USB-C POWER ADAPTER COVER PLATES FAMILY

PEP ecopassport®

Product Environmental Profile

Registration number:	**ABBG-00497-V01.01-EN**	Drafting rules:	**PCR-ed4-EN-2021 09 06**
Contact information:	**Pia Denninghoff, pia.denninghoff@de.abb.com**	Supplemented by:	**PSR-0005-ed3.1-EN-2023 12 08**
Verifier accreditation number:	**VH45**	Information and reference documents:	**www.pep-ecopassport.org**
Date of issue:	**December-25**	Validity period:	**5 years**

Independent verification of the declaration and data in compliance with ISO 14025: 2006

Internal: ☐ **External:** ☒ x

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"

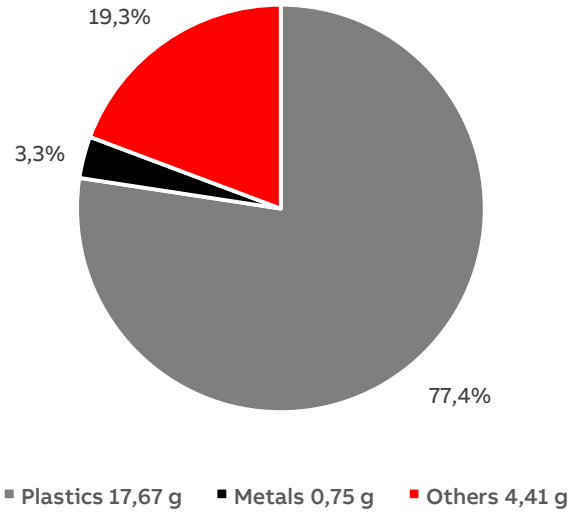
ABB Purpose & Embedding Sustainability

ABB is committed to continually promoting and embedding sustainability across its operations and value chain, aspiring to become a role model for others to follow.
With its ABB Purpose, ABB is focusing on reducing harmful emissions, preserving natural resources and championing ethical and humane behavior.
The contect of this PEP cannot be compared with the content based on another program/database.
Scan QR code for more information

General information

Reference product	One cover plate for USB C power adapter 6479-84 (2CKA006400A0449) and its primary packaging.
Description of the product	Cover plate for USB C power adapter 6479-84 (2CKA006400A0449). The main function of the reference product is to protect people for 20 years against direct contact with live parts of the electrical socket
Functional unit	Protect people for 20 years against direct contact with live parts of the electrical socket. The reference service life of the product is 20 years.
Other products covered	The remaining products covered by the PEP are presented in the table "General characteristics of all variants of products covered by the PEP".
Manufacturing address	ABB AG BUSCH-JAEGER Freisenbergstr. 2 58513 Lüdenscheid GERMANY

Constituent Materials



Total weight of reference product and packaging	**22,8**	**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%
PC	53,4	**Low alloyed steel**	3,3	**Cardboard**	19,3
PA6	19,2				
LDPE foil	4,8				

RoHS and REACH compatability and other information about the products materials (i.e. halogen free, recyclability).

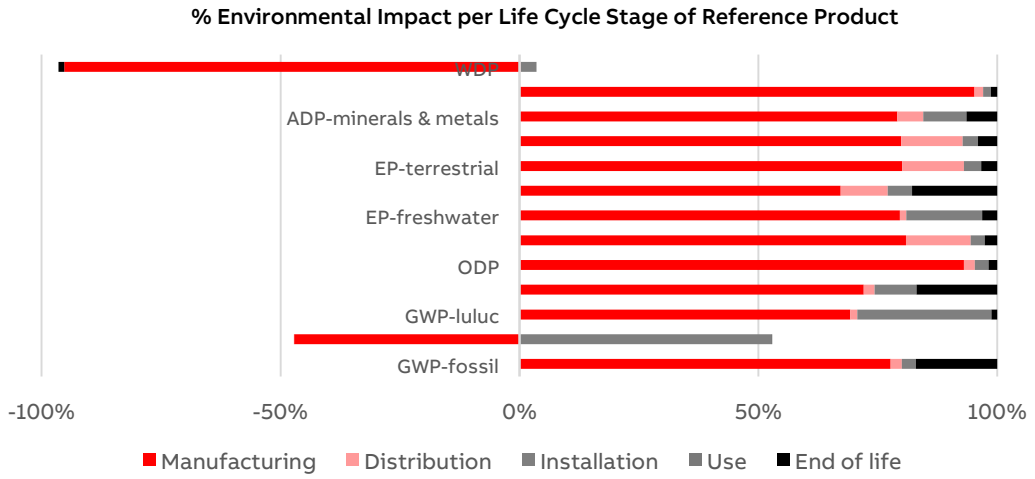
Additional Information

Manufacturing	The production of reference product (2CKA006400A0449) occurs at the ABB AG factory located in Aue, Germany. The final product is assembled and packaged at the ABB AG factory in Lüdenscheid, which serves as the last logistic platform for the reference product.
Distribution	The distribution stage involves transporting the reference product from the last logistic platform of ABB AG to its installation site. This transport scenario is estimated based on the concentration of the market for the reference product group, utilizing sales data for the products within that group.
Installation	During installation, the disposal of packaging was considered.
Use	No energy consumption, no maintenance operations needed.
End of life	The end-of-life scenario for the reference product is created according to the recommendations given in the PEP PCR-ed4-EN-2021 09 06 document.
Benefits and loads beyond the system boundaries	Benefits and loads beyond the system boundaries (Module D) have been considered.

Environmental Impacts

Reference lifetime	20 years
Product category	Other equipment family in accordance with: - PEP PCR-ed4-EN-2021 09 06 - PEP PSR 0005-ed3.1-EN-2023 12 08
Installation elements	No installation materials are required in the life cycle of the product.
Use scenario	No material and energy consumption occur during the use stage. No maintenance phase is planned.
Geographical representativeness	Europe
Technological representativeness	Technological representativeness
Software and database used	SimaPro 9.5.0.1 & Ecoinvent 3.9
Energy model used	
Manufacturing	A specyfic ABB AG (Busch-Jaeger) energy mix has been used.
Installation	Non-applicable
Use	Non-applicable
End of life	Recycling of product and packaging (Europe).

Common base of mandatory indicators



Environmental impact indicators

Indicator		Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
GWP	Total	kg CO2 eq.	1,32E-01	9,48E-02	3,06E-03	1,15E-02	0,00E+00	2,23E-02	-8,14E-03
	Fossil	kg CO2 eq.	1,31E-01	1,02E-01	3,06E-03	3,87E-03	0,00E+00	2,23E-02	-1,39E-02
	Biogenic	kg CO2 eq.	8,20E-04	-6,77E-03	-2,27E-07	7,59E-03	0,00E+00	6,45E-06	5,76E-03
	Luluc	kg CO2 eq.	7,68E-05	5,31E-05	1,14E-06	2,16E-05	0,00E+00	9,24E-07	-3,07E-05
ODP		kg CFC-11 eq.	2,36E-09	2,19E-09	5,34E-11	6,73E-11	0,00E+00	4,35E-11	-3,58E-10
AP		H+ eq.	3,44E-04	2,78E-04	4,66E-05	1,02E-05	0,00E+00	8,96E-06	-7,02E-05
EP	Freshwater	kg P eq.	9,47E-06	7,54E-06	1,22E-07	1,51E-06	0,00E+00	2,98E-07	-5,86E-06
	Marine	kg N eq.	1,16E-04	7,82E-05	1,15E-05	5,87E-06	0,00E+00	2,08E-05	-1,76E-05
	Terrestrial	mol N eq.	9,85E-04	7,89E-04	1,27E-04	3,54E-05	0,00E+00	3,31E-05	-1,75E-04
POCP		kg NMVOC eq.	2,89E-04	2,31E-04	3,74E-05	9,16E-06	0,00E+00	1,17E-05	-6,03E-05
ADP	Minerals & metals	kg SB eq.	1,12E-07	8,85E-08	6,08E-09	1,01E-08	0,00E+00	7,24E-09	-4,13E-08
	Fossil	MJ	2,22E+00	2,12E+00	3,99E-02	3,50E-02	0,00E+00	3,06E-02	-2,45E-01
WDP		m³ eq. depr.	-3,60E-02	-3,69E-02	1,03E-04	1,26E-03	0,00E+00	-4,69E-04	-3,29E-03

Resource use indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
PERE	MJ	4,82E-01	4,74E-01	3,42E-04	6,02E-03	0,00E+00	1,07E-03	-1,02E-01
PERM	MJ	1,51E-01	1,51E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,10E-01
PERT	MJ	6,32E-01	6,25E-01	3,42E-04	6,02E-03	0,00E+00	1,07E-03	-2,11E-01
PENRE	MJ	2,22E+00	2,12E+00	3,99E-02	3,50E-02	0,00E+00	3,06E-02	-2,45E-01
PENRM	MJ	6,10E-01	6,10E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,11E-02
PENRT	MJ	2,83E+00	2,73E+00	3,99E-02	3,50E-02	0,00E+00	3,06E-02	-2,66E-01

Common base of mandatory indicators

Use of secondary materials, water, and energy resources

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
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	1,27E-03	1,22E-03	3,31E-06	4,37E-05	0,00E+00	-1,34E-06	-1,35E-04

Waste category indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
HWD	kg	2,12E-03	1,44E-03	3,66E-05	1,25E-04	0,00E+00	5,20E-04	-7,86E-04
N-HWD	kg	1,29E-01	7,32E-02	3,41E-04	5,65E-03	0,00E+00	5,03E-02	-8,80E-03
RWD	kg	4,37E-07	3,46E-07	5,95E-09	6,04E-08	0,00E+00	2,52E-08	-6,65E-07

Output flow indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
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	4,85E-03	1,83E-04	0,00E+00	4,06E-03	0,00E+00	6,10E-04	0,00E+00
MfER	kg	1,05E-02	1,44E-03	0,00E+00	8,03E-04	0,00E+00	8,28E-03	-2,25E-05
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Other indicators

Indicator		Unit	Total
Biogenic Carbon	Product	kg of C	0,00E+00
	Packaging	kg of C	1,83E-03

Optional indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
Tot PE	MJ	3,46E+00	3,35E+00	4,02E-02	4,10E-02	0,00E+00	3,16E-02	-4,77E-01
Efp	Dise inc	2,60E-09	2,15E-09	1,67E-10	9,42E-11	0,00E+00	1,85E-10	-4,63E-10
IrHH	kBq U-235 eq	5,42E-03	5,06E-03	2,41E-05	2,36E-04	0,00E+00	9,91E-05	-2,60E-03
ETX FW	CTUe	9,29E-01	7,99E-01	7,58E-03	4,80E-02	0,00E+00	7,45E-02	-1,46E-01
HTX CE	CTUh	7,46E-10	7,03E-10	1,57E-11	9,24E-12	0,00E+00	1,75E-11	-4,06E-10
HTX N-CE	CTUh	3,57E-10	1,89E-10	2,07E-11	4,95E-11	0,00E+00	9,79E-11	-9,93E-11
IrLS	Pt	8,40E-01	8,03E-01	3,11E-03	2,50E-02	0,00E+00	9,00E-03	-4,94E-01

Extrapolation Factors

The LCA calculations were made for all representative products of products' variations groups. Based on LCA results extrapolation factors can be obtained for each individual environmental indicator. Thus, the extrapolation factors are calculated as a simple ratio of the indicator's value of representative product of products' variations groups to the value obtained for the reference product LCIA. The values of extrapolation factors for total impact score, manufacturing, distribution, installation, use and end of life stages and Module D are listed below.

Based on the LCIA calculations, most environmental indicator values for each life cycle phase for each product from product family, can be calculated using the following formula:

$$y = a * x_0$$

Where:

- y is the score of chosen environmental impact category
- a is the extrapolation factor (slope of linear function)
- x_0 is the score of chosen environmental impact category of the reference product

Values of "Secondary materials" for products containing secondary materials, can be calculated using the following formula:

$$y = a * x_0 + b$$

Where:

- y is the score of chosen environmental impact category
- a is the extrapolation factor (slope of linear function)
- x_0 is the score of chosen environmental impact category of the reference product
- b is the extrapolation factor (y-intercept of linear function)

Extrapolation Factors

General characteristics of all product variations covered by the PEP

Variation	Product code	Product type	Material
01	**2CKA006400A0439**	6479-214	Standard PC
	2CKA006400A0438	6479-212	
	2CKA006400A0440	6479-214-510	
02	**2CKA006400A0441**	6479-914	Standard PC
	2CKA006400A0442	6479-916-510	
03	**2CKA006400A0449**	6479-84	**Reference product**
	2CKA006400A0443	6479-81	Standard PC
	2CKA006400A0444	6479-81-500	
	2CKA006400A0445	6479-82	
	2CKA006400A0446	6479-82-500	
	2CKA006400A0450	6479-84-500	
04	**2CKA006400A0453**	6479-885	Standard PC
	2CKA006400A0447	6479-83	
	2CKA006400A0448	6479-83-500	
	2CKA006400A0451	6479-884	
	2CKA006400A0452	6479-884-500	
	2CKA006400A0454	6479-885-500	
05	**2CKA006400A0455**	6479-866	Standard PC GF10
	2CKA006400A0456	6479-866-500	Stainless steel
06	**2CKA006400A0457**	6479-44G	Recycled PC (93%)
	2CKA006400A0458	6479-44M	
07	**2CKA006400A0459**	6479-45M	Recycled PC (98%)
08	**2CKA006400A0465**	6479-915	Recycled PC (98%)

Extrapolation Factors

Values of 'a' scaling factor to calculate total environmental impact score for all products' family in alternative life cycle scenario.

-	VARIATION							
Impact category	03 (ref.)	01	02	04	05	06	07	08
GWP-total	1,00	0,83	0,86	1,00	2,05	0,67	0,65	0,59
GWP-fossil	1,00	0,83	0,86	1,00	2,05	0,67	0,65	0,59
GWP-biogenic	1,00	0,89	0,91	1,00	2,39	0,81	0,89	0,85
GWP-luluc	1,00	0,91	0,93	1,00	2,36	0,77	0,76	0,74
ODP	1,00	0,84	0,87	1,00	1,52	0,61	0,59	0,55
AP	1,00	0,88	0,90	1,00	3,15	0,77	0,75	0,71
EP-freshwater	1,00	0,97	0,97	1,00	6,06	0,98	0,97	0,95
EP-marine	1,00	0,86	0,89	1,00	2,19	0,82	0,81	0,73
EP-terrestrial	1,00	0,88	0,90	1,00	2,50	0,77	0,76	0,71
POCP	1,00	0,88	0,90	1,00	2,67	0,80	0,78	0,73
ADP-minerals	1,00	0,93	0,94	1,02	28,17	0,96	0,96	0,90
ADP-fossils	1,00	0,81	0,84	1,00	1,66	0,47	0,44	0,42
WDP	1,00	1,08	1,06	1,00	0,15	1,25	1,26	1,26
PERE	1,00	0,82	0,85	1,01	2,05	0,88	0,88	0,74
PERM	1,00	0,98	0,98	1,00	1,06	1,00	1,00	0,98
PERT	1,00	0,86	0,89	1,01	1,81	0,91	0,91	0,80
PENRE	1,00	0,81	0,84	1,00	1,66	0,47	0,44	0,42
PENRM	1,00	0,79	0,83	1,00	0,85	0,37	0,34	0,33
PENRT	1,00	0,80	0,84	1,00	1,48	0,45	0,42	0,40
SM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,00	0,59	0,66	1,02	2,92	0,90	0,91	0,53
HWD	1,00	0,94	0,95	1,00	49,92	1,01	1,01	0,95
NHWD	1,00	0,82	0,85	1,02	2,35	1,04	1,05	0,86
RWD	1,00	0,97	0,98	1,00	7,34	1,00	1,00	0,98
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,00	1,00	1,00	1,00	4,33	1,00	1,00	1,00
MER	1,00	0,79	0,83	1,00	0,92	1,04	1,04	0,82
EE	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, product	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, packaging	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

Extrapolation Factors

Values of ‘a’ scaling factor to calculate manufacturing stage environmental impact score for all products’ family in alternative life cycle scenario.

-	VARIATION							
Impact category	03 (ref.)	01	02	04	05	06	07	08
GWP-total	1,00	0,83	0,86	1,00	2,39	0,54	0,51	0,48
GWP-fossil	1,00	0,84	0,87	1,00	2,28	0,57	0,54	0,52
GWP-biogenic	1,00	1,01	1,01	1,00	0,84	1,02	1,02	1,03
GWP-luluc	1,00	0,87	0,90	1,00	2,79	0,67	0,65	0,63
ODP	1,00	0,84	0,87	1,00	1,50	0,58	0,56	0,53
AP	1,00	0,89	0,91	1,00	3,46	0,71	0,69	0,68
EP-freshwater	1,00	0,97	0,97	1,00	6,91	0,97	0,97	0,94
EP-marine	1,00	0,89	0,92	1,00	2,62	0,72	0,70	0,68
EP-terrestrial	1,00	0,89	0,91	1,00	2,69	0,71	0,69	0,68
POCP	1,00	0,89	0,91	1,00	2,89	0,74	0,72	0,70
ADP-minerals	1,00	0,94	0,94	1,02	34,89	0,94	0,94	0,89
ADP-fossils	1,00	0,80	0,84	1,00	1,63	0,44	0,41	0,39
WDP	1,00	1,08	1,06	1,00	0,26	1,24	1,25	1,26
PERE	1,00	0,82	0,85	1,01	2,03	0,88	0,88	0,74
PERM	1,00	0,98	0,98	1,00	1,06	1,00	1,00	0,98
PERT	1,00	0,86	0,88	1,01	1,80	0,91	0,91	0,80
PENRE	1,00	0,80	0,84	1,00	1,63	0,44	0,41	0,39
PENRM	1,00	0,79	0,83	1,00	0,85	0,37	0,34	0,33
PENRT	1,00	0,80	0,84	1,00	1,45	0,43	0,39	0,38
SM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,00	0,57	0,65	1,02	2,90	0,90	0,90	0,51
HWD	1,00	0,97	0,98	1,00	70,23	1,01	1,01	0,98
NHWD	1,00	0,86	0,88	1,03	3,43	1,04	1,06	0,89
RWD	1,00	0,97	0,98	1,00	7,88	1,00	1,00	0,98
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,00	1,00	1,00	1,00	21,38	1,00	1,00	1,00
MER	1,00	0,97	1,00	1,00	0,99	1,03	1,03	0,95
EE	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, product	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, packaging	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

Extrapolation Factors

Values of ‘a’ scaling factor to calculate distribution stage for all products’ family in alternative life cycle scenario.

-	VARIATION							
Impact category	03 (ref.)	01	02	04	05	06	07	08
GWP-total	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
GWP-fossil	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
GWP-biogenic	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
GWP-luluc	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
ODP	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
AP	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
EP-freshwater	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
EP-marine	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
EP-terrestrial	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
POCP	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
ADP-minerals	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
ADP-fossils	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
WDP	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
PERE	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
PERM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PERT	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
PENRE	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
PENRM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PENRT	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
SM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
HWD	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
NHWD	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
RWD	1,00	0,81	0,85	1,00	1,61	1,03	1,03	0,84
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MER	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EE	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, product	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, packaging	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

Extrapolation Factors

Values of ‘a’ scaling factor to calculate installation stage for all products’ family in alternative life cycle scenario.

-	VARIATION							
Impact category	03 (ref.)	01	02	04	05	06	07	08
GWP-total	1,00	1,00	1,00	1,00	1,00	1,00	1,01	1,01
GWP-fossil	1,00	1,00	1,00	1,00	1,00	1,00	1,01	1,01
GWP-biogenic	1,00	1,00	1,00	1,00	1,00	1,00	1,01	1,01
GWP-luluc	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
ODP	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
AP	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EP-freshwater	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EP-marine	1,00	1,00	1,00	1,00	1,00	1,00	1,01	1,01
EP-terrestrial	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
POCP	1,00	1,00	1,00	1,00	1,00	1,00	1,01	1,01
ADP-minerals	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
ADP-fossils	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
WDP	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PERE	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PERM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PERT	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PENRE	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PENRM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PENRT	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
SM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
HWD	1,00	1,00	1,00	1,00	1,00	1,00	1,02	1,02
NHWD	1,00	1,00	1,00	1,00	1,00	1,00	1,04	1,04
RWD	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MER	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EE	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, product	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, packaging	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

Extrapolation Factors

Values of ‘a’ scaling factor to calculate end of life stage for all products’ family in alternative life cycle scenario.

-	VARIATION							
Impact category	03 (ref.)	01	02	04	05	06	07	08
GWP-total	1,00	0,75	0,79	1,00	1,24	1,04	1,04	0,79
GWP-fossil	1,00	0,75	0,79	1,00	1,23	1,04	1,04	0,79
GWP-biogenic	1,00	0,91	0,92	1,00	13,94	1,02	1,02	0,92
GWP-luluc	1,00	0,86	0,88	1,00	10,13	1,02	1,02	0,88
ODP	1,00	0,77	0,81	1,00	3,16	1,04	1,04	0,81
AP	1,00	0,78	0,82	1,00	4,11	1,04	1,04	0,82
EP-freshwater	1,00	0,88	0,90	1,00	11,69	1,02	1,02	0,90
EP-marine	1,00	0,74	0,79	1,00	1,21	1,04	1,04	0,79
EP-terrestrial	1,00	0,77	0,81	1,00	2,86	1,04	1,04	0,80
POCP	1,00	0,77	0,81	1,00	2,86	1,04	1,04	0,80
ADP-minerals	1,00	0,81	0,84	1,00	6,11	1,03	1,03	0,84
ADP-fossils	1,00	0,78	0,82	1,00	4,28	1,03	1,03	0,82
WDP	1,00	0,65	0,72	1,00	-5,92	1,06	1,06	0,71
PERE	1,00	0,91	0,93	1,00	14,18	1,01	1,01	0,92
PERM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PERT	1,00	0,91	0,93	1,00	14,18	1,01	1,01	0,92
PENRE	1,00	0,78	0,82	1,00	4,28	1,03	1,03	0,82
PENRM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PENRT	1,00	0,78	0,82	1,00	4,28	1,03	1,03	0,82
SM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,00	-0,26	-0,04	1,00	-78,49	1,20	1,20	-0,06
HWD	1,00	0,84	0,87	1,00	8,98	1,03	1,03	0,87
NHWD	1,00	0,74	0,79	1,00	0,94	1,04	1,04	0,78
RWD	1,00	0,94	0,95	1,00	16,49	1,01	1,01	0,95
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,00	1,00	1,00	1,00	21,38	1,00	1,00	1,00
MER	1,00	0,74	0,79	1,00	0,90	1,04	1,04	0,78
EE	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, product	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, packaging	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

Extrapolation Factors

Values of ‘a’ scaling factor to calculate Module D for all products’ family in alternative life cycle scenario.

-	VARIATION							
Impact category	03 (ref.)	01	02	04	05	06	07	08
GWP-total	1,00	0,79	0,83	1,01	4,82	-4,01	-4,28	-2,72
GWP-fossil	1,00	0,88	0,90	1,00	3,24	-1,93	-2,09	-1,18
GWP-biogenic	1,00	1,01	1,00	1,00	1,00	1,03	1,03	1,02
GWP-luluc	1,00	0,92	0,94	1,00	1,32	0,48	0,46	0,56
ODP	1,00	0,85	0,88	1,00	1,40	-1,38	-1,51	-0,81
AP	1,00	0,93	0,95	1,00	2,74	-0,07	-0,13	0,19
EP-freshwater	1,00	0,88	0,90	1,00	3,35	0,98	0,97	0,87
EP-marine	1,00	0,95	0,96	1,00	2,55	-0,16	-0,23	0,13
EP-terrestrial	1,00	0,95	0,96	1,00	2,69	-0,22	-0,29	0,09
POCP	1,00	0,94	0,95	1,00	2,65	0,08	0,03	0,29
ADP-minerals	1,00	0,95	0,96	1,00	6,33	0,86	0,86	0,86
ADP-fossils	1,00	0,87	0,89	1,00	2,28	-3,44	-3,68	-2,25
WDP	1,00	0,93	0,94	1,00	2,65	-1,46	-1,59	-0,80
PERE	1,00	0,96	0,97	1,00	1,26	0,39	0,35	0,53
PERM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PERT	1,00	0,98	0,98	1,00	1,13	0,70	0,69	0,77
PENRE	1,00	0,87	0,89	1,00	2,28	-3,44	-3,68	-2,25
PENRM	1,00	1,00	1,00	1,00	1,00	-15,81	-16,72	-10,83
PENRT	1,00	0,88	0,90	1,00	2,18	-4,42	-4,72	-2,93
SM	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NRSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
FW	1,00	0,88	0,90	1,00	2,21	-0,43	-0,51	-0,12
HWD	1,00	0,97	0,98	1,00	13,73	1,00	1,00	0,98
NHWD	1,00	0,98	0,99	1,00	3,32	1,00	1,00	0,99
RWD	1,00	0,80	0,84	1,01	1,29	1,03	1,03	0,84
CRU	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MFR	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
MER	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
EE	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, product	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic C, packaging	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

Extrapolation Factors

Values of ‘b’ extrapolation factors to calculate environmental impact score for products containing secondary materials - total.

-	VARIATION		
Impact category	06	07	08
Secondary materials	0,014	0,014	0,010

The remaining values are established as zero.

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	
SM	Use of secondary materials
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Net use of fresh water

Waste category indicators	
HWD	Hazardous waste disposed
N-HWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed

Output flow indicators	
CfRu	Components for re-use
MfR	Materials for recycling
MfER	Materials for energy recovery
EE	Exported Energy

Optional indicators	
Tot PE	Total use of primary energy during the life cycle
Efp	Emissions of Fine particles
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-0005-ed2-EN-2016 03 29” - SPECIFIC RULES FOR Electrical switchgear and control gear Solutions (Circuit breakers)

[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 v3.8 (2022). ecoinvent database version 3.8 - (https://ecoinvent.org/)

[7] SimaPro Software version 9.3.0.3 - PRé Sustainability

[8] UNI EN 15804:2012+A2:2019: Sustainability of constructions - Environmental product declarations (September 2019)

[9] IEC/TR 62635 - Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment - Edition 1.0 2012-10

[10] https://www.ecosystemspa.com/

[11] LB-DT 17-21D - RoHS II (MCCBs and ACBs)

[12] LB-DT 18-21D - REACH (MCCBs and ACBs)

[13] 1SDL000571R0 Ver 01 - RoHS Exemptions (MCCBs and ACBs)

[14] 1SDL000572R0 Ver 01 - SVHC present in excess of 0.1% (MCCBs and ACBs)

