E+00	2.20E-01	1.20E-01	9.77E-02	1.86E-03
M051890000	Cluster 1	8.30E-01	2.20E-01	1.20E-01	9.77E-02	1.86E-03
M051450000	Cluster 1	3.63E-01	7.69E-02	4.81E-02	2.78E-02	5.28E-04
M051190000	Cluster 1	8.70E-02	2.24E-02	1.62E-02	6.04E-03	1.15E-04
M051930000	Cluster 1	8.08E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051730000	Cluster 1	1.20E+00	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051980000	Cluster 1	1.03E+00	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051970000	Cluster 1	9.70E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051530000	Cluster 1	9.01E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051710000	Cluster 1	8.47E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051960000	Cluster 1	8.64E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051510000	Cluster 1	7.61E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051690000	Cluster 1	7.99E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051870000	Cluster 1	7.40E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051950000	Cluster 1	6.28E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051490000	Cluster 1	6.63E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051670000	Cluster 1	6.46E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051940000	Cluster 1	5.54E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051830000	Cluster 1	4.95E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051650000	Cluster 1	4.93E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051470000	Cluster 1	5.22E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051370000	Cluster 1	4.93E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051630000	Cluster 1	4.20E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051350000	Cluster 1	3.48E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051430000	Cluster 1	3.35E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M051330000	Cluster 1	2.95E-01	1.79E-01	9.91E-02	7.80E-02	1.48E-03
M050930000	Cluster 2	1.23E+00	2.93E-01	1.60E-01	1.30E-01	2.47E-03
M050730000	Cluster 2	1.09E+00	2.51E-01	1.37E-01	1.12E-01	2.12E-03
M050890000	Cluster 2	8.30E-01	2.20E-01	1.20E-01	9.77E-02	1.86E-03
M050940000	Cluster 2	5.72E-01	1.14E-01	7.08E-02	4.17E-02	7.92E-04
M050850000	Cluster 2	5.47E-01	9.78E-02	5.32E-02	4.34E-02	8.25E-04
M050190000	Cluster 2	8.70E-02	2.24E-02	1.62E-02	6.04E-03	1.15E-04
M050980000	Cluster 2	1.05E+00	1.66E-01	9.27E-02	7.18E-02	1.36E-03
M050960000	Cluster 2	8.58E-01	1.66E-01	9.27E-02	7.18E-02	1.36E-03
M050950000	Cluster 2	6.29E-01	1.66E-01	9.27E-02	7.18E-02	1.36E-03
M050970000	Cluster 2	9.88E-01	1.66E-01	9.27E-02	7.18E-02	1.36E-03
M050990000	Cluster 2	1.59E+00	1.66E-01	9.27E-02	7.18E-02	1.36E-03
M050910000	Cluster 2	9.90E-01	1.66E-01	9.27E-02	7.18E-02	1.36E-03
M050530000	Cluster 2	9.05E-01	1.66E-01	9.27E-02	7.18E-02	1.36E-03
M050710000	Cluster 2	9.05E-01	1.66E-01	9.27E-02	7.18E-02	1.36E-03

# Variables Weights Continued

SKU	Cluster	Product net weight (kg)	Packaging weight (kg)	Cardboard weight (kg)	Pallet weight (kg)
M050510000	Cluster 2	7.65E-01	1.66E-01	9.27E-02	7.18E-02
M050690000	Cluster 2	7.99E-01	1.66E-01	9.27E-02	7.18E-02
M050870000	Cluster 2	7.75E-01	1.66E-01	9.27E-02	7.18E-02
M050490000	Cluster 2	6.67E-01	1.66E-01	9.27E-02	7.18E-02
M050670000	Cluster 2	6.91E-01	1.66E-01	9.27E-02	7.18E-02
M050650000	Cluster 2	5.04E-01	1.66E-01	9.27E-02	7.18E-02
M050830000	Cluster 2	4.93E-01	1.66E-01	9.27E-02	7.18E-02
M050470000	Cluster 2	5.15E-01	1.66E-01	9.27E-02	7.18E-02
M050370000	Cluster 2	4.98E-01	1.66E-01	9.27E-02	7.18E-02
M050630000	Cluster 2	4.07E-01	1.66E-01	9.27E-02	7.18E-02
M050450000	Cluster 2	3.83E-01	1.66E-01	9.27E-02	7.18E-02
M050350000	Cluster 2	3.53E-01	1.66E-01	9.27E-02	7.18E-02
M050330000	Cluster 2	2.87E-01	1.66E-01	9.27E-02	7.18E-02
M050430000	Cluster 2	3.28E-01	1.66E-01	9.27E-02	7.18E-02
M053300002	Cluster 3	6.13E-01	3.42E-02	5.80E-03	2.79E-02
M053300007	Cluster 3	6.13E-01	7.25E-02	3.00E-02	4.17E-02
M053300003	Cluster 3	6.13E-01	8.74E-02	4.75E-02	3.91E-02
M053300000	Cluster 3	6.13E-01	9.75E-02	5.32E-02	4.34E-02
M053310005	Cluster 4	9.75E-01	8.24E-02	1.74E-02	6.38E-02
M053310007	Cluster 4	9.75E-01	1.51E-01	6.30E-02	8.68E-02
M053310009	Cluster 4	9.75E-01	2.49E-02	8.70E-03	1.59E-02
M053310000	Cluster 4	9.75E-01	1.95E-01	1.06E-01	8.68E-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):**  $y = ax_1 + bx_2 + cx_3 + dx_4 + e$   
 $x_1 = \text{Product net weight (kg)}, x_2 = \text{Cardboard weight (kg)}, x_3 = \text{Pallet weight}, x_4 = \text{PE film weight}$
  
- **Manufacturing Stage (Clusters 3 & 4):**  $y = ax_1 + b$   
 $x_1 = \text{Product net weight} + \text{Packaging weight (kg)}$
  
- **Distribution Stage:**  $y = ax_1 + b$   
 $x_1 = \text{Product net weight} + \text{Packaging weight (kg)}$
  
- **Installation Stage:**  $y = ax_1 + b$   
 $x_1 = \text{Cardboard weight (kg)}, x_2 = \text{Pallet weight (kg)}$
  
- **End-of-Life Stage:**  $y = ax_1 + b$   
 $x_1 = \text{Product net weight}$
  
- **Benefits-and-Loads Stage:**  $y = ax_1 + b$   
 $x_1 = \text{Packaging weight (kg)}$

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	e
GWP-total	2.13E+00	-1.79E+01	-1.64E+07	8.61E+08	1.01E+00
GWP-fossil	2.16E+00	-1.52E+01	-1.52E+07	8.01E+08	9.26E-01
GWP-biogenic	-3.40E-02	-2.70E+00	-1.12E+06	5.91E+07	7.90E-02
GWP-luluc	1.53E-03	-8.19E-03	-1.32E+04	6.96E+05	6.33E-04
ODP	6.49E-07	-3.54E-06	-3.33E+00	1.75E+02	1.12E-07
AP	8.95E-03	-5.95E-02	-6.11E+04	3.22E+06	3.39E-03
EP-freshwater	5.79E-04	-4.42E-03	-4.76E+03	2.50E+05	2.23E-04
EP-marine	1.78E-03	-1.24E-02	-1.35E+04	7.12E+05	6.94E-04
EP-terrestrial	1.86E-02	-1.20E-01	-1.29E+05	6.80E+06	6.76E-03
POCP	8.66E-03	-5.53E-02	-5.73E+04	3.02E+06	2.99E-03
ADP-minerals & metals	2.27E-05	-1.53E-04	-1.47E+02	7.75E+03	5.47E-06
ADP-fossil	4.37E+01	-2.95E+02	-2.91E+08	1.53E+10	1.60E+01
WDP	8.69E-01	-5.12E+00	-5.11E+06	2.69E+08	4.48E-01
Tot PE	4.61E+01	-2.89E+02	-3.09E+08	1.63E+10	1.89E+01
PERE	1.81E+00	-7.81E+00	-6.30E+06	9.73E+08	2.87E+00
PERM	6.38E-01	1.37E+01	-6.88E+04	3.62E+06	-5.80E-04
PERT	2.44E+00	5.88E+00	-1.86E+07	9.76E+08	2.87E+00
PENRE	2.64E+01	-2.05E+02	-2.06E+08	1.08E+10	1.33E+01
PENRM	1.73E+01	-9.01E+01	-8.47E+07	4.46E+09	2.65E+00
PENRT	4.37E+01	-2.95E+02	-2.91E+08	1.53E+10	1.60E+01
SM	0.00E+00	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	0.00E+00
NRSF	0.00E+00	0.00E+00	-3.94E+06	0.00E+00	0.00E+00
FW	1.39E-02	-1.06E-01	-1.11E+05	5.83E+06	1.15E-02
HWD	9.48E-04	-5.52E-03	-5.25E+03	2.76E+05	1.90E-04
N-HWD	-6.01E-02	-6.39E+00	-6.30E+06	3.32E+08	2.42E-01
RWD	2.48E-05	-3.95E-04	-4.03E+02	2.12E+04	2.68E-05
CfRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MfR	-2.11E-01	-4.21E+00	-3.94E+06	2.07E+08	1.46E-01
MfER	0.00E+00	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	0.00E+00
Efp	9.07E-08	-6.17E-07	-6.45E-01	3.39E+01	2.81E-08
IrHH	9.77E-02	-1.54E+00	-1.58E+06	8.30E+07	1.03E-01
ETX FW	1.69E+01	-1.15E+02	-1.14E+08	6.00E+09	4.61E+00
HTX CE	8.93E-09	-7.58E-08	-7.57E-02	3.98E+00	3.37E-09
HTX N-CE	2.20E-08	-1.61E-07	-1.65E-01	8.68E+00	7.21E-09
IrLS	1.22E+01	8.09E+01	-6.30E+07	3.31E+09	3.26E+00
Biogenic Carbon-product	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-05
Biogenic Carbon-packaging	2.08E-02	4.50E-01	-1.19E+03	6.24E+04	-1.00E-05

# Extrapolation Factors

## Manufacturing stage – Cluster 2

Indicator	a	b	c	d	e
GWP-total	4.62E+00	-8.31E-01	-1.32E+06	6.95E+07	5.53E-01
GWP-fossil	4.48E+00	6.84E-01	-1.23E+06	6.48E+07	5.05E-01
GWP-biogenic	1.37E-01	-1.52E+00	-8.93E+04	4.70E+06	4.78E-02
GWP-luluc	3.54E-03	5.60E-03	-1.07E+03	5.63E+04	2.68E-04
ODP	1.16E-06	-5.67E-08	-2.69E-01	1.41E+01	1.97E-08
AP	1.82E-02	4.20E-03	-4.94E+03	2.60E+05	1.70E-03
EP-freshwater	1.30E-03	5.49E-04	-3.84E+02	2.02E+04	9.10E-05
EP-marine	3.84E-03	1.67E-03	-1.09E+03	5.76E+04	3.20E-04
EP-terrestrial	3.82E-02	1.51E-02	-1.05E+04	5.50E+05	3.19E-03
POCP	1.74E-02	4.50E-03	-4.64E+03	2.44E+05	1.41E-03
ADP-minerals & metals	4.51E-05	1.01E-06	-1.19E+01	6.25E+02	1.40E-06
ADP-fossil	8.79E+01	8.73E+00	-2.35E+07	1.24E+09	7.95E+00
WDP	1.65E+00	2.15E-01	-4.13E+05	2.18E+07	3.06E-01
Tot PE	9.31E+01	3.39E+01	-2.50E+07	1.32E+09	1.03E+01
PERE	4.61E+00	1.15E+01	-5.10E+05	7.88E+07	2.36E+00
PERM	6.41E-01	1.37E+01	-2.16E+04	1.14E+06	-1.47E-03
PERT	5.25E+00	2.52E+01	-1.52E+06	7.99E+07	2.36E+00
PENRE	5.77E+01	1.04E+01	-1.67E+07	8.77E+08	7.64E+00
PENRM	3.01E+01	-1.68E+00	-6.82E+06	3.59E+08	3.03E-01
PENRT	8.79E+01	8.75E+00	-2.35E+07	1.24E+09	7.95E+00
SM	0.00E+00	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	0.00E+00
NRSF	0.00E+00	0.00E+00	-3.17E+05	0.00E+00	0.00E+00
FW	3.08E-02	9.38E-03	-8.96E+03	4.72E+05	8.41E-03
HWD	1.75E-03	-3.29E-05	-4.24E+02	2.23E+04	4.49E-05
N-HWD	8.98E-01	1.89E-01	-5.10E+05	2.68E+07	6.80E-02
RWD	8.60E-05	2.60E-05	-3.26E+01	1.71E+03	1.56E-05
CfRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MfR	3.88E-01	-9.26E-02	-3.17E+05	1.67E+07	3.66E-02
MfER	0.00E+00	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	0.00E+00
Efp	1.89E-07	5.47E-08	-5.23E-02	2.75E+00	1.03E-08
IrHH	3.37E-01	1.01E-01	-1.27E+05	6.70E+06	5.94E-02
ETX FW	3.43E+01	4.37E+00	-9.20E+06	4.84E+08	1.46E+00
HTX CE	2.04E-08	3.26E-09	-6.12E-03	3.22E-01	1.28E-09
HTX N-CE	4.71E-08	1.12E-08	-1.33E-02	7.02E-01	2.65E-09
IrLS	2.17E+01	1.46E+02	-5.21E+06	2.74E+08	1.52E+00
Biogenic Carbon-product	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-05
Biogenic Carbon-packaging	2.08E-02	4.50E-01	-3.72E+02	1.96E+04	-2.53E-05

# Extrapolation Factors

## Manufacturing stage – Cluster 3

Indicator	a	b
GWP-total	-5.60E-01	2.83E+00
GWP-fossil	9.00E-01	1.86E+00
GWP-biogenic	-1.46E+00	9.70E-01
GWP-luluc	4.82E-03	-1.33E-03
ODP	1.92E-08	5.36E-07
AP	4.74E-03	6.60E-03
EP-freshwater	5.28E-04	2.97E-04
EP-marine	1.66E-03	8.97E-04
EP-terrestrial	1.55E-02	9.98E-03
POCP	5.22E-03	5.71E-03
ADP-minerals & metals	3.95E-06	1.86E-05
ADP-fossil	1.38E+01	3.75E+01
WDP	2.93E-01	8.57E-01
Tot PE	3.81E+01	2.71E+01
PERE	1.03E+01	-2.28E+00
PERM	1.40E+01	-8.14E+00
PERT	2.43E+01	-1.04E+01
PENRE	1.32E+01	2.36E+01
PENRM	5.72E-01	1.39E+01
PENRT	1.38E+01	3.75E+01
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	1.02E-02	1.49E-02
HWD	8.56E-05	7.78E-04
N-HWD	3.11E-01	8.53E-02
RWD	2.89E-05	2.83E-05
CfRU	0.00E+00	0.00E+00
MfR	0.00E+00	6.11E-02
MfER	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00
Efp	6.21E-08	5.26E-08
IrHH	1.13E-01	1.10E-01
ETX FW	6.14E+00	1.25E+01
HTX CE	5.36E-09	6.47E-09
HTX N-CE	1.25E-08	1.47E-08
IrLS	1.44E+02	-7.70E+01
Biogenic Carbon-product	0.00E+00	1.04E-05
Biogenic Carbon-packaging	4.59E-01	-2.68E-01

# Extrapolation Factors

## Manufacturing stage – Cluster 4

Indicator	a	b
GWP-total	-6.31E-01	4.21E+00
GWP-fossil	8.20E-01	2.71E+00
GWP-biogenic	-1.45E+00	1.50E+00
GWP-luluc	4.02E-03	-1.45E-03
ODP	1.76E-08	8.34E-07
AP	4.21E-03	9.90E-03
EP-freshwater	4.34E-04	5.06E-04
EP-marine	1.45E-03	1.43E-03
EP-terrestrial	1.38E-02	1.54E-02
POCP	4.86E-03	8.49E-03
ADP-minerals & metals	3.64E-06	2.87E-05
ADP-fossil	1.28E+01	5.52E+01
WDP	2.73E-01	1.19E+00
Tot PE	3.64E+01	3.80E+01
PERE	9.22E+00	-3.87E+00
PERM	1.44E+01	-1.34E+01
PERT	2.36E+01	-1.72E+01
PENRE	1.20E+01	3.38E+01
PENRM	7.80E-01	2.14E+01
PENRT	1.28E+01	5.52E+01
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	9.22E-03	1.95E-02
HWD	8.63E-05	1.20E-03
N-HWD	2.97E-01	9.41E-02
RWD	2.45E-05	3.94E-05
CfRU	0.00E+00	0.00E+00
MfR	0.00E+00	6.51E-02
MfER	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00
Efp	5.81E-08	8.00E-08
IrHH	9.57E-02	1.53E-01
ETX FW	5.57E+00	1.93E+01
HTX CE	5.72E-09	8.94E-09
HTX N-CE	1.08E-08	2.33E-08
IrLS	1.42E+02	-1.22E+02
Biogenic Carbon-product	0.00E+00	1.04E-05
Biogenic Carbon-packaging	4.70E-01	-4.37E-01

# Extrapolation Factors

## Distribution stage – All clusters

Indicator	a	b
GWP-total	2.31E-01	7.26E-12
GWP-fossil	2.31E-01	9.90E-14
GWP-biogenic	1.20E-04	2.82E-13
GWP-luluc	7.95E-05	-3.16E-13
ODP	4.67E-09	-1.29E-19
AP	9.21E-04	-2.78E-13
EP-freshwater	1.58E-05	9.02E-15
EP-marine	3.45E-04	7.79E-14
EP-terrestrial	3.76E-03	5.48E-14
POCP	1.45E-03	-7.70E-15
ADP-minerals & metals	6.27E-07	-7.16E-14
ADP-fossil	3.36E+00	-1.35E-10
WDP	1.60E-02	1.71E-12
Tot PE	3.42E+00	-1.12E-10
PERE	5.18E-02	-3.67E-12
PERM	0.00E+00	0.00E+00
PERT	5.18E-02	-3.67E-12
PENRE	3.36E+00	1.15E-10
PENRM	0.00E+00	0.00E+00
PENRT	3.36E+00	1.15E-10
SM	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00
FW	5.04E-04	-9.78E-14
HWD	2.21E-05	-1.81E-13
N-HWD	2.88E-01	-1.56E-11
RWD	1.01E-06	6.24E-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	2.35E-08	-3.66E-14
IrHH	4.09E-03	9.77E-14
ETX FW	7.97E-01	2.64E-11
HTX CE	1.44E-09	-2.77E-20
HTX N-CE	2.17E-09	1.38E-19
IrLS	3.39E+00	-8.38E-11
Biogenic Carbon-product	0.00E+00	0.00E+00
Biogenic Carbon-packaging	0.00E+00	0.00E+00

# Extrapolation Factors

## Installation stage – All clusters

Indicator	a	b	c
GWP-total	2.43E+00	1.53E+00	-2.50E-04
GWP-fossil	7.47E-01	5.25E-02	-4.31E-05
GWP-biogenic	1.67E+00	1.48E+00	-2.05E-04
GWP-luluc	4.91E-03	-8.37E-05	-1.99E-06
ODP	1.59E-08	5.67E-10	-1.42E-12
AP	4.17E-03	1.61E-04	-2.91E-07
EP-freshwater	5.14E-04	8.19E-06	-2.17E-08
EP-marine	1.61E-03	1.92E-04	-1.75E-07
EP-terrestrial	1.35E-02	6.99E-04	-7.26E-07
POCP	4.29E-03	2.41E-04	-1.94E-07
ADP-minerals & metals	3.29E-06	8.06E-08	-4.61E-10
ADP-fossil	1.10E+01	4.60E-01	-5.55E-04
WDP	2.45E-01	-5.44E-04	-3.86E-05
Tot PE	3.10E+01	4.72E-01	-8.70E-04
PERE	1.99E+01	1.22E-02	-7.71E-05
PERM	0.00E+00	0.00E+00	0.00E+00
PERT	1.99E+01	1.22E-02	-3.12E-04
PENRE	1.11E+01	4.60E-01	-5.58E-04
PENRM	0.00E+00	0.00E+00	0.00E+00
PENRT	1.11E+01	4.60E-01	-5.58E-04
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	-5.90E-05
FW	8.77E-03	-1.65E-03	-2.10E-06
HWD	5.65E-05	3.39E-06	-3.15E-09
N-HWD	1.15E+00	7.21E-01	-7.71E-05
RWD	2.71E-05	6.64E-07	-8.67E-10
CfRU	0.00E+00	0.00E+00	0.00E+00
MfR	8.28E-01	3.15E-01	-5.90E-05
MfER	0.00E+00	0.00E+00	0.00E+00
EE	5.43E-01	1.73E+00	-3.39E-05
Efp	5.00E-08	3.00E-09	-3.34E-12
IrHH	1.06E-01	2.62E-03	-3.29E-06
ETX FW	5.80E+00	1.28E-01	-9.56E-04
HTX CE	3.56E-09	2.63E-10	-1.60E-13
HTX N-CE	1.19E-08	7.57E-10	-1.35E-12
IrLS	1.14E+02	4.90E-01	-2.82E-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

# Extrapolation Factors

## End-of-life stage – All clusters

Indicator	a	b
GWP-total	2.05E+00	2.65E-04
GWP-fossil	2.04E+00	2.64E-04
GWP-biogenic	6.77E-03	3.65E-07
GWP-luluc	1.17E-04	1.09E-08
ODP	6.64E-09	4.62E-13
AP	1.01E-03	1.14E-07
EP-freshwater	8.13E-05	7.24E-09
EP-marine	3.51E-04	3.93E-08
EP-terrestrial	3.00E-03	4.02E-07
POCP	1.13E-03	1.31E-07
ADP-minerals & metals	1.27E-06	1.04E-10
ADP-fossil	2.92E+00	2.74E-04
WDP	1.20E-01	-5.42E-06
Tot PE	3.31E+00	2.94E-04
PERE	3.83E-01	2.06E-05
PERM	0.00E+00	0.00E+00
PERT	3.83E-01	2.06E-05
PENRE	2.92E+00	2.74E-04
PENRM	0.00E+00	0.00E+00
PENRT	2.92E+00	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	6.18E-02	2.86E-06
HWD	8.29E-05	9.88E-09
N-HWD	1.54E-01	4.30E-05
RWD	5.63E-06	3.70E-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	8.07E-09	1.29E-12
IrHH	2.19E-02	1.42E-06
ETX FW	1.23E+02	4.79E-03
HTX CE	1.29E-09	1.39E-13
HTX N-CE	7.13E-09	4.26E-13
IrLS	1.22E+00	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	1.02E-04
GWP-fossil	-2.62E-01	1.02E-04
GWP-biogenic	-2.56E-04	9.93E-08
GWP-luluc	-2.58E-04	1.00E-07
ODP	-2.38E-09	9.18E-13
AP	-9.78E-04	3.79E-07
EP-freshwater	-8.24E-05	3.20E-08
EP-marine	-2.09E-04	8.09E-08
EP-terrestrial	-2.12E-03	8.21E-07
POCP	-7.35E-04	2.85E-07
ADP-minerals & metals	-1.07E-07	4.15E-11
ADP-fossil	-3.62E+00	1.40E-03
WDP	-3.29E-02	1.28E-05
Tot PE	-3.91E+00	1.51E-03
PERE	-2.93E-01	1.14E-04
PERM	0.00E+00	0.00E+00
PERT	-2.93E-01	1.14E-04
PENRE	-3.62E+00	1.40E-03
PENRM	0.00E+00	0.00E+00
PENRT	-3.62E+00	1.40E-03
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	4.96E-07
HWD	-9.74E-06	3.76E-09
N-HWD	-4.75E-03	1.84E-06
RWD	-6.37E-06	2.47E-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	3.31E-12
IrHH	-2.61E-02	1.01E-05
ETX FW	-5.10E-01	1.98E-04
HTX CE	-3.14E-10	1.21E-13
HTX N-CE	-1.07E-09	4.13E-13
IrLS	-3.84E-01	1.49E-04
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 reaching 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

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[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

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[5] ISO 14044:2006 - Environmental management - Life cycle assessment - Requirements and guidelines

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