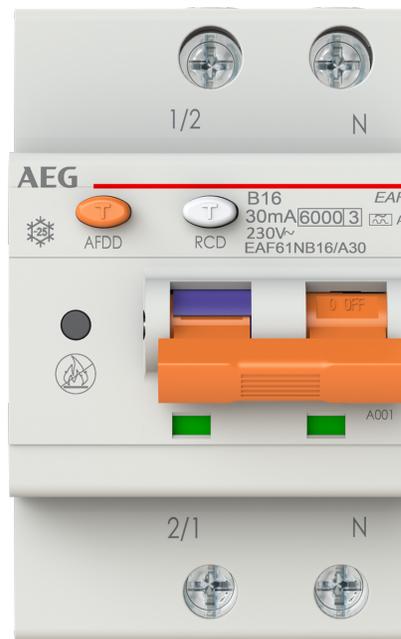


AEG EAF-R ARC FAULT DETECTION DEVICE

PEP ecopassport®

Product Environmental Profile



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

ORGANIZATION		CONTACT INFORMATION			
ABB S.p.A.		Cesare Fogli – cesare.fogli@it.abb.com			
ADDRESS		WEBSITE			
ABB S.p.A. – ELSB Viale dell'Industria, 18 20009 Vittuone (MI) -Italy		new.abb.com/it			
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Purpose & Embedding Sustainability

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 Purpose, focus is on reducing harmful emissions, preserving natural resources and championing ethical and humane behavior.

"other points or for example a QR code or link to AEG website, where more information on the topic"



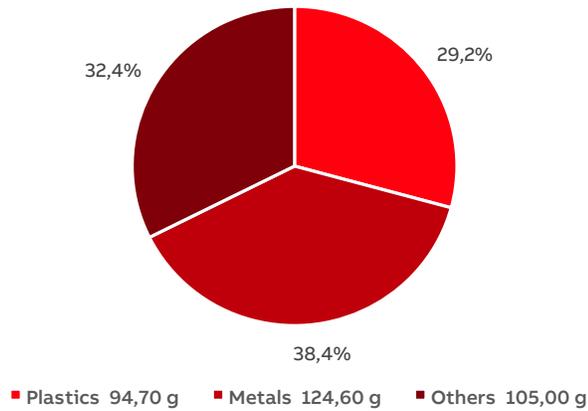
General Information

Reference product	2CSA255910R9165- AEG DS-ARC1 EAF61NB16/A30
	EAFR is a 1P+N arc fault detection device (AFDD) with an integrated RCBO in three modules, for the protection against earth arc faults, parallel arc faults, series arc faults, overvoltage, short-circuit currents, overload, earth fault currents
Functional unit	<p>The functional unit is designed to protect people and premises against risks of fire ignited by a hazardous series or parallel electric arc in a final circuit of rated voltage 230V and rated current 16A, according to the appropriate use scenario, and during the reference service life of the product of 20 years.</p> <p>The AFDD function is associated to an RCBO which defines the use scenario according to PSR-0005-ed3-EN2023 par 3.5.2 Section 3.16 This protection is ensured in accordance with the following parameters:</p> <ul style="list-style-type: none"> - Number of poles: 1P+N - Rated breaking capacity I_{cn}: 6 and 10kA - Tripping curve Cd: type B and C - Sensitivity: 30 mA - Type of differential protection: A - Application scenario: Household/Commercial
Other products covered	<p>AEG EAFR homogeneous family</p> <ul style="list-style-type: none"> - Rated voltage U_n [V] 230 - Tripping Curve B,C - Rated current I_n[A] from 6 to 20 - Rated breaking capacity [A] 6/10 kA - Rated Sensitivity [mA] 30 - Type of differential protection A - Number of poles N_p [P] 1P+N

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Constituent Materials



Total weight in reference product including packaging (g)

324,3

g

Plastics as % of weight		Metals as % of weight		Others as % of weight	
Name and CAS number	Weight%	Name and CAS number	Weight%	Name and CAS number	Weight%
PA	19,9	STEEL	26,8	Wood	12,9
Glass Fiber	7,6	Copper	9,4	CARDBOARD	8,4
PC	1,7	Other metals	1,3	PCB	6,8
PE	0,1	Aluminium	0,8	Other	2,6
-	-	Zinc	0,1	PAPER	1,8

Total weight of the reference product 249,9 plus packaging 74,4g

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Additional Environmental Information

Manufacturing	The manufacturing stage includes the production and transportation to the manufacturer's last logistic platform of EAFR and its packaging. The production occurs at the factory located in Santa Palomba (RM).
Distribution	The transport from Santa Palomba factory to the Regional Distribution Centre in Worms (Germany) was taken into account. For the distribution of the product from Worms to the final customer, the intracontinental transport scenario provided by PCR-ed4-EN-2021 09 06 standard was adopted, considering the European macro-area.
Installation	The installation phase only implies manual activities and no energy is consumed. This phase also includes the disposal of the packaging of the product. Statistical average data from Eurostat databases were considered for the disposal of the product and its packaging.
Use	<p>During the use phase, the product dissipate some electricity due to power losses. The average power loss of the switch has been calculated by following the assumption indicated in the PSR-0005-ed3-EN-2023 06 06:</p> <ul style="list-style-type: none"> • Nominal current load rate @15% (Household/Commercial scenario) • RSL of 20 years. • Functioning time of 30% of the RSL (α). No maintenance is planned
End of life	The default end of life scenario provided by the IEC/TR 62635 document has been adopted, considering the product transport by lorry over 1000 km and its disposal.
Benefits and loads beyond the system boundaries	No benefits and loads beyond the system boundaries has been considered.

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Environmental Impacts

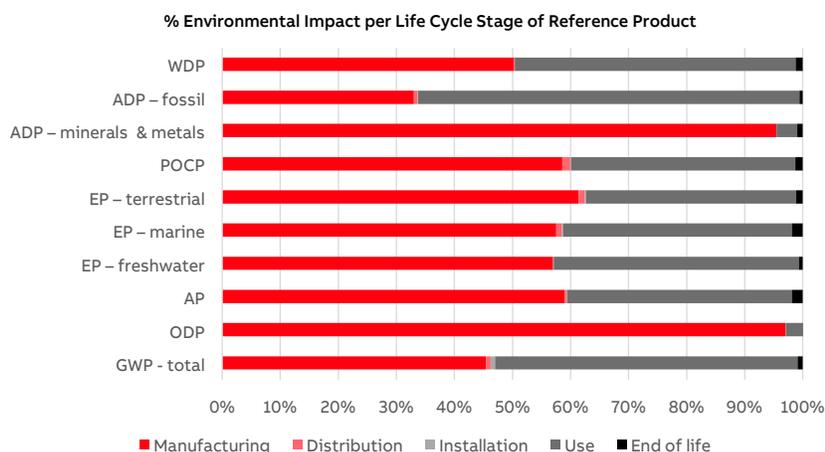
Reference lifetime	20 years
Product category	Arc fault detection and protection module, with or without opening system associated with an RCBO as per PSR005 §3.16 and §3.5.2.
Installation elements	No installation materials are required in the life cycle of the product.
Use scenario	The calculation of the use stage electricity consumption from the average power consider the following assumptions: - Nominal current load rate as 15% (Household / Commercial); - RSL of 20 years; - Functioning time of 30% of the RSL. No maintenance is planned for the product
Geographical representativeness	Europe
Technological representativeness	Technological representativeness refers to the specific production process for primary data.
Software and database used	SimaPro 9.4.0.2, ecoinvent 3.9 and ELCD

Energy model used

Manufacturing	GO energy mix 2022. The energy-related processes used for the remaining inputs are those included in the ecoinvent v3.9 datasets.
Installation	No energy consumption occur during the installation stage.
Use	Electricity, low voltage {RER} market group for electricity, low voltage Cut-off, S
End of life	The energy-related processes used for the inputs of the end-of-life stage are those included in the ecoinvent datasets selected for the analysis.

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Common base of mandatory indicators



Environmental impact indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life
GWP-total	kg CO ₂ eq.	2,07E+01	9,42E+00	1,58E-01	1,64E-01	1,08E+01	1,82E-01
GWP-fossil	kg CO ₂ eq.	2,01E+01	9,33E+00	1,58E-01	1,69E-02	1,04E+01	1,76E-01
GWP-biogenic	kg CO ₂ eq.	5,81E-01	6,98E-02	1,18E-04	1,47E-01	3,58E-01	6,02E-03
GWP-luluc	kg CO ₂ eq.	4,24E-02	1,62E-02	7,48E-05	8,51E-06	2,60E-02	1,52E-04
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 CFC-11 eq.	6,85E-06	6,65E-06	3,47E-09	2,85E-10	1,99E-07	2,36E-09
ODP = Depletion potential of the stratospheric ozone layer							
AP	H+ eq.	1,54E-01	9,10E-02	6,55E-04	7,90E-05	5,97E-02	2,95E-03
AP = Acidification potential, Accumulated Exceedance							
EP-freshwater	kg P eq.	2,33E-02	1,33E-02	1,13E-05	1,60E-06	9,86E-03	1,56E-04
EP-marine	kg N eq.	2,45E-02	1,41E-02	2,49E-04	4,02E-05	9,66E-03	4,64E-04
EP-terrestrial	mol N eq.	2,42E-01	1,48E-01	2,65E-03	3,17E-04	8,74E-02	2,77E-03
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.	7,27E-02	4,26E-02	9,96E-04	1,10E-04	2,81E-02	9,16E-04
POCP = Formation potential of tropospheric ozone							
ADP-minerals & metals	kg Sb eq.	3,50E-03	3,34E-03	4,29E-07	5,50E-08	1,26E-04	3,26E-05
ADP-fossil	MJ	3,61E+02	1,19E+02	2,32E+00	2,31E-01	2,37E+02	2,00E+00
ADP-minerals & metals = Abiotic depletion potential for non-fossil resources ADP-fossil = Abiotic depletion for fossil resources potential							
WDP	m ³ eq. depr.	5,50E+00	2,76E+00	1,11E-02	1,10E-03	2,66E+00	6,65E-02
WDP = Water Deprivation potential							

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Common base of mandatory indicators

Inventory flows indicator – Resource use indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life
PERE	MJ	6,93E+01	1,59E+01	3,40E-02	4,13E-03	5,31E+01	2,49E-01
PERM	MJ	1,24E+00	1,24E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	7,06E+01	1,71E+01	3,40E-02	4,13E-03	5,31E+01	2,49E-01
PENRE	MJ	3,57E+02	1,15E+02	2,32E+00	2,31E-01	2,37E+02	2,00E+00
PENRM	MJ	3,82E+00	3,82E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,61E+02	1,19E+02	2,32E+00	2,31E-01	2,37E+02	2,00E+00

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

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life
SM	kg	2,05E-02	2,05E-02	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	2,93E-01	9,92E-02	3,65E-04	4,97E-05	1,92E-01	2,05E-03

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

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life
Hazardous waste disposed	kg	1,41E-03	9,66E-04	1,44E-05	1,47E-06	4,16E-04	1,50E-05
Non- hazardous waste disposed	kg	2,44E+00	1,06E+00	2,04E-01	2,87E-02	9,52E-01	2,02E-01
Radioactive waste disposed	kg	1,97E-03	2,52E-04	7,09E-07	8,16E-08	1,71E-03	5,81E-06

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Common base of mandatory indicators

Inventory flows indicator – Output flow indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	3,23E-01	1,64E-01	0,00E+00	3,98E-02	0,00E+00	1,19E-01
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	2,23E-01	2,49E-02	0,00E+00	8,56E-02	0,00E+00	1,13E-01

Inventory flow indicator – other indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life
Biogenic carbon content of the product	kg of C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Biogenic carbon content of the associated packaging	kg of C	2,75E-02	2,75E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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Optional indicators

Environmental indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life
Total use of primary energy during the life cycle	MJ	4,31E+02	1,36E+02	2,36E+00	2,36E-01	2,90E+02	2,25E+00
Emissions of fine particles	incidence of diseases	8,17E-07	5,66E-07	1,63E-08	1,43E-09	2,19E-07	1,44E-08
Ionizing radiation, human health	kBq U235 eq.	7,73E+00	1,02E+00	2,93E-03	3,34E-04	6,68E+00	2,26E-02
Ecotoxicity (fresh water)	CTUe	3,08E+02	2,64E+02	1,12E+00	1,45E-01	3,98E+01	3,01E+00
Human toxicity, car-cinogenic effects	CTUh	2,36E-08	1,56E-08	6,88E-11	1,31E-11	4,90E-09	3,05E-09
Human toxicity, non-carcinogenic effects	CTUh	9,85E-07	7,31E-07	1,67E-09	1,85E-10	1,95E-07	5,71E-08
Impact related to land use/soil quality		1,13E+02	6,26E+01	2,36E+00	1,40E-01	4,62E+01	1,66E+00

Other indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life
No Other indicators used							

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Extrapolation Factors

For other products than the Reference product covered by this PEP, the environmental impacts for each phase of the lifecycle are obtained by a linear correlation with respect to average power loss for the use phase. This environmental indicator value shall be calculated using the following formula:

For the manufacturing and use stages: $y = a_n x + b_n$

Impact	USE	
	a	b
Climate change	8,91E+00	5,63E+00
Climate change - Fossil	8,59E+00	5,43E+00
Climate change - Biogenic	2,96E-01	1,87E-01
Climate change - Land use and LU change	2,14E-02	1,35E-02
Ozone depletion	1,64E-07	1,03E-07
Acidification	4,93E-02	3,11E-02
Eutrophication. freshwater	8,14E-03	5,14E-03
Eutrophication. marine	7,97E-03	5,03E-03
Eutrophication. terrestrial	7,21E-02	4,55E-02
Photochemical ozone formation	2,32E-02	1,46E-02
Resource use. minerals and metals	1,04E-04	6,58E-05
Resource use. fossils	1,95E+02	1,23E+02
Water use (AWARE)	2,19E+00	1,38E+00
Total use of primary energy during the life cycle	2,39E+02	1,51E+02
PERE	4,38E+01	2,77E+01
PERM	0,00E+00	0,00E+00
PERT	4,38E+01	2,77E+01
PENRE	1,95E+02	1,23E+02
PENRM	0,00E+00	0,00E+00
PENRT	1,95E+02	1,23E+02
Use of secondary material	0,00E+00	0,00E+00
Use of renewable secondary fuels	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	0,00E+00	0,00E+00
Net use of fresh water	1,58E-01	9,99E-02
Hazardous waste disposed	3,43E-04	2,17E-04
Non-hazardous waste disposed	7,86E-01	4,96E-01
Radioactive waste disposed	1,41E-03	8,91E-04
Particulate matter	1,81E-07	1,14E-07
Ionising radiation	5,51E+00	3,48E+00
Ecotoxicity. freshwater	3,29E+01	2,07E+01
Human toxicity. cancer	4,04E-09	2,55E-09
Human toxicity. non-cancer	1,61E-07	1,02E-07
Land use	3,81E+01	2,41E+01
Component for reuse	0,00E+00	0,00E+00
Materials for recycling	0,00E+00	0,00E+00
Materials for energy recovery	0,00E+00	0,00E+00
Exported energy	0,00E+00	0,00E+00

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

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

PENRT = Total Use of non-renewable primary energy resources

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For the weight and average power loss data of the variants, please refer to table below.

ABB Code of the specific product	Name	Avg power loss @15%In [w]
2CSA255111R1065	EAF61NB06/A30	5,50E-01
2CSA255111R1105	EAF61NB10/A30	5,30E-01
2CSA255111R1135	EAF61NB13/A30	5,50E-01
2CSA255111R1165	EAF61NB16/A30	5,60E-01
2CSA255111R1205	EAF61NB20/A30	5,80E-01
2CSA255111R1064	EAF61NC06/A30	5,50E-01
2CSA255111R1104	EAF61NC10/A30	5,30E-01
2CSA255111R1134	EAF61NC13/A30	5,50E-01
2CSA255111R1164	EAF61NC16/A30	5,60E-01
2CSA255111R1204	EAF61NC20/A30	5,80E-01
2CSA275111R1065	EAF101NB06/A30	5,50E-01
2CSA275111R1105	EAF101NB10/A30	5,30E-01
2CSA275111R1135	EAF101NB13/A30	5,50E-01
2CSA275111R1165	EAF101NB16/A30	5,60E-01
2CSA275111R1205	EAF101NB20/A30	5,80E-01
2CSA275111R1064	EAF101NC06/A30	5,50E-01
2CSA275111R1104	EAF101NC10/A30	5,30E-01
2CSA275111R1134	EAF101NC13/A30	5,50E-01
2CSA275111R1164	EAF101NC16/A30	5,60E-01
2CSA275111R1204	EAF101NC20/A30	5,80E-01
2CSA255113R1064	MD6AFDDR0630A	5,50E-01
2CSA255113R1104	MD6AFDDR1030A	5,30E-01
2CSA255113R1164	MD6AFDDR1630A	5,60E-01
2CSA255113R1204	MD6AFDDR2030A	5,80E-01

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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 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)

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Approved	Public	ABBG-00517-V01.01-EN		1 EN	12/13

Reference

PEP ecopassport® PROGRAM. PCR-ed4-EN-2021 09 06. Product Category Rules for Electrical, Electronic and HVAC-R Products.

PEP ecopassport® PROGRAM. PSR-0005-ed3-EN-2023 06 06. Specific rules for Electrical switchgear and control gear Solutions.

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International Electrotechnical Commission. IEC/TR 62635 Ed. 1.0 en:2012. Guidelines For End-Of-Life Information Provided By Manufacturers And Recyclers And For Recyclability Rate Calculation Of Electrical And Electronic Equipment. 2012. ISBN 978-2-83220-413-9.

9AKK108468A9821 LCA Report to support PEP Ecopassport for EAF61NB16/A30 an Arc Fault Detection and Protection Module with Circuit Breaker and Overcurrent Protection (RCBO).

Registration number:	ABBG-0517-V01.01-EN	Drafting Rules:	PCR-ed4-EN-2021 09 06
		Supplemented by:	PSR-0005-ed3-EN-2023 06 06
Verifier accreditation number:	VH50	Information and reference documents:	www.pep-ecopassport.org
Date of issue:	02/2024	Validity period:	5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2006			
Internal:	<input type="radio"/>	External:	<input checked="" type="radio"/>
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 cannot be compared with components from any other program.			
Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"			

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