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Product Environmental Profile

Harmony push-button XB6E…..



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Product Environmental Profile - PEP

Product overview

The main purpose of the XB6E….. range is to establish or open an electrical contact (from 5 V to 250 V, AC/DC) and thus to switch on or off an equipment.

This range consists of: pushbuttons, selector/key switches, emergency stop trigger action pushbuttons for start / stop machines, pilot lights, illuminated pushbuttons and illuminated emergency stop pushbuttons for mounting in diameter 16 mm hole.

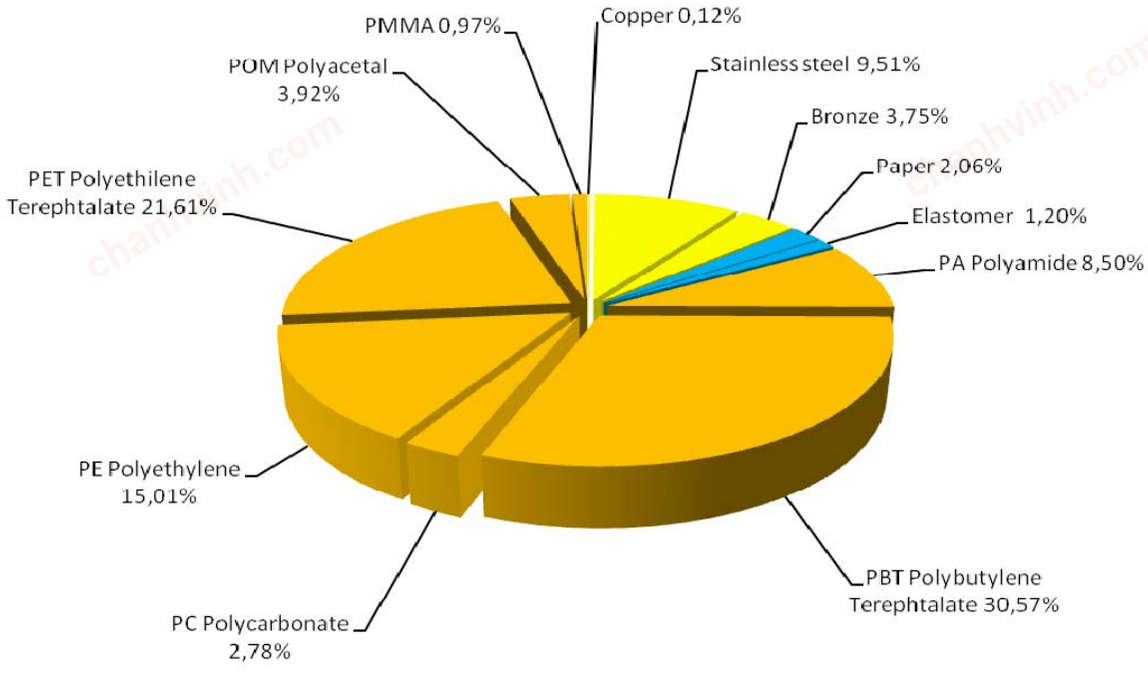
The representative product used for the analysis is XB6EAA11P. Its main features are: no illuminated pushbutton with spring return, round shape, white color, 1 NO and 1 NC contact.

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 10 g and 27.9 g including packaging. It is 12.3 g for the XB6EAA11P. 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

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)

Manufacturing

The XB6EAA….. products range is 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 XB6E….. packaging weight is *4.7 g*. It consists of PET, low density PE and paper.

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

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Use

The products of the XB6E….. 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 0.11 W and 0.47 W for the XB6E….. product range. It is 0.11 W (utilisation category AC12: Ue = 120 V and Ie = 1.5 A, see IEC 60947-5-1) for the referenced XB6EAA11P. In real standard use conditions, dissipated power is less or equal to 20 µW by contact block (under I = 20 mA) for the XB6E….. products range. So, it is 20 µW for the referenced XB6EAA11P.This thermal dissipation represents less than 0.06 % 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 XB6E….. have been optimized to decrease the amount of waste and allow recovery of the product components and materials. This product range doesn't need any special end-of-life treatment. According to countries' practices this product can enter the usual end-of-life treatment process. 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: 26 %.
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:
- the calculation was performed on the XB6EAA11P
- product packaging: is included
- scenario for the Use phase: this product range is included in the category 1: (assumed service life is 20 years and use scenario is: Product dissipation is 20 µW (according to utilisation category AC12 (Ue = 120 V and Ie = 1.5 A)), loading rate is 30% and service uptime percentage is 30%.
- the geographical representative area for the assessment is European zone and the electrical power model used for calculation is 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	For 1 pushbutton XB6EAA11P				
		S=M+D+U+E	M	D	U	E
Raw Material Depletion	Y-1	2,30E-16	1,53E-16	9,52E-20	7,69E-17	2,51E-20
Energy Depletion	MJ	7,12E+01	3,43E+00	6,98E-02	6,77E+01	1,84E-02
Water depletion	dm^3	1,03E+01	5,01E-01	6,63E-03	9,79E+00	1,74E-03
Global Warming	g≈CO_2	3,65E+03	2,31E+02	5,53E+00	3,42E+03	1,46E+00
Ozone Depletion	g≈CFC-11	3,11E-04	1,21E-04	3,91E-06	1,86E-04	1,03E-06
Air Toxicity	m^3	6,12E+05	4,40E+04	1,04E+03	5,67E+05	2,74E+02
Photochemical Ozone Creation	g≈C_2H_4	1,37E+00	2,06E-01	4,73E-03	1,16E+00	1,24E-03
Air acidification	g≈H^+	4,92E-01	3,01E-02	7,05E-04	4,61E-01	1,85E-04
Water Toxicity	dm^3	1,02E+03	4,85E+01	6,91E-01	9,75E+02	1,82E-01
Water Eutrophication	g≈PO_4	1,82E-02	1,01E-02	9,19E-05	8,03E-03	2,42E-05
Hazardous waste production	kg	5,79E-02	1,17E-03	2,06E-06	5,67E-02	5,41E-07

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 4.1, and with its database version 11.0.
The manufacturing phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.
In order to evaluate the impact of other products, it has to be considered that the electric consumption is the same through the whole range (only contact resistance). Thus the rule to be applied for another reference within this range is:

- Multiply Manufacturing (M), Distribution (D) & End-of-Life (E) impacts by the mass of the product divided by 12.3 (mass of the reference product)
- Keep the Use (U) phase as is.

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.

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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_2H_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 achieved with Schneider-Electric TT01 V5 and TT02 V15 procedures in compliance with ISO14040 series standards
PEP established according to PEPecopassport PCR : PEP- PCR-ed 2-EN-2011 12 09 rules

Schneider Electric Industries SAS
35, rue Joseph Monier
CS 30323
F- 92506 Rueil Malmaison Cedex
RCS Nanterre 954 503 439
Capital social 896 313 776 €

www.schneider-electric.com

Published by: Schneider Electric

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