Product Environmental Profile

Miniature Circuit Breaker: PLN6 Series (MW)

Eaton product	PLN6 B16/1N PSR product category: Circuit Breaker
Description of the product	PLN6 Module Width (MW) Miniature Circuit Breaker (MCB) is an automatically operating electrical switch protecting an electrical circuit from damage caused by excess current from an overload or short circuit. It is provided with a thermal-magnetic trip unit.
Homogeneous Environmental Families Covered	The PEP concerns all the MCB offering combinations with following specifications- Series: PLN6, PLN4, HLN No. of poles: 1+N (compacted in 1 modular unit) Rated current range: 2-40 A Tripping characteristics: B, C
Functional unit	Protect during 20 years the installation against overloads and short-circuits in circuit with assigned voltage 230V/400V and rated current 16A. This protection is ensured in accordance with the following parameters: - Number of poles 1+N - Rated breaking capacity 6kA - Tripping curve B
Company information	EATON Electroproductie SRL, Strada Independentei, Nr: 8 437071, Sârbi, Romania Email: productstewardship-es@eaton.com

Constituent Materials			
Reference product mass	1.79E-01 kg (with packaging)		
Category PEP Material	Materials	Mass (kg)	Percentage (%)
Others	Cardboard	6.12E-02	34.19%
Metal	Steel	4.14E-02	23.13%
Plastic	Ultramid	4.05E-02	22.63%
Metal	Copper	2.38E-02	13.30%
Plastic	Polyamide	5.07E-03	2.83%
Others	Paper	2.95E-03	1.65%
Plastic	Polyphenylene sulphide	1.33E-03	0.74%
Plastic	PET	1.32E-03	0.74%
Metal	Aluminium	4.78E-04	0.27%
Others	Glue	3.63E-04	0.20%
Others	Glass fibre	2.69E-04	0.15%
Metal	Silicon	2.27E-04	0.13%
Metal	Ferrous alloy	2.07E-04	0.12%
Metal	Silver	5.54E-09	<0.1%
Total		**1.79E-01**	

Substance Assessment

The representative product is compliant with the EU-RoHS Directive (2011/65/EU) by application of exemptions and the product contains lead (Pb) which is listed as Substance-of-Very-High-Concern (SVHC) on the Candidate List of the EU-REACH Regulation (1907/2006/EC).

Additional Environmental Information	
Manufacturing	The reference product is assembled at Eaton plant holding management system certifications according to ISO 14001 standards.
Distribution	Eaton is committed to minimizing weight and volume of product and packaging with focus to optimize transport efficiency.
Installation	Product installation need standard tools which do not require any additional energy source and no waste other than the obsolete product packaging is generated during this step. Only treatment of packaging waste is considered in this phase.
Use	Product do not require maintenance during operation.
End of life	Recyclability of product is equal to 54.0% as per EIME calculated based on the method described in IEC/TR 62635, Edition 1.0/2012-10 "Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment".

Environmental Impacts	
The calculation of environmental impacts is the result of a Product Life Cycle Analysis in accordance with ISO 14040/44, covering the entire product lifecycle, i.e. "Cradle-to-Grave" including the following life cycle phases: production, distribution, installation, use and end of life. System modelling was carried out using the commercial LCA software EIME v5.9.4 with database version CODDE-2022-01.	
Manufacturing Phase	The product is manufactured at EATON Electroproductie SRL, Sârbi, Romania Energy modelled used: Romania
Distribution Phase	Distribution of the product in its packaging from the manufacturer's last logistics platform to the installation place is considered as per PCR rules.
Installation Phase	Product installed in Europe. Only treatment of packaging waste is considered in this phase. Energy model used: Europe
Use Phase	Reference lifetime: 20 Years Energy model used: Europe Usage profile: The product has an average power loss of 0.4736 W in active mode with 50% of the loading rate. For 30% of the use time rate, total losses are 24.9 kWh over the 20 years. No maintenance required for the product.
End of life Phase	Product disposed with WEEE guidelines. Energy model used: Europe

Environmental Impact Indicators: Mandatory

Impact Indicators	Unit	Total	Manufacturing	Distribution	Installation	Use* (B6 Only)	End of life
Global warming (GWP100)	kg CO_2 eq.	1.09E+01	1.02E+00	4.22E-02	8.24E-03	9.84E+00	2.16E-02
Ozone layer depletion	kg CFC-11 eq.	1.24E-07	8.45E-08	8.55E-11	1.67E-11	3.90E-08	7.68E-10
Acidification potential	kg SO_2 eq.	1.97E-02	2.25E-03	1.90E-04	3.83E-05	1.72E-02	2.74E-05
Eutrophication	kg PO_4^{3-} eq.	4.77E-03	1.54E-03	4.36E-05	9.14E-06	3.17E-03	9.09E-06
Photochemical oxidation	kg ethylene eq.	1.58E-03	2.05E-04	1.35E-05	2.79E-06	1.35E-03	3.08E-06
Abiotic depletion (elements)	kg antimony eq.	2.39E-06	1.38E-06	1.69E-09	3.24E-10	1.01E-06	2.66E-10
Abiotic depletion (fossil fuels)	MJ	1.63E+02	8.74E+00	5.93E-01	1.14E-01	1.53E+02	1.07E-01
Water Pollution	m^3	3.84E+02	2.71E+01	6.94E+00	1.34E+00	3.48E+02	1.27E+00
Air pollution	m^3	7.48E+02	6.47E+01	1.73E+00	3.73E-01	6.80E+02	1.17E+00

*B6 is energy requirements during the use stage. Other sub modules in the use stage (B2-,B7) are equal to zero. So, it is not listed in the table

Environmental Impact Indicators: Optional

Impact Indicators	Unit	Total	Manufacturing	Distribution	Installation	Use* (B6 Only)	End of life
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	5.20E+01	2.06E+00	7.95E-04	1.52E-04	4.99E+01	1.49E-04
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	5.20E+01	2.06E+00	7.95E-04	1.52E-04	4.99E+01	1.49E-04
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	2.74E+02	1.28E+01	5.96E-01	1.14E-01	2.60E+02	1.40E-01
Use of non-renewable primary energy resources used as raw materials	MJ	1.82E+00	1.82E+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	2.75E+02	1.46E+01	5.96E-01	1.14E-01	2.60E+02	1.40E-01
Use of secondary materials	kg	9.88E-02	9.88E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	m3	6.71E-01	2.29E-01	3.78E-06	7.28E-07	4.42E-01	1.73E-05
Hazardous waste disposed of	kg	7.08E-01	3.50E-01	0.00E+00	1.08E-07	1.91E-01	1.67E-01
Non-hazardous waste disposed of	kg	2.25E+00	7.80E-01	1.50E-03	3.91E-04	1.47E+00	4.46E-04
Radioactive waste disposed of	kg	6.45E-04	3.36E-04	1.07E-06	2.05E-07	3.07E-04	7.59E-07
Materials for recycling	kg	1.65E-01	3.89E-02	0.00E+00	6.40E-02	0.00E+00	6.17E-02
Materials for energy recovery	kg	9.52E-04	3.05E-04	0.00E+00	6.48E-04	0.00E+00	0.00E+00
Total use of primary energy during the life cycle	MJ	3.27E+02	1.66E+01	5.97E-01	1.14E-01	3.10E+02	1.40E-01

*B6 is energy requirements during the use stage. Other sub modules in the use stage (B1-B5, B7) are equal to zero. So, it is not listed in the table.

To evaluate the environmental impact of other product covered by this PEP, multiply the impact figures by –

Factors for Manufacturing, Distribution, Installation and End-of-Life Phase:

Category	MCB Series	No. of poles	Rated current range (A)	Tripping characteristics	Multiplying factor
Reference	PLN6	1+N	16	B	1
Other products under homogeneous environmental family	PLN4	1+N	2-40	B, C	1
	PLN6	1+N	2-40	B, C	1
	HLN	1+N	2-40	B, C	1

Factors for Use Phase:

Series	Tripping characteristics	Rated Current (A)	Multiplying factor for Use phase
PLN4	B	6	0.80
		10	0.88
		13	0.96
		16	1.00
		20	1.46
		25	1.32
		32	1.62
		40	2.03
	C	2	0.70
		4	0.68
		6	0.55
		10	0.88
		13	0.97
		16	1.01
		20	1.39
		25	1.72
		32	1.62
		40	1.86
PLN6	B	6	0.80
		10	0.88
		13	0.96
		16	1.00
		20	1.46
		25	1.32
		32	1.62
		40	2.03
	C	2	0.70
		4	0.68
		6	0.55
		10	0.88

Series	Tripping characteristics	Rated Current (A)	Multiplying factor for Use phase
		13	0.97
		16	1.01
		20	1.39
		25	1.72
		32	1.62
		40	1.86
HLN	B	6	0.80
		10	0.88
		13	0.96
		16	1.00
		20	1.46
		25	1.32
		32	1.62
		40	2.03
	C	2	0.70
		4	0.68
		6	0.55
		10	0.88
		13	0.97
		16	1.01
		20	1.39
		25	1.72
		32	1.62
		40	1.86

Disclaimer
This Product Environmental Profile and its content is based on information available to us. It refers to the product at the date of issue. We make no express or implied representations or warranties with respect to the information contained herein.

Registration N°	EATO-00058-V01.01-EN	*Drafting rules*	PCR-ed3-EN-2015 04 02
Verifier accreditation N°	VH47	*Supplemented by*	PSR-0005-ed2-EN-2016 03 29
Date of issue	12-2022	*Information and reference documents*	www.pep-ecopassport.org
		Validity period	5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2010			
Internal	X	External	
The PCR review was conducted by a panel of experts chaired by chaired by Philippe Osset (SOLINNEN)			
The elements of the present PEP cannot be compared with elements from another program.			
Document in compliance with ISO 14025: 2010 « Environmental labels and declarations. Type III environmental declarations »			