PRODUCTS FAMILY DECLARATION FOR MCB INDUSTRY SERIES OF ABB

PEP ecopassport®

Environmental Product Declaration

Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"

ORGANIZATION	CONTACT INFORMATION
ABB LV Installation Materials Co., Ltd. Beijing	Leon-Lixiong Huang, leon-lixiong.huang@cn.abb.com
ADDRESS	WEBSITE
No.17 Kangding Street, Beijing Economic-Technological Development Area, Beijing, China	https://new.abb.com/cn

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	PEP ecopassport® ABBG-00338-V01.01-EN	1	en	1/15

ABB Purpose & Embedding Sustainability

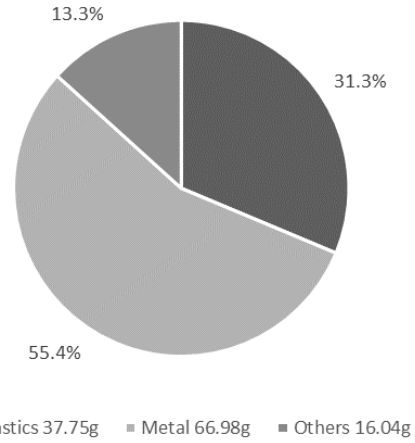
ABB is committed to continually promoting and embedding sustainability across its operations and value chain, aspiring to become a role model for others to follow. With its ABB Purpose, ABB is focusing on reducing harmful emissions, preserving natural resources and championing ethical and humane behavior.

More information on the topic about Sustainability strategy 2030 — ABB Group see the website: “https://global.abb/group/en/sustainability/sustainability-strategy-2030”

General Information

Reference product	The reference product is one unit of Miniature Circuit Breaker (MCB)- produced by ABB, the representative product is S201-C16.
Description of the product	Products are Miniature Circuit Breaker (MCB) products which are terminal distribution protection product with overload and short circuit protection. Different models of products and better electrical performance, comply with IEC/EN 60898-1, IEC/EN 60947-2 and UL1077 allowing their use in residential, commercial, and industrial applications. The representative product is S201-C16, 1 Pole,16A, C Curve, 6KA.
Functional unit of the representative product	Protect the installation from overloads and short circuits in a circuit with rated voltage Ue (230/440 V), rated current In (16A), with Np poles (1p), a rated breaking capacity Icn (6kA) and the tripping curve Cd (C), in the Industrial application area, according to the use scenario of 50% load rate and 30% use rate during the reference service life of the product of 20 years.
Products concerned	The products covered by this PEP are: S200, S200M, S200MDC, S200MUC, S200MUC V, M200M

Constituent materials



Total weight of Reference product	Net weight of the product is 105.29 g. Gross weight of packaged product is 120.77 g (including product packaging and transportation packaging).

Components	**Mass (g)**	**Product weight, incl. product pack (g)**	**Product weight, incl. product pack and transportation pack (g)**
Product	105.29		
Product packaging	8.37	113.66	120.77
Transportation packaging	7.11		

Plastics as % of weight		**Metals as % of weight**		**Other as % of weight**	
Name and CAS number	Weight-%	Name and CAS number	Weight-%	Name and CAS number	Weight-%
PA6	29.3	Steel	50.3	Paper	9.8
Other plastic	2.0	Copper	3.7	Wood	2.9
		Al	1.4	Others	0.6

Additional Environmental Information

Manufacturing	ISO 14001 compliant plant, green energy usage
Distribution	/
Installation	For the installation of the product, only standard tools (electric screw) are needed.
Use	This product requires no servicing, no maintenance or additional products.
End of life	The reference product is assumed to be partly recovery, incineration and landfilled.
Benefits and loads beyond the system boundaries	/

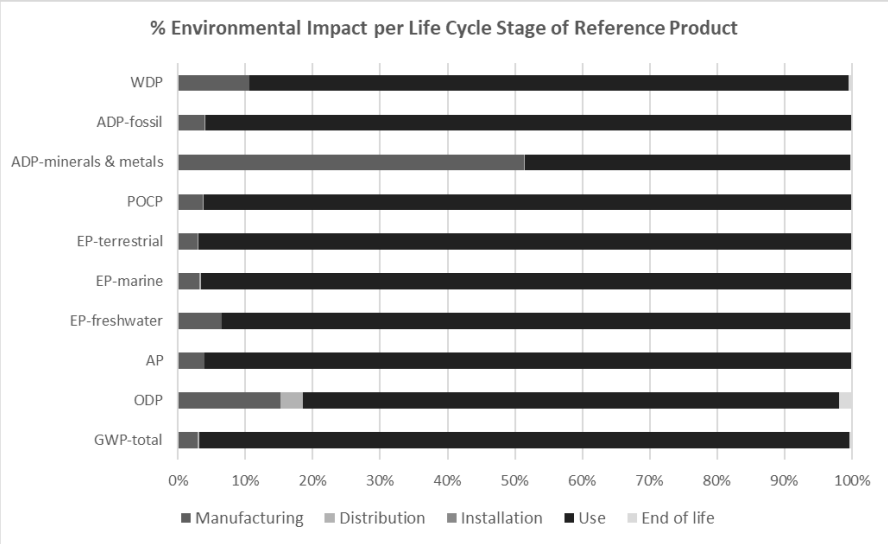
Environmental impacts

Reference lifetime	20 years.
Product category	Circuit Breakers, PSR-0005-ed3-EN-2023 06 06 3.2 Specific rules for the “Circuit-breakers” family
Installation elements	Electric screw is used for installation, not other material is needed.
Use scenario	At loading rate 50% of rated current & use time rate 30% of reference lifetime total energy consumption is 32.07 kWh
Geographical representativeness	The representative product is produced in China and 93.7% used in Chinese and other districts including Brazil (2.1%), Singapore (1.5%), Australia (1.5%), United States (0.7%), and South Africa (0.5%) in year 2022.
Technological representativeness	In the manufacturing stage, specific data was collected to calculate the environmental impact caused by the manufacturing process. For the production of raw materials and parts, datasets from Ecoinvent 3.8 were used. During the dataset selection, the technological representation was considered carefully. Datasets with the same production processes were preferred. If not available, datasets with similar production processes were chosen.
Time representativeness	The generic data were extracted from databases (mainly Ecoinvent). Furthermore, there reference years of these data are between 2011 – 2021 and is valid until 2022 meaning that no data used in the model are older than 10 years.
Software and database used	SimaPro version 9.4.0.4 & databases ecoinvent 3.8 & EF3.0

Energy model used

Manufacturing	Materials and parts production: Global electricity mix Product assembly: Photovoltaic power and hydropower of China
Installation	Global electricity mix
Use	Average electricity mix of China, Brazil, Singapore, Australia, United States, South Africa
End of life	Global electricity mix

Common base of mandatory indicators



Environmental impact indicators

Indicators	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
GWP-total	**kg CO2 eq**	3.57E+01	1.05E+00	5.12E-02	1.37E-02	3.45E+01	1.25E-01	/
GWP-fossil	**kg CO2 eq**	3.55E+01	1.05E+00	4.06E-02	4.73E-04	3.42E+01	1.25E-01	/
GWP-biogenic	**kg CO2 eq**	2.60E-01	8.53E-04	1.06E-02	1.32E-02	2.36E-01	9.45E-05	/
GWP-luluc	**kg CO2 eq**	1.66E-02	9.93E-04	1.70E-05	1.60E-07	1.55E-02	2.26E-05	/
GWP-fossil = Global Warming Potential fossil fuels GWP-biogenic = Global Warming Potential biogenic GWP-luluc = Global Warming Potential land use and land use change								
ODP	**kg CFC11 eq**	2.66E-07	4.03E-08	8.90E-09	5.53E-11	2.12E-07	4.95E-09	/
ODP = Depletion potential of the stratospheric ozone layer								
AP	**mol H+ eq**	1.89E-01	7.29E-03	2.07E-04	3.19E-06	1.81E-01	1.60E-04	/
AP = Acidification potential, Accumulated Exceedance								
EP-freshwater	**kg P eq**	7.70E-03	4.95E-04	3.02E-06	5.30E-08	7.19E-03	1.50E-05	/
EP-marine	**kg N eq**	3.94E-02	1.26E-03	5.93E-05	1.42E-06	3.80E-02	4.65E-05	/
EP-terrestrial	**mol N eq**	4.17E-01	1.20E-02	6.48E-04	1.29E-05	4.03E-01	4.74E-04	/
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment EP-terrestrial = Eutrophication potential, Accumulated Exceedance								
POCP	**kg NMVOC eq**	1.09E-01	3.97E-03	1.92E-04	3.30E-06	1.05E-01	1.38E-04	/
POCP = Formation potential of tropospheric ozone								
ADP-minerals & metals	**kg Sb eq**	2.20E-04	1.13E-04	1.35E-07	1.39E-09	1.06E-04	3.22E-07	/
ADP-fossil	**MJ**	3.21E+02	1.25E+01	5.94E-01	4.47E-03	3.07E+02	4.15E-01	/
ADP-minerals & metals = Abiotic depletion potential for non-fossil resources ADP-fossil = Abiotic depletion for fossil resources potential								
WDP	**m3 world eq. depr.**	4.06E+00	4.28E-01	2.11E-03	3.23E-04	3.61E+00	2.03E-02	/
WDP = Water Deprivation potential								

Common base of mandatory indicators

Inventory flows indicator - Resource use indicators

Indicators	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
PERE	**MJ**	3.44E+01	1.24E+00	6.79E-03	1.44E-04	3.31E+01	1.52E-02	/
PERM	**MJ**	1.99E-01	1.99E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	/
PERT	**MJ**	3.46E+01	1.44E+00	6.79E-03	1.44E-04	3.31E+01	1.52E-02	/
PENRE	**MJ**	3.20E+02	1.14E+01	5.94E-01	4.47E-03	3.07E+02	4.15E-01	/
PENRM	**MJ**	1.16E+00	1.16E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	/
PENRT	**MJ**	3.21E+02	1.25E+01	5.94E-01	4.47E-03	3.07E+02	4.15E-01	/

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials

PERM = Use of renewable primary energy resources used as raw materials

PERT = Total Use of renewable primary energy resources

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials

PENRM = Use of non-renewable primary energy resources used as raw materials

PENRT = Total Use of non-renewable primary energy resources

Inventory flows indicator - Indicators describing the use of secondary materials, water, and energy resources

Indicators	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	/
RSF	**MJ**	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	/
FW	**M^3**	1.12E-01	1.11E-02	6.88E-05	1.08E-05	1.00E-01	5.35E-04	/

SM = Use of secondary material

RSF = Use of renewable secondary fuels

NRSF = Use of non-renewable secondary fuels

FW = Use of net fresh water

Inventory flows indicator – Waste category indicators

Indicators	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
Hazardous waste disposed	**kg**	2.07E-04	1.30E-04	1.52E-06	9.82E-09	6.44E-05	1.12E-05	/
Non-hazardous waste disposed	**Kg**	3.17E+00	2.15E-01	2.94E-02	3.06E-04	2.78E+00	1.43E-01	/
Radioactive waste disposed	**Kg**	2.15E-04	1.92E-05	3.86E-06	1.87E-08	1.89E-04	2.26E-06	/

Common base of mandatory indicators

Inventory flows indicator – Output flow indicators

Indicators	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
Components for reuse	**kg**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	/
Materials for recycling	**Kg**	5.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.25E-02	/
Materials for energy recovery	**Kg**	1.88E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.88E+01	/
Exported energy	**MJ**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	/

Note: In manufacturing stage, the recycled content of raw materials is 0, and scrap value is 30% according to PSR. In EoL stage, recovery rate and disposal rate is based on PCR.

Inventory flow indicator – other indicators

Indicators	Unit	Total	Manufacturing	Distribution	Installa-tion	Use	End of life	Benefits
Biogenic carbon content of the prod-uct	**kg of C**	0.00E+00	/	/	/	/	/	/
Biogenic carbon content of the asso-ciated packaging	**kg of C**	7.37E-03	/	/	/	/	/	/

Note: As no biogenic carbon in the product, thus, only the biogenic carbon in the packaging was calculated. Of the product packaging and packaging for transportation, the materials containing biogenic carbon are wood pallet and paper board.

Family of Products Extrapolation Rules

For other products than the Reference product covered by this PEP, the environmental impacts for each phase of the lifecycle are obtained by multiplying the values of the Reference product by the following coefficients:

The impact for Manufacturing, Distribution, Installation and End of life phases of a product covered by the PEP other than the representative product is proportional to weight of the product, thus, the impacts should be calculated by multiple the coefficient factor_1 by the environmental impact for this phase of the representative product.

The environmental impact for Use phase of a product covered by the PEP other than the representative product is proportional to the amount of the electricity used in use stage, thus, the impacts should be calculated by multiple the coefficient factor_2 by the environmental impact for this phase of the representative product.

Extrapolation rules for Manufacturing, Distribution, Installation and End of life phases (coefficient factor_1)

Pole	Rated Current (A)	S200	S200M	S200MDC, S200MUC V, S200MUC	M200M
1P	0.2 0.3 0.5 0.75 1 1.6 2 3 4 5 6 8 10 13 15	1.01	1.02	1.03	1.03
	16 20 25 30 32	**1.00**	1.03	1.04	1.04
	35 40 50 60 63	1.10	1.10	1.10	1.11
1P+N	0.5 1 1.6 2 3 4 6 8 10 13	1.96	1.97	NA	NA
	16 20 25 32	1.93	1.99	NA	NA
	40 50 63	2.11	2.12	NA	NA
2p	0.2 0.3 0.5 0.75 1 1.6 2 3 4 5 6 8 10 13 15	2.02	2.04	2.05	2.06
	16 20 25 30 32	2.00	2.06	2.07	2.07
	35 40 50 60 63	2.19	2.20	2.19	2.21
3p	0.2 0.3 0.5 0.75 1 1.6 2 3 4 5 6 8 10 13 15	3.02	3.04	3.05	3.07
	16 20 25 30 32	2.98	3.07	3.09	3.09
	35 40 50 60 63	3.27	3.29	3.28	3.29
3P+N	0.5 1 1.6 2 3 4 6 8 10 13	3.97	4.01	NA	NA
	16 20 25 32	3.92	4.05	NA	NA
	40 50 63	4.29	4.32	NA	NA
4P	0.2 0.3 0.5 0.75 1 1.6 2 3 4 5 6 8 10 13 15	4.06	4.10	4.11	4.13
	16 20 25 30 32	3.98	4.12	4.14	4.14
	35 40 50 60 63	4.36	4.40	4.38	4.40

Extrapolation rules for Use phases (coefficient factor_2)

Pole	Rated Current (A)	Tripping Curve B,C,D	Tripping Curve K	Tripping Curve Z
1P	0.2	NA	0.81	NA
	0.3	NA	0.84	NA
	0.5	0.79	0.76	1.23
	0.75	NA	0.68	NA
	1	0.65	0.68	1.07
	1.6	0.72	0.72	1.09
	2	0.57	0.71	0.98
	3	0.60	0.60	0.60
	4	0.68	0.86	0.86
	5	NA	0.99	0.99
	6	0.44	0.71	1.73
	8	0.68	0.60	1.39
	10	0.74	0.71	0.92
	13	0.97	0.99	1.06
	15	NA	1.07	1.07
	16	**1.00**	0.90	1.15
	20	1.09	1.09	1.09
	25	1.28	1.28	1.28
	30	NA	1.69	1.69
	32	1.57	1.57	1.57
	35	NA	1.57	1.57
	40	1.74	1.74	1.74
	50	2.10	2.13	2.18
	60	NA	2.67	2.67
	63	2.55	2.55	2.55
1P+N	0.5	0.79	0.76	1.23
	1	0.65	0.68	1.07
	1.6	0.72	0.72	1.09
	2	0.58	0.72	0.99
	3	0.61	0.61	0.61
	4	0.70	0.88	0.88
	6	0.49	0.75	1.77
	8	0.76	0.68	1.47
	10	0.86	0.84	1.04

Pole	Rated Current (A)	Tripping Curve B,C,D	Tripping Curve K	Tripping Curve Z
	13	1.18	1.19	1.27
	16	1.31	1.21	1.47
	20	1.58	1.58	1.58
	25	2.05	2.05	2.05
	32	2.62	2.62	2.62
	40	3.38	3.38	3.38
	50	3.02	3.05	3.10
	63	4.01	4.01	4.01
2P	0.2	NA	1.62	NA
	0.3	NA	1.67	NA
	0.5	1.58	1.52	2.47
	0.75	NA	1.37	NA
	1	1.30	1.36	2.14
	1.6	1.44	1.44	2.18
	2	1.15	1.42	1.97
	3	1.20	1.20	1.20
	4	1.35	1.72	1.72
	5	NA	1.97	1.97
	6	0.88	1.42	3.46
	8	1.36	1.19	2.78
	10	1.48	1.43	1.84
	13	1.94	1.97	2.12
	15	NA	2.14	2.14
	16	2.00	1.80	2.30
	20	2.18	2.18	2.18
	25	2.57	2.57	2.57
	30	NA	3.38	3.38
	32	3.14	3.14	3.14
	35	NA	3.15	3.15
	40	3.48	3.48	3.48
	50	4.20	4.25	4.35
	60	NA	5.34	5.34
	63	5.10	5.10	5.10
3P	0.2	NA	2.43	NA
	0.3	NA	2.51	NA
	0.5	2.38	2.28	3.70
	0.75	NA	2.05	NA
	1	1.94	2.05	3.20
	1.6	2.16	2.16	3.27
	2	1.72	2.14	2.95
	3	1.80	1.80	1.80
	4	2.03	2.58	2.58
	5	NA	2.96	2.96
	6	1.32	2.13	5.19
	8	2.04	1.79	4.18
	10	2.23	2.14	2.76
	13	2.91	2.96	3.18
	15	NA	3.20	3.20
	16	3.00	2.70	3.46
	20	3.26	3.26	3.26
	25	3.85	3.85	3.85
	30	NA	5.07	5.07
	32	4.71	4.71	4.71
	35	NA	4.72	4.72
	40	5.22	5.22	5.22
	50	6.30	6.38	6.53
	60	NA	8.01	8.01
	63	7.65	7.65	7.65
3P+N	0.5	2.38	2.28	3.70
	1	1.94	2.05	3.21
	1.6	2.17	2.16	3.27
	2	1.73	2.14	2.96
	3	1.81	1.81	1.81
	4	2.05	2.59	2.59

Pole	Rated Current (A)	Tripping Curve B,C,D	Tripping Curve K	Tripping Curve Z
	6	1.37	2.17	5.23
	8	2.12	1.87	4.26
	10	2.35	2.27	2.88
	13	3.12	3.17	3.39
	16	3.31	3.01	3.77
	20	3.76	3.76	3.76
	25	4.62	4.62	4.62
	32	5.76	5.76	5.76
	40	6.86	6.86	6.86
	50	7.23	7.30	7.45
	63	9.12	9.12	9.12
4P	0.2	NA	3.24	NA
	0.3	NA	3.35	NA
	0.5	3.17	3.04	4.93
	0.75	NA	2.74	NA
	1	2.59	2.73	4.27
	1.6	2.89	2.88	4.35
	2	2.29	2.85	3.94
	3	2.40	2.40	2.40
	4	2.71	3.43	3.43
	5	NA	3.95	3.95
	6	1.77	2.83	6.92
	8	2.72	2.39	5.57
	10	2.97	2.86	3.68
	13	3.88	3.94	4.25
	15	NA	4.27	4.27
	16	4.00	3.59	4.61
	20	4.35	4.35	4.35
	25	5.13	5.13	5.13
	30	NA	6.76	6.76
	32	6.28	6.28	6.28
	35	NA	6.30	6.30
	40	6.96	6.96	6.96
	50	8.41	8.50	8.70
	60	NA	10.68	10.68
	63	10.21	10.21	10.21

Note: NA indicates no product in this combination.

Environmental Impact Indicator Glossary

Impact indicators

Indicator	Description	Distribution
Global warming potential (GWP) - total	Indicator of potential global warming caused by emissions to air contributing to the greenhouse effect. The total global warming potential GWP-total) is the sum of three sub-categories of climate change. GWP-total = GWP-fossil + GWP-biogenic + GWP- land use and land use change	kg CO_2 eq.
Ozone depletion (ODP)	Emissions to air that contribute to the destruction of the stratospheric ozone layer	kg CFC-11 eq.
Acidification of soil and water (A)	Acidification of soils and water caused by the release of certain gases to the atmosphere, such as nitrogen oxides and sulphur oxides	H+ eq.
Eutrophication (E)	Indicator of the contribution to eutrophication of water by the enrichment of the aquatic ecosystem with nutritional elements, e.g. industrial or domestic effluents, agriculture, etc. This indicator is divided to three: freshwater, marine and terrestrial.	kg P eq., kg N eq., mole N eq.
Photochemical ozone creation (POCP)	Indicator of emissions of gases that affect the creation of photochemical ozone in the lower atmosphere (smog) because of the rays of the sun.	kg NMVOC eq.
Depletion of abiotic resources − elements (ADPe)	Indicator of the depletion of natural non-fossil resources	kg Sb eq.
Depletion of abiotic resources − fossil fuels (ADPf)	The use of non-renewable fossil resources in an unsustainable way (e.g. from material to waste)	MJ (lower heating value)
Water Deprivation potential (WDP)	Deprivation-weighted water consumption. Assesses the potential of water deprivation, to either humans or ecosystems, building on the assumption that the less water remaining available per area, the more likely another user will be deprived.	m^3 world eq. depr.

Resource use indicators

Indicator	Description	Distribution
Total use of primary energy	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) + Total use of renewable primary energy re-sources (primary energy and primary energy resources used as raw materials)	MJ (lower heating value)

References

- PEP Ecopassport PROGRAM PCR-Product Category Rules for Electrical, Electronic and HVAC-R Products (PCR-ed4-EN-2021 09 06).
- PEP Ecopassport PROGRAM PSR-SPECIFIC RULES FOR Electrical switchgear and control gear Solutions (PSR-0005-ed3-EN-2023 06 06).
- ISO (2006a). ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.
- ISO (2006b). ISO 14040:2006/Amd 1:2020, Environmental management – Life cycle assessment – Principles and framework— Amendment 1.
- ISO 14044:2006/Amd 1:2017/Amd 2:2020 Environmental management – Life cycle assessment – Requirements and guidelines.
- ISO 14020:2000, Environmental labels and declarations — General principles.
- ISO 14025:2006 “Environmental labels and declarations. Type III environmental declarations.
- EN 50693:2019, Product category rules for life cycle assessments of electronic and electrical products and systems.
- EN 15804 +A2:2019, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
- LCA report –MCB Series of Miniature Circuit Breaker Products, 23-10-2023.

Registration number:	**Drafting Rules:** *PCR-ed4-EN-2021 09 06*
ABBG-00338-V01.01-EN	**Supplemented by:** *PSR-0005-ed3-EN-2023 06 06*
Verifier accreditation number: VH50	**Information and reference documents:** www.pep-ecopassport.org
Date of issue: 10-2023	**Validity period:** 5 years
Internal: ☐	External: ☒
Independent verification of the declaration and data, in compliance with ISO 14025: 2006	
The PCR review was conducted by a panel of experts chaired by Julie ORGELET (DDemain)	
PEP are compliant with XP C08-100-1: 2016 or EN 50693:2019 The components of the present PEP may not be compared with components from any other program.	
Document in compliance with ISO 14025: 2006, Environmental labels and declarations. Type III environmental declarations	