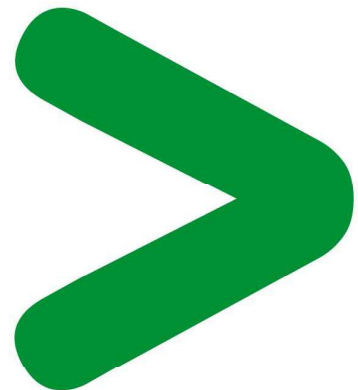


Product Environmental Profile

Replacement Battery Cartridges



Product Environmental Profile – PEP

Product overview

The main purpose of the Replacement Battery Cartridges (RBCs) is to provide replacement battery packs in APC-branded Uninterruptible Power Supplies (UPSs).

The functional unit is to provide 28.8 Amp Hour (Ah) of electrical storage to support back up power to diverse UPS models for 5 years using valve regulated, sealed lead acid batteries.

This range consists of Replacement Battery Cartridges that range in capacity from 3.2 Ah to 330 Ah. The representative product used for the analysis is RBC12 APC Replacement Battery Cartridge #12.

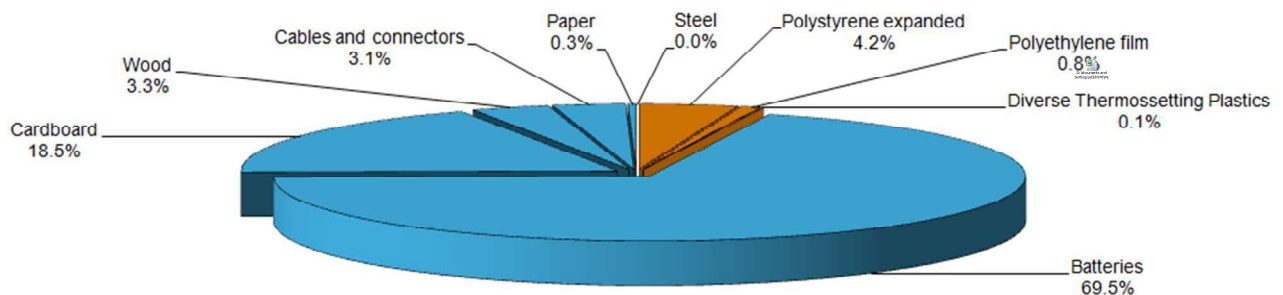
The product range consists of products with the following model numbers: (APC)RBC(XXX)(Y-YY) where APC is optional, XXX is any number from 001 to 999 and (Y) are option designators. Note that Y-LI and Y-NMH are designators reserved for RBCs with Lithium polymer and Nickel Metal Hydride battery chemistries and are not included in this product range.

The environmental impacts of this referenced product are representative of the impacts of the other products of the range which are developed with a similar technology.

The environmental analysis was performed in conformity with ISO 14040.

Constituent materials

The mass of the product range is from 1,670 g and 108,500 g including packaging. It is 13,919 g for the RBC12 APC Replacement Battery Cartridge #12 reference product. The constituent materials are distributed as follows:



Substance assessment

Products of this range are designed in conformity with the requirements of the European RoHS Directive 2011/65/EU (RoHS2) and EU Delegated Directive (EU) 2015/863 and do not contain, or only contain in the authorised proportions, lead, mercury, cadmium, hexavalent chromium, flame retardants (polybrominated biphenyls - PBB, polybrominated diphenyl ethers - PBDE) or phthalates (Bis(2-ethylhexyl) phthalate - DEHP, Butyl benzyl phthalate - BBP, Dibutyl phthalate -DBP, Diisobutyl phthalate - DIBP as mentioned in the Directive

The battery pack(s) within this product range are designed to conform with the requirements of the Battery and Accumulator Directive (European Directive 2006/66/EC of 26 September 2006) and do not contain, or only contain in authorized proportions, the regulated substances lead (Pb), mercury (Hg) and cadmium (Cd) as mentioned in the Battery Directive. Additionally, the non-spillable, valve regulated lead acid batteries used in the battery pack(s) within this product range are certified by their manufacturers as capable of withstanding the IATA/ICAO Vibration and Pressure Differential Test and that at a temperature of 55 degrees Centigrade, there is no free electrolyte to flow from a ruptured or cracked case.

Details of ROHS and REACH substances information are available on the Schneider-Electric [Green Premium website](http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page) . (<http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page>)

Product Environmental Profile – PEP

Manufacturing

The Replacement Battery Cartridge product range is manufactured at a Schneider Electric production site on which an ISO14001 certified environmental management system has been established.

Distribution

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

The RBC12 APC Replacement Battery Cartridge #12 packaging weight is 3,919 g. It consists of 2,648 g of cardboard, 608 g of polystyrene, 480 g of wood, 119 g of polyethylene film and 49 g of paper.

The product distribution flows have been optimised by setting up local distribution centres close to the market areas.

Use

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

The dissipated power depends on the conditions under which the product is implemented and used. This dissipated power is between 0.0095 W and 0.9785 W for the Replacement Battery Cartridge product range. It is 0.0854 W at 100% load for the referenced RBC12 APC Replacement Battery Cartridge #12 product.

This thermal dissipation represents less than 1% of the power which passes through the product.

The product range does not require special maintenance operations.

End of life

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

This product range contains batteries 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 on the Schneider-Electric Green Premium website [Green Premium website](http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page)

(<http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page>).

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 without packaging is: 62%.

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), Installation (I) Use (U), and End of life (E).

Modeling hypothesis and method:

Product Environmental Profile – PEP

- The calculation was performed on RBC12 APC Replacement Battery Cartridge #12 product.
- Product packaging is included.
- Installation components: no special components included.
- Scenario for the Use phase: the products in this range are not directly covered by a PSR. A small amount of energy (0.0854 W for the reference product) is consumed by continuously maintain the initial battery charge. The assumed service lifetime is 5 years based on the recommendation of the supplier.
- The geographical representative area for the assessment is European, and the electrical power model used for calculation is ELCD_Electricity_mix_<1kV_EU-27__ELCD-0089 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	For Replacement Battery Cartridge , commercial reference RBC12or description of the representative product					
		S = M + D + I + U + E	M	D	I	U	E
Air Acidification (AA)	g H+ eq	1.74E+01	1.65E+01	2.00E-01	0.00E+00	4.77E-01	1.86E-01
Air toxicity (AT)	m³	4.97E+07	4.86E+07	2.97E+05	0.00E+00	5.53E+05	2.77E+05
Energy Depletion (ED)	MJ	8.05E+02	7.32E+02	1.52E+01	0.00E+00	4.47E+01	1.33E+01
Global Warming Potential (GWP)	g CO ₂ eq.	4.60E+04	4.18E+04	1.07E+03	0.00E+00	2.21E+03	9.46E+02
Hazardous Waste Production (HWP)	Kg	3.06E-01	3.05E-01	1.33E-06	0.00E+00	3.79E-04	1.17E-06
Ozone Depletion Potential (ODP)	g CFC-11 eq.	8.15E-03	7.64E-03	2.04E-06	0.00E+00	5.04E-04	1.79E-06
Photochemical Ozone Creation Potential (POCP)	g C ₂ H ₄ eq.	1.95E+01	1.89E+01	2.40E-01	0.00E+00	1.37E-01	2.36E-01
Raw Material Depletion (RMD)	Y-1	1.09E-12	1.09E-12	2.20E-17	0.00E+00	2.98E-17	1.93E-17
Water Depletion (WD)	dm³	4.29E+02	4.23E+02	1.12E-01	0.00E+00	5.76E+00	9.82E-02
Water Eutrophication (WE)	g PO ₄ ³⁻ eq.	3.00E+00	2.98E+00	2.00E-03	0.00E+00	2.10E-02	1.76E-03
Water Toxicity (WT)	m³	1.35E+01	1.16E+01	4.60E-01	0.00E+00	9.84E-01	4.04E-01

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 5 and with its database version CODDE 2015-04.

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

This product range benefits from an eco-design process which is utilized in the design of all products. A design scorecard is generated for all new products to assist engineers in deploying eco-design and then comparing the design features of the new product against the previous version of the product. which help reduce its impacts on the environment.

According to this environmental analysis, proportionality rules may be used to evaluate the impacts of other products of this range: Across all impact categories impacts of other products in this family may be proportional extrapolated based on the ratio of the product mass to that of the reference product mass. The impacts for installation and use are zero across all products in the family.

System approach

As the products of the range are designed in accordance with the European RoHS Directive 2011/65/EU, 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

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 ⁺ .
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.
Energy Depletion (ED)	This indicator gives the quantity of energy consumed, whether it is from fossil, hydroelectric, nuclear or other sources. It takes into account the energy from the material produced during combustion. It is expressed in MJ.
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 .
Hazardous Waste Production (HWP)	This indicator quantifies 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.
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.
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).
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.
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 .
Water Eutrophication (WE)	Eutrophication is a natural process defined as the enrichment in mineral salts of marine or lake waters or a process accelerated by human intervention, defined as the enrichment in nutritive elements (phosphorous compounds, nitrogen compounds and organic matter). This indicator represents the water eutrophication of lakes and marine waters by the release of specific substances in the effluents. It is expressed in grams equivalency of PO ₄ ³⁻ (phosphate).
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.

PEP achieved with Schneider-Electric TT01 V10 and TT02 V22 procedures in compliance with ISO14040 series standards

Verifier accreditation N° : VH08				Applicable PCR : PEP-PCR-ed 2.1-EN-2012 12 11			
Date of issue: 12-2015				Period of validity: 6 years			
Independent verification of the declaration and data, according to ISO 14025:2006							
Internal		X	External				
In compliance with ISO 14025:2006 type III environmental declarations							
PCR review was conducted by an expert panel chaired by J. Chevalier (CSTB).							
The elements of the actual PEP cannot be compared with elements from another program.							

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