



FAZ Miniature circuit breaker (xEffect Series)

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Representative product	FAZ-C63/4-AS (181717) Product Category: Circuit-breakers
Description of the series	FAZ 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. It is used for commercial, industrial and civil applications.
Homogeneous Environmental Families Covered	The PEP concerns all the MCB offerings combinations with following specifications - Series: FAZ No. of poles - 1P, 1+N, 2P, 3P, 3+N, 4P Rated current range - 0.16-63A. Tripping Characteristics - B, C, D
Functional unit	Protect the installation from overloads and short circuits in a circuit with rated voltage 400 V, rated current 63 A, with 4 poles, a rated breaking capacity 15KA, in the industrial application area, according to the appropriate use scenario, and during the reference service life of the product of 20 years.
Company information	EATON Electrical LTD 2# AND 6# LOU YAN RD Suzhou, China, 215021 Email : productstewardship-es@eaton.com

Constituent Materials			
Reference product mass (kg)		5.42E-01 Kg (With Packaging)	
Category PEP Material	Material constituent	Mass (kg)	% Contribution
Plastic	PA 6.6 GF30%	1.82E-01	33.6%
Metal	Steel	1.64E-01	30.2%
Metal	Copper	9.81E-02	18.1%
Metal	Stainless steel with chrome	4.68E-02	8.6%
Others	Cardboard	2.85E-02	5.3%
Plastic	Polyamide 12 (PA 12)	7.18E-03	1.3%
Others	Paper	6.21E-03	1.1%
Metal	Ferronickel	4.28E-03	0.8%
Plastic	Polyamide (PA 6)	3.03E-03	0.6%
Plastic	Polyamide (PA 6.6)	7.96E-04	0.1%
Metal	Silver	5.34E-04	<0.1%
Plastic	Polyoxymethylene (POM)	4.14E-04	<0.1%
Plastic	Polybutylene terephthalate (PBT)	2.16E-04	<0.1%
Others	Glue	1.61E-04	<0.1%
Metal	Silicon	1.01E-04	<0.1%
Others	Miscellaneous	3.60E-05	<0.1%
Total		5.42E-01	100.0%

Substance Assessment

The representative product is compliant with the EU-RoHS Directive (2011/65/EU) with exemption and the product contain Lead (CAS No 7439-92-1) substance listed as Substance-of-Very-High-Concern (SVHC) on the Candidate List of the EU-REACH Regulation (1907/2008/EC).

Additional Environmental Information

Manufacturing	The reference product is manufactured and assembled at an Eaton plant Suzhou, China holding Environmental management system certifications according to ISO 14001 standards.
Distribution	Eaton is committed to minimizing weight and volume of product and its associated packaging material with focus to optimize transport efficiency.
Installation	During installation of the product only standard tools are needed, which do not require any additional energy source and no waste other than the obsolete product packaging is generated during this step.
Use	The product requires energy consumption during operation but does not require any maintenance.
End of life	The product is disposed considering 100% incineration without energy recovery.

Environmental Impacts

The calculation of the environmental impacts is the result of the Product's Life Cycle Analysis in accordance with ISO 14040/44, covering the entire 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 v6.3.0.1-20 with database version CODDE-2025-04 Indicators Set used: PEF EF 3.1 (Compliance: PEP ed.4, EN15804+A2) v2.0

Manufacturing	The product is manufactured at an Eaton plant Suzhou, China. Energy model used: China.
Distribution	Since Asia is the major market for the product, following transport scenario is considered for the product from Eaton Suzhou plant to end user for this study. As per PCR 4 (section 2.5.3), 3500 km by road.

Installation	Product is installed in various countries of Asia. Hence, packaging waste treatment is considered in this phase considering country specific statistics as per PSR. Energy model used: Europe
Use	Reference lifetime: 20 years Energy model used: Asia Pacific. Usage profile: The product has an average power loss of 4.76 W in active mode with 50% of the loading rate. For 30% of the use time rate, total losses are 250.33 kWh over the 20 years. Product do not require any maintenance/replacement during useful life. No maintenance required for the product.
End of life	The product is disposed considering 100% incineration without energy recovery.. Energy model used: Europe

Environmental Impact considering for Functional Unit

Environmental Impact Indicators: Mandatory

Mandatory environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	Use(B1-B7)* (Only B6)	C1-C4 - End of life
Climate change - total	kg CO2 eq.	1.92E+02	4.31E+00	1.22E-01	6.66E-02	1.87E+02	2.73E-01
Climate change - fossil fuels	kg CO2 eq.	1.91E+02	4.32E+00	1.22E-01	1.17E-02	1.86E+02	2.71E-01
Climate change - biogenics	kg CO2 eq.	6.64E-01	-1.07E-02	4.99E-07	5.49E-02	6.18E-01	2.20E-03
Climate change - land use and land use transformation	kg CO2 eq.	3.59E-07	1.64E-07	1.84E-07	5.96E-10	0.00E+00	9.82E-09
Ozone depletion	kg eq. CFC-11	1.25E-06	2.33E-07	1.48E-09	4.31E-10	9.87E-07	2.72E-08
Acidification (AP)	mole of H+ eq.	1.34E+00	4.33E-02	1.93E-04	6.91E-05	1.29E+00	1.91E-03
Freshwater eutrophication	kg P eq.	9.84E-05	3.93E-05	4.55E-07	1.51E-08	5.82E-05	3.96E-07
Marine aquatic eutrophication	kg of N eq.	1.45E-01	3.40E-03	3.49E-05	1.66E-05	1.41E-01	4.62E-04
Terrestrial eutrophication	mole of N eq.	1.69E+00	3.69E-02	3.83E-04	2.22E-04	1.64E+00	6.12E-03
Photochemical ozone formation	kg of NMVOC eq.	4.84E-01	1.31E-02	1.24E-04	4.68E-05	4.70E-01	1.33E-03
Depletion of abiotic resources - elements	kg eq. Sb	9.48E-04	9.28E-04	4.35E-08	1.80E-09	2.00E-05	3.76E-08
Depletion of abiotic resources - fossil fuels	MJ	3.20E+03	9.81E+01	2.16E+00	2.19E-01	3.10E+03	5.03E+00
Water scarcity	m3 eq	1.23E+01	1.86E+00	4.39E-03	6.96E-04	1.04E+01	3.27E-02

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

Inventory Flow Indicators: Mandatory

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	Use(B1-B7)* (Only B6)	C1-C4 - End of life
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	3.06E+02	4.03E+00	6.82E-03	1.90E-02	3.01E+02	3.66E-01
Use of renewable primary energy resources used as raw materials	MJ	5.92E-01	5.92E-01	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	3.06E+02	4.62E+00	6.82E-03	1.90E-02	3.01E+02	3.66E-01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	3.20E+03	9.36E+01	2.16E+00	2.19E-01	3.10E+03	5.03E+00
Use of non-renewable primary energy resources used as raw materials	MJ	4.48E+00	4.48E+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	3.20E+03	9.81E+01	2.16E+00	2.19E-01	3.10E+03	5.03E+00
Use of secondary materials	kg	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
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
Net use of fresh water	m3	2.87E-01	4.34E-02	1.02E-04	1.59E-05	2.43E-01	7.57E-04
Hazardous waste disposed of	kg	2.87E+01	2.24E+01	5.10E-04	1.30E-02	5.37E+00	8.62E-01
Non-hazardous waste disposed of	kg	3.53E+01	2.28E+00	1.13E-02	1.58E-03	3.30E+01	3.81E-02
Radioactive waste disposed of	kg	2.66E-03	1.34E-04	8.96E-06	6.66E-07	2.50E-03	1.83E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	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
Exported energy	MJ by energy vector	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content of the product	kg of C.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content of the associated packaging	kg of C.	1.48E-02	1.48E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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

Environmental Impact Indicators: Optional

Optional Environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	Use (B1-B7)* (Only B6)	C1-C4 - End of life
Total primary energy	MJ	3.51E+03	1.03E+02	2.17E+00	2.38E-01	3.40E+03	5.40E+00
Particulate matter	Incidence of diseases	7.61E-06	3.31E-07	1.65E-09	4.79E-10	7.27E-06	1.27E-08
Ionising radiation, human health	kBq U235 eq	3.56E+01	3.08E+00	4.31E-03	4.39E-03	3.24E+01	9.78E-02
Ecotoxicity, freshwater	CTUe	2.64E+03	2.25E+03	3.56E+00	3.04E-01	3.84E+02	8.62E+00
Human toxicity, cancer	CTUh	9.37E-07	9.13E-07	2.39E-11	2.20E-12	2.37E-08	8.74E-11
Human toxicity, non-cancer	CTUh	1.41E-06	5.00E-07	4.55E-10	8.78E-11	9.09E-07	3.89E-09
Land use	without dimension	1.13E+00	1.18E-02	5.22E-04	2.57E-04	1.11E+00	9.09E-03

***Note:** For the considered scenario, *B6 is energy requirements during the use stage. Other sub modules in the use stage (B1- 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, apply the following conversion factors to the Environmental Impact shown above.

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

Model	MCB Series	No. of poles	Rated current range (A)	Tripping characteristics	Multiplying factors for all current ranges
Baseline	FAZ-C63/4	4P	63	C	1
Other homogeneous env. Family	FAZ	1P	0.16-63	B, C, D	0.25
		1+N			0.5
		2P			0.5
		3P			0.75
		3+N			1
		4P			1

Multiplication Factors for Use Phase:

Series	Tripping characteristics	Rated Current(A)	Multiplying factor for Use phase			
			1 pole & 1P+N	2 pole	3 Pole & 3P+N	4 Pole
FAZ	B	1	0.23	0.46	0.69	0.92
	B	1.5	0.43	0.85	1.28	1.70
	B	1.6	0.48	0.97	1.45	1.93
	B	2	0.29	0.59	0.88	1.18
	B	2.5	0.31	0.63	0.94	1.26
	B	3	0.42	0.83	1.25	1.66
	B	3.5	0.49	0.98	1.47	1.95
	B	4	0.29	0.58	0.88	1.17
	B	5	0.38	0.76	1.13	1.51
	B	6	0.36	0.71	1.07	1.42
	B	7	0.39	0.78	1.17	1.56
	B	8	0.40	0.81	1.21	1.61
	B	10	0.36	0.71	1.07	1.43
	B	12	0.48	0.97	1.45	1.93
	B	13	0.46	0.92	1.38	1.85
	B	15	0.38	0.76	1.13	1.51
	B	16	0.43	0.86	1.29	1.72
	B	20	0.58	1.16	1.74	2.32

Series	Tripping characteristics	Rated Current(A)	Multiplying factor for Use phase			
			1 pole & 1P+N	2 pole	3 Pole & 3P+N	4 Pole
	B	25	0.51	1.02	1.54	2.05
	B	30	0.53	1.06	1.59	2.12
	B	32	0.64	1.29	1.93	2.58
	B	35	0.75	1.49	2.24	2.98
	B	40	0.64	1.28	1.91	2.55
	B	50	0.84	1.68	2.52	3.36
	B	63	1.00	2.00	3.00	4.00
	C	0.16	0.28	0.57	0.85	1.14
	C	0.25	0.33	0.66	0.98	1.31
	C	0.5	0.34	0.68	1.02	1.36
	C	0.75	0.51	1.02	1.52	2.03
	C	1	0.23	0.46	0.69	0.92
	C	1.5	0.27	0.55	0.82	1.10
	C	1.6	0.31	0.62	0.94	1.25
	C	2	0.29	0.59	0.88	1.18
	C	2.5	0.31	0.63	0.94	1.26
	C	3	0.25	0.49	0.74	0.98
	C	3.5	0.26	0.51	0.77	1.03
	C	4	0.29	0.58	0.88	1.17
	C	5	0.31	0.63	0.94	1.26
	C	6	0.24	0.48	0.73	0.97
	C	7	0.29	0.58	0.86	1.15
	C	8	0.26	0.51	0.77	1.02
	C	10	0.29	0.59	0.88	1.18
	C	12	0.39	0.79	1.18	1.57
	C	13	0.46	0.92	1.38	1.85
	C	15	0.38	0.76	1.13	1.51
	C	16	0.43	0.86	1.29	1.72
	C	20	0.58	1.16	1.74	2.32
	C	25	0.51	1.02	1.54	2.05
	C	30	0.53	1.06	1.59	2.12
	C	32	0.64	1.29	1.93	2.58
	C	35	0.64	1.29	1.93	2.57
	C	40	0.64	1.28	1.91	2.55
	C	50	0.84	1.68	2.52	3.36
	C	63	1.00	2.00	3.00	4.00
	D	0.5	0.34	0.68	1.02	1.36
	D	1	0.17	0.34	0.50	0.67
	D	1.5	0.23	0.46	0.69	0.93
	D	1.6	0.26	0.53	0.79	1.05
	D	2	0.22	0.44	0.66	0.87
	D	2.5	0.20	0.39	0.59	0.79
	D	3	0.25	0.49	0.74	0.98
	D	3.5	0.26	0.51	0.77	1.03
	D	4	0.29	0.58	0.88	1.17
	D	5	0.30	0.61	0.91	1.22
	D	6	0.24	0.48	0.73	0.97
	D	7	0.29	0.58	0.86	1.15
	D	8	0.26	0.51	0.77	1.02
	D	10	0.29	0.59	0.88	1.18
	D	12	0.33	0.67	1.00	1.33
	D	13	0.39	0.78	1.17	1.56
	D	15	0.38	0.76	1.13	1.51
	D	16	0.43	0.86	1.29	1.72
	D	20	0.41	0.82	1.23	1.65
	D	25	0.46	0.92	1.38	1.84
	D	30	0.47	0.94	1.42	1.89
	D	32	0.56	1.12	1.68	2.24

Series	Tripping characteristics	Rated Current(A)	Multiplying factor for Use phase			
			1 pole & 1P+N	2 pole	3 Pole & 3P+N	4 Pole
	D	35	0.64	1.29	1.93	2.57
	D	40	0.60	1.21	1.81	2.42
	D	50	0.89	1.78	2.68	3.57
	D	63	1.00	2.00	3.00	4.00

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Independent verification of the declaration and data, in compliance with ISO 14025: 2006			
Internal	X	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 or EN 50693:2019			
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"			