

Product Environmental Profile

PS100

High-availability power supply



Product Environmental Profile - PEP

Product overview

The main purpose of the PS100 is to supply backup operating power for the equipments in a medium voltage substations (motor mechanisms, circuit breaker coils, transmission equipments and control or protection units).

This range consists of two product variants, 24V (EMS58580) or 48V (EMS58581), and the associated 24Ah and 38Ah batteries (respectively EMS58582 & EMS58583)

The equipments used for the analysis are a PS100-48 associated to 38Ah battery.

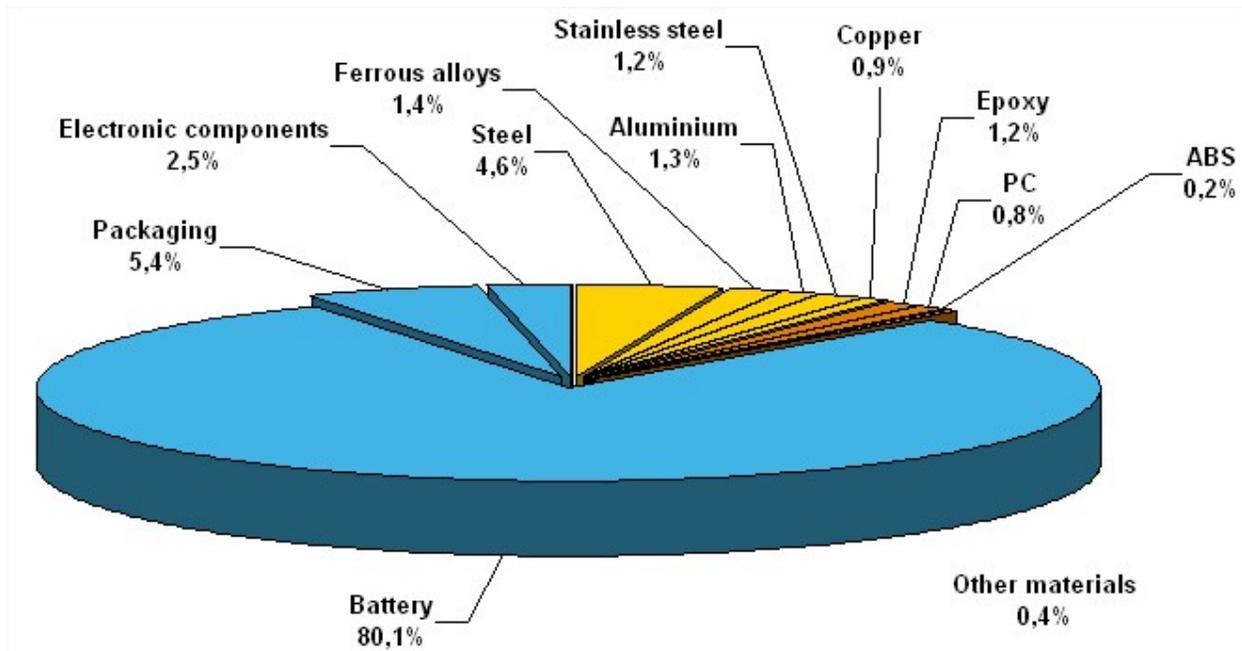
The environmental impacts of these equipments are representative of the impacts of the range.

The environmental analysis was performed in conformity with ISO 14040.

Constituent materials

The mass of the equipments is 18 kg including packaging.

The constituent materials are distributed as follows:



Substance assessment

Products of this range are designed in conformity with the requirements of the RoHS directive (European Directive 2002/95/EC of 27 January 2003) and do not contain, or only contain in the authorised proportions, lead, mercury, cadmium, hexavalent chromium or flame retardants (polybrominated biphenyls - PBB, polybrominated diphenyl ethers - PBDE) as mentioned in the Directive

Manufacturing

The PS100 are manufactured at a production site which complies with the regulations governing industrial sites.

Distribution

The weight and volume of the packaging have been optimized, based on the European Union's packaging directive.

The PS100 packaging weight consists in 470g of cardboard and paper, while battery's packaging is 500g of cardboard.

Use

The products of the PS100 range do not generate environmental pollution (noise, emissions) requiring special precautionary measures in standard use.

The electrical power consumption depends on the conditions under which the product is implemented and used. The electrical power consumed by the PS100 range is between 12W and 300W. It is 25W on average for the referenced PS100-48

During the 20 years-service life of the PS100 unit, the battery will have to be changed once.

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End of life

At end of life, the products in the PS100 have been optimized to decrease the amount of waste and allow recovery of the product components and materials.

This product range contains PCBs with electrolytic capacitors that should be separated from the stream of waste so as to optimize end-of-life treatment by special treatments. The location of these components and other recommendations are given in the End of Life Instruction document which is available for this product range.

The recyclability potential of the products has been evaluated using the "ECO-DEEE recyclability and recoverability calculation method" (version V1, 20 Sep. 2008 presented to the French Agency for Environment and Energy Management: ADEME).

According to this method, the potential recyclability ratio is: 57%.

As described in the recyclability calculation method this ratio includes only metals and plastics which have proven industrial recycling processes.

Environmental impacts

Life cycle assessment has been performed on the following life cycle phases: Materials and Manufacturing (M), Distribution (D), Use (U), and End of life (E).

Modelling hypotheses and methods:

- The calculation was performed on a PS100-48 with its 38Ah battery

- Products packaging is included

- Installation components: No special components included.

- Scenario for the Use phase: PS100 are "Energy consuming products", that are used to power up other devices, through one 12V output (radio output) and a 24 or 48 V output for other devices (it is 48V for PS100-48V under study).

The maximum power delivered by the PS100 can reach 300W for 1 minute, but this will occur very rarely (maximum once or twice a year), and thus, not considered in the calculation.

The nominal power delivered by the PS100 is around 45W on the 48V output & 9W on the 12V output, for an efficiency around 75% (at this rate). Moreover, an additional 12W are consumed for communication and alarm functions, so energy absorbed by the PS100 is 25W on average.

PS100 are designed to run for 20 years without special maintenance, save an exchange of the battery after 10 years.

The electrical power model used for calculation is the European model.

End of life impacts are based on a worst case transport distance to the recycling plant (1000km)

Presentation of the product environmental impacts

Environmental indicators	Unit	PS100 – 48V				
		S=M+D+U+E	M	D	U	E
Raw Material Depletion	Y-1	3,54E-12	1,90E-12	3,49E-17	1,64E-12	3,69E-17
Energy Depletion	MJ	5,31E+04	1,25E+03	2,56E+01	5,18E+04	2,71E+01
Water depletion	dm ³	8,43E+03	6,52E+02	2,43E+00	7,77E+03	2,57E+00
Global Warming	g≈CO ₂	2,69E+06	7,12E+04	2,03E+03	2,62E+06	2,14E+03
Ozone Depletion	g≈CFC-11	1,71E-01	1,81E-02	1,43E-03	1,50E-01	1,51E-03
Air Toxicity	m ³	5,46E+08	6,44E+07	3,82E+05	4,81E+08	4,04E+05
Photochemical Ozone Creation	g≈C ₂ H ₄	9,22E+02	2,89E+01	1,73E+00	8,89E+02	1,83E+00
Air acidification	g≈H ⁺	3,77E+02	1,77E+01	2,58E-01	3,59E+02	2,73E-01
Water Toxicity	dm ³	7,58E+05	1,43E+04	2,53E+02	7,43E+05	2,68E+02
Water Eutrophication	g≈PO ₄	1,05E+01	3,27E+00	3,37E-02	7,20E+00	3,56E-02
Hazardous waste production	kg	4,45E+01	1,31E+00	7,53E-04	4,32E+01	7,97E-04

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 4, and with its database version 11.

The Use phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.

System approach

As the products of the range are designed in accordance with the RoHS Directive (European Directive 2002/95/EC of 27 January 2003), they can be incorporated without any restriction in an assembly or an installation subject to this Directive.

Please note that the values given above are only valid within the context specified and cannot be used directly to draw up the environmental assessment of an installation.

Glossary

Raw Material Depletion (RMD)	This indicator quantifies the consumption of raw materials during the life cycle of the product. It is expressed as the fraction of natural resources that disappear each year, with respect to all the annual reserves of the material.
Energy Depletion (ED)	This indicator gives the quantity of energy consumed, whether it be from fossil, hydroelectric, nuclear or other sources. This indicator takes into account the energy from the material produced during combustion. It is expressed in MJ.
Water Depletion (WD)	This indicator calculates the volume of water consumed, including drinking water and water from industrial sources. It is expressed in dm ³ .
Global Warming (GW)	The global warming of the planet is the result of the increase in the greenhouse effect due to the sunlight reflected by the earth's surface being absorbed by certain gases known as "greenhouse-effect" gases. The effect is quantified in gram equivalent of CO ₂ .
Ozone Depletion (OD)	This indicator defines the contribution to the phenomenon of the disappearance of the stratospheric ozone layer due to the emission of certain specific gases. The effect is expressed in gram equivalent of CFC-11.
Air Toxicity (AT)	This indicator represents the air toxicity in a human environment. It takes into account the usually accepted concentrations for several gases in the air and the quantity of gas released over the life cycle. The indication given corresponds to the air volume needed to dilute these gases down to acceptable concentrations.
Photochemical Ozone Creation (POC)	This indicator quantifies the contribution to the "smog" phenomenon (the photochemical oxidation of certain gases which generates ozone) and is expressed in gram equivalent of ethylene (C ₂ H ₄).
Air Acidification (AA)	The acid substances present in the atmosphere are carried by rain. A high level of acidity in the rain can cause damage to forests. The contribution of acidification is calculated using the acidification potentials of the substances concerned and is expressed in mode equivalent of H ⁺ .
Water Toxicity (WT)	This indicator represents the water toxicity. It takes into account the usually accepted concentrations for several substances in water and the quantity of substances released over the life cycle. The indication given corresponds to the water volume needed to dilute these substances down to acceptable concentrations.
Hazardous Waste Production (HWP)	This indicator calculates the quantity of specially treated waste created during all the life cycle phases (manufacturing, distribution and utilization). For example, special industrial waste in the manufacturing phase, waste associated with the production of electrical power, etc. It is expressed in kg.

PEP in compliance with Schneider-Electric TT01 V5.1 and TT02 V15 procedures

PEP established according to PCR PEPecopassport 2010:1.0 rules

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