PRODUCT ENVIRONMENTAL PROFILE

DAC1-13S-31-275

Parafoudre BT de Type 1+2 Triphasé+N – DAC1-13 Range

Company Information
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Methodology
PEP has been performed according to the PCR version PEP-PCR-ed4-2021 09 06 and PSR version PSR-005-ed3.1-2023 12 08 issued by the PEP ecopassport program. For further information, please see the website of the program www.pep-ecopassport.org

GENERAL INFORMATION

Reference product	The range DAC1-13 are Type 1+2 plug-in surge arresters with very high-power ratings, designed to be installed at the entrance to low-voltage installations equipped with lightning conductors. The “Multi-Varistor” technology used provides a very high discharge current and the best possible performance for the LV network (no follow current). Given their very high discharge capacity, these DAC1-13 surge arresters are particularly compact and are available in a multi-pole version to protect single-phase or three-phase networks. The representative product is DAC1-13S-31-275, Type 1+2 Three-phase+N LV surge arresters because it is the best-selling product of the references covered. This PEP is validated for 5 years.
Functional unit	Protect, against direct and indirect effects of lightning or against transient overvoltages, electronic equipment connected to networks with a rated operational voltage of up to 1000 V AC or 1500 V DC, via a surge arrester of type 1+2, with 3+1 poles, according to the appropriate use scenario, and for the reference service life of the product of 20 years.
Specifications of the representative product (product code 821710244)	This protection is ensured in accordance with the following parameters for the product in this PEP: - Surge protective device type according to the standard IEC 61643-11 = T1+2 - Number of protected conductors: Np = 3+1 - Maximum continuous operating voltage: Uc = 275 V - Rated discharge current for class 2 test (current waveshape 8/20µs): In = 20 kA - Impulse discharge current for class 1 test (current waveshape 10/350s) (kA): limp = 12.5 kA - Voltage protection level Up =1.5 kV - Current drawn by the surge protective device and his related functions: Ic = 10µA - Frequency range of the low-voltage system: 50 Hz to 60 Hz
Software and database used	EIME 6.3 software from LCIE Bureau Veritas. Databases CODDE 2025-04, ELCD and ESR (WEEE), indicator set PEF EF 3.1
Standards	NF EN 61643-11/IEC 61643-11: Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage systems - Requirements and test methods UL1449 ed.5: Underwriters Laboratories Safety Standard for Surge Protective Devices (SPD)
Geographical representativeness	[A1-A3] : China [A4], [A5], [B1-B7], [C1-C4]: Europe

CONSTITUENT MATERIALS

All useful measures have been adopted to ensure that the materials used in the composition of the product do not contain any substances banned by the legislation in force at the time of marketing (for example: REACH and ROHS).

Total weight of reference product	634.07E-3 kg including the product, its packaging and additional elements and accessories Product Mass = 605.0146E-3 kg, Package Mass = 25.68E-3 kg, Notice Mass = 3.38E-3 kg

Table 1: Materials distribution of the reference product

Plastics			**Metals**			**Others**		
	kg	%		kg	%		kg	%
Polyamide 66	1.58E-1	24.7	Copper	1,26E-1	19.8	Zinc oxide	2.21E-1	34.5
Epoxy resin	1.1E-3	0.2	Stainless Steel	4.85E-2	7.6	Cardboard	2.57E-2	4.0
Others	8.9E-4	0.1	Ferronickel	1.27E-2	2.0	Inorganic chemicals	1.78E-2	2.8
			Cobalt	5.1E-3	0.8	Paper	4.8E-3	0.8
			Steel	2.2E-3	0.4	Varnish	3.6E-3	0.6
			Others	4.4E-3	0.6	Others	7.8E-3	1.1
Total		25%	Total		31.2%	Total		43.8%

REPRESENTATIVNESS

Time Coverage:
Reference years: The modules used cover the period from 2014 to 2024.
Current status: There is considerable disparity. While some transport modules (air freight, trucks) are very recent (2024), other end of life data such as “EoL, Small Household Elec Equip.” date back to 2014.
Collection: For manufacturing processes (injection, bending, etc.), the data in the CODDE database mainly date from 2022, providing good representativeness for a current analysis.

Geographical Coverage:
Declared deviation: Although final assembly and raw material manufacturing take place in China, many of the modules used are of the RER (Europe) or EU-27 type (e.g., PA6.6, steel, aluminum).
Methodological justification: The decision was made to prioritize the technical nature of the material rather than its geographical origin when the specific “China” module did not exist in the CODDE 04-2025 database.
Compliance points: Certain critical flows such as the electricity mix (“Electricity mix; China”) or specific components (PWB connectors, switches) are well modeled in the CN zone (China), thus limiting overall uncertainty.

Technological Coverage:
Technical representativeness: The use of “[configurable]” modules (e.g., steel bending, injection molding, SAC welding) demonstrates a desire to adhere to actual manufacturing steps at the plant.
Primary vs. secondary data: The data used is mainly secondary data from the EIME (CODDE) database, but chosen to accurately represent the design of the commercial references cited.

ENVIRONMENTAL IMPACTS

Modules	Life Cycle Stage
A1-A3 Manufacturing Stage	Manufacturing takes place in CITEL plant in Shanghai. The plan has the ISO 14001 and ISO 9001 certification. The A1-A3 module covers the extraction and processing of raw materials [A1], transport to the manufacturer [A2] and manufacturing [A3]. The reference product DAC1-13S-31-275 is divided into two sub-assemblies: - The MDAC1-13-275 module: present in 3x - The BDACS31G base The modelling also includes the product instructions and its primary packaging, namely a single cardboard box. The energy module use is Electricity Mix; production mix; low voltage; 2022; China, CN. The transportation of raw materials or product until the logistic platform is included.
A4 Distribution Stage	The product is distributed exclusively in Europe from our logistics site in France. Transportation of the product in its packaging from the manufacturer's last logistic platform to the distributor and from the distributor to the installation place. We consider that the product is mainly sold in Europe. We are therefore basing our calculations on the scenario described in section 5.5.3 p22 of PCR ed4, namely intra-continental transport: 3,500 km by lorry >27t.
A5 Installation Stage	For the installation of the product, only standard tools (electric screw) are needed. Installation at the place of use and disposal of packaging waste. The product packaging is disposed of in Europe, as we consider the product to be sold entirely in Europe. The module Energy use is Electricity Mix; production mix; Low Voltage; 2022; Europe.
B1-B7 Use Stage	This product requires no servicing, no maintenance or additional products. Only B6 module is applicable, the others (B1 to B7) have impacts equal to 0. The representative product is only used in Europe. The calculation is based on the use scenario in Europe, operation for 20 years, load factor: 100% of Ic. The module Energy use is Electricity Mix; production mix; Low Voltage; 2022; Europe. We calculate the energy consumption of our product based on a reference lifespan of 20 years and express it in watts per hour. The formula is as follows: E = U0 x Ic x A x 20 x 365 x 24 in W.h For a three-phase product, A = 3. The actual mains voltage Uo between L and N/PE is equal to 230V for a 230/400V application and Ic = 10 µA for 100% MOV and 0% VG.
C1-C4 End of life Stage	The C1-C4 module covers the desinstallation [C1], transport to waste treatment plant [C2], treatment of waste with a view to its reuse, recovery or recycling [C3] and disposal [C4]. The product is covered by ESR data under the category EoL Small Household Electrical Equipment. We consider the product to have reached the end of its life in Europe.
Module D	Module D covers the net benefits and costs arising from the reuse of products or the recycling or recovery of energy from end-of-life materials. We are using the [0;100] method: we are counting as profit what will generate recycled material.

Table 2: Environmental impact indicators of life cycle impact assessment

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			A1+A2+A3	A4	A5	B stage	C stage	D
Indicators	**unit**	**Total**	**Manufacturing stage**	**Distribution stage**	**Installation stage**	**Use stage B6**	**End of Life stage**	**Ben./loads byd system bound.**
Climat change - total	kg CO2 eq.	7,70E+00	6,38E+00	1,34E-01	8,35E-02	4,89E-01	6,13E-01	-1,50E+00
Climate change - fossil fuels	kg CO2 eq.	7,59E+00	6,37E+00	1,34E-01	3,19E-02	4,78E-01	5,78E-01	-1,49E+00
Climate change - biogenics	kg CO2 eq.	1,04E-01	6,41E-03	5,49E-07	5,17E-02	1,08E-02	3,54E-02	-6,66E-03
Climate change - land use and land use transformation	kg CO2 eq.	4,55E-06	4,11E-06	2,03E-07	1,18E-09	0,00E+00	2,41E-07	0,00E+00
Ozone depletion	kg.equivalent.CFC-11	3,75E-07	3,02E-07	1,63E-09	4,71E-10	2,09E-09	6,79E-08	-7,66E-08
Acidification (AP)	mole of H+ equiv	6,89E-02	5,70E-02	2,14E-04	1,01E-04	2,56E-03	9,05E-03	-8,04E-02
Freshwater eutrophication	kg P eq.	1,69E-04	1,57E-04	5,03E-07	4,39E-07	1,17E-06	9,64E-06	-8,20E-03
Marine aquatic eutrophication	kg of N equiv	1,25E-02	6,74E-03	3,94E-05	4,10E-05	2,99E-04	5,38E-03	-4,86E-03
Terrestrial eutrophication	mole of N equiv	8,49E-02	7,36E-02	4,33E-04	3,01E-04	4,80E-03	5,79E-03	-6,30E-02
Photochemical ozone formation	kg of NMVOC equiv	2,70E-02	2,38E-02	1,39E-04	7,05E-05	9,49E-04	2,05E-03	-1,68E-02
Depletion of abiotic resources - elements	kg.equivalent.Sb	7,89E-03	7,89E-03	4,79E-08	1,91E-09	1,58E-07	2,04E-06	-8,30E-04
Depletion of abiotic resources - fossil fuels	MJ	1,23E+02	9,73E+01	2,39E+00	3,37E-01	1,17E+01	1,09E+01	-1,41E+01
Water scarcity	m3 of equiv. deprivation worldwide	1,85E+02	3,65E+01	4,84E-03	2,78E-03	3,70E-02	1,49E+02	-7,50E+02
Emission of fine particles	incidence of diseases	4,37E-07	3,79E-07	1,83E-09	5,92E-10	2,00E-08	3,61E-08	-1,97E-07
Ionizing radiation, human health	kBq of U235 equiv.	1,68E+00	9,95E-01	4,75E-03	4,56E-03	6,39E-01	4,05E-02	-8,35E-02
Ecotoxicity, fresh water	CTUe	2,87E+03	2,85E+03	3,92E+00	4,63E-01	7,33E-01	9,60E+00	-2,25E+01
Human toxicity, cancer effects	CTUh	5,51E-07	5,46E-07	2,63E-11	3,49E-09	6,04E-11	7,75E-10	-1,45E-08
Human toxicity, non-cancer effects	CTUh	6,98E-07	6,34E-07	5,02E-10	1,05E-10	1,43E-09	6,24E-08	-8,83E-07
Impacts related to land use/soil quality	-	3,17E+00	1,66E+00	5,74E-04	1,08E-04	1,30E-02	1,50E+00	-2,97E+01

Table 3: Inventory Flow indicators of life cycle impact assessment
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			A1+A2+A3	A4	A5	B stage	C stage	D
Indicators	**unit**	**Total**	**Manufacturing stage**	**Distribution stage**	**Installation stage**	**Use stage B6**	**End of Life stage**	**Ben./loads byd system bound.**
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	6,51E+00	3,03E+00	7,51E-03	4,39E-02	2,74E+00	6,90E-01	-5,80E+00
Use of renewable primary energy resources used as raw materials	MJ	5,80E-01	5,80E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	7,09E+00	3,61E+00	7,51E-03	4,39E-02	2,74E+00	6,90E-01	-5,80E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	1,17E+02	9,20E+01	2,39E+00	3,37E-01	1,17E+01	1,09E+01	-1,41E+01
Use of non-renewable primary energy resources used as raw materials	MJ	5,31E+00	5,31E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1,23E+02	9,73E+01	2,39E+00	3,37E-01	1,17E+01	1,09E+01	-1,41E+01
Use of secondary materials	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m3	4,96E+00	8,50E-01	1,13E-04	2,12E-04	8,66E-04	4,10E+00	-1,81E+01
Total use of primary energy during the life cycle	MJ	1,30E+02	1,01E+02	2,40E+00	3,81E-01	1,45E+01	1,16E+01	-1,99E+01
Hazardous waste disposed of	kg	2,84E+01	2,84E+01	5,61E-04	1,77E-03	1,35E-02	1,24E-03	-8,94E-04
Non-hazardous waste disposed of	kg	1,54E+00	1,43E+00	1,25E-02	9,19E-03	7,37E-02	1,49E-02	-1,78E-02

Radioactive waste disposed of	kg	2,27E-04	1,86E-04	9,87E-06	2,13E-06	1,74E-05	1,18E-05	-8,13E-06
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	2,70E-02	3,17E-03	0,00E+00	2,38E-02	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ by energy vector	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Biogenic carbon content of the product: 0,00E+00 kg of C

Biogenic carbon content of the associated packaging: 1,27E-02 kg of C

Note: The method for calculating biogenic carbon is -1/+1.

VERIFICATION

Registration number: ***CITE-00003-V01.01-EN***	Drafting rules:: ***« PCR-ed4-FR-2021 09 06 »*** ***Supplemented by « PSR-005-ed3.1-FR-2023 12 08»***
Verifier accreditation number: ***VH48***	Information and reference documents: **www.pep-ecopassport.org**
Date of issue: 03-2026	Validity period**: 5 ans**
Independent verification of the declaration and data in compliance with ISO 14025: 2006	
Internal : ☐	**External : ☒**
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain)	
PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022 The components of the present PEP may not be compared with components from any other program.	
Document complies with ISO 14025:2006 “Environmental labels and declarations. Type III environmental declarations”	