Powering Business Worldwide	**Product Environmental Profile**	PEP ecopassport®

	**NZM4 Molded Case Circuit Breaker (UL) With Electronic Trip Unit and STD Technology**

Representative product	NZMH4-VE1200-NA (Y7-271159) Product Category: Circuit Breaker
Description of the product	Eaton Moeller series NZM4 molded case circuit breaker with Electronic Trip Unit and STD Technology is designed to provide circuit protection for low-voltage distribution systems. The NZM circuit breakers protect entire systems and cables across all levels, from the main distribution board all the way to the load itself.
Homogeneous Environmental Families Covered	The PEP concerns following product offerings from Eaton Moeller series NZM Circuit Breaker as mentioned below: • Series: NZM4 Circuit Breaker • Switching Capacity: H (High), N (Normal) • Rated Current: 800A, 1000A, 1200A • Release Type: AE (System protection, electronic), VE (Selectivity and generator protection, electronic) • Region of Usage: North America, UL-listed / CSA-certified
Functional unit	'Protect the installation from overloads and short circuits in a circuit with rated voltage 690V, rated current 1200A, with 3 poles, a rated breaking capacity 50kA, with IP20 Rating, 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 Electro Productie s.r.l, Independentei 8, Sarbi, Romania, 437157 Email: productstewardship-es@eaton.com

Constituent Materials			
Reference product mass	2.05E+01 Kg (With packaging)		
Category PEP Material	**Material constituent**	**Mass (kg)**	**% Contribution**
Metals	Copper	7.09E+00	34.6%
Plastics	Polycarbonate	5.85E+00	28.6%
Metals	Steel	3.27E+00	16.0%
Other	Cardboard	9.44E-01	4.6%
Metals	Stainless Steel	8.28E-01	4.0%
Other	Wood	5.83E-01	2.8%
Plastics	Polyester	5.78E-01	2.8%
Plastics	Polyurethane	4.44E-01	2.2%
Other	Glass Fiber	2.38E-01	1.2%
Plastics	Polyetherimide	1.71E-01	0.8%
Plastics	Polyamide	1.52E-01	0.7%
Other	Printed Wiring Board	1.37E-01	0.7%
Plastics	Polybutylene Terephthalate (PBT)	8.11E-02	0.4%
Plastics	Silver	4.35E-02	0.2%
Metals	Ferromagnet	2.74E-02	0.1%
Other	Miscellaneous	4.63E-02	0.2%
Total		2.05E+01	100.0%

Substance Assessment
The representative product is compliant/exempted with the EU-RoHS Directive (2011/65/EU) and the product does contain Lead, Perfluorobutane sulfonic acid (PFBS) and its salts, diboron trioxide, lead monoxide and Lead titanium zirconium oxide as substance 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 an Eaton plant Sarbi, Romania 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	The installation process does not require any energy consumption and there is no waste other than the obsolete product packaging generated during this step.
Use	The product requires energy consumption during operation.
End of life	The product is assumed to be disposed with 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 v6.2.4 with database version CODDE-2024-04 (Updated on 2024-06-04). Indicators Set: PEF EF 3.1 (Compliance: PEP ed.4, EN15804+A2) v2.0	
Manufacturing Phase	The product is assembled as well as packed at Eaton facility in Sarbi, Romania. Product is then shipped to distribution centre in Rheinbach, Germany. Energy model used: Romania
Distribution Phase	Distribution of the product in its packaging from the Eaton's last logistics platform to the installation place in North America is considered as per PSR rules.
Installation Phase	Product is installed in North America, United States. There is no installation energy consumption for reference product. Only treatment of packaging waste is considered in this phase.
Use Phase	Reference lifetime: 20 Years Usage profile: The product has power loss of 160 W at full load condition. As per PSR-0005 section 3.2.2., for Industrial applications considering 50% of the loading rate and 30% of the use time rate, total losses are 2102.4 kWh over the 20 years. Product do not require any maintenance/replacement during useful life. Energy model used: United States
End of life Phase	Product is disposed considering WEEE guidelines with default scenario.
Module-D	Module D is calculated according to PCR-ed4-EN-2021 09 06 based on the materials recycled and the modelled end-of-life scenario. It expresses the net benefits and loads beyond the boundaries of the system and are not to be included in the life cycle totals.

Environmental Impact Indicators: Mandatory

Mandatory environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Climate change - total (GWP)	kg CO_2 eq.	1.16E+03	1.34E+02	6.54E+00	2.92E+00	1.01E+03	9.66E+00	0.00E+00
Climate change - fossil fuels (GWP-f)	kg CO_2 eq.	1.16E+03	1.33E+02	6.54E+00	5.73E-01	1.01E+03	9.64E+00	0.00E+00
Climate change - biogenics (GWP-b)	kg CO_2 eq.	5.03E+00	1.22E+00	0.00E+00	2.35E+00	1.44E+00	2.62E-02	0.00E+00
Climate change - land use and land use transformation (GWP-lu)	kg CO_2 eq.	8.12E-03	8.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ozone depletion (ODP)	kg eq. CFC-11	1.84E-05	1.36E-05	8.58E-09	1.92E-08	4.00E-06	8.69E-07	0.00E+00

Mandatory environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Acidification (AP)	mole of H+ eq.	7.00E+00	2.14E+00	2.17E-01	3.38E-03	4.57E+00	6.90E-02	0.00E+00
Freshwater eutrophication (Ep-fw)	kg P eq.	1.91E-02	1.73E-02	2.26E-06	4.50E-07	1.80E-03	1.28E-05	0.00E+00
Marine aquatic eutrophication (Ep-m)	kg of N eq.	7.65E-01	1.14E-01	5.16E-02	8.32E-04	5.80E-01	1.79E-02	0.00E+00
Terrestrial eutrophication (Ep-t)	mole of N eq.	9.05E+00	1.32E+00	5.66E-01	1.09E-02	6.92E+00	2.30E-01	0.00E+00
Photochemical ozone formation (POCP)	kg of NMVOC eq.	2.62E+00	5.05E-01	1.46E-01	2.35E-03	1.91E+00	5.13E-02	0.00E+00
Depletion of abiotic resources - elements (ADP-e)	kg eq. Sb	7.65E-02	7.63E-02	2.35E-07	4.04E-08	1.34E-04	6.69E-07	0.00E+00
Depletion of abiotic resources - fossil fuels (ADP-f)	MJ	2.56E+04	2.89E+03	8.31E+01	1.06E+01	2.24E+04	1.67E+02	0.00E+00
Water scarcity (WDP)	m^3 eq.deprivation worldwide	2.02E+02	1.54E+02	2.17E-02	2.33E-02	4.71E+01	9.02E-01	0.00E+00

Inventory Flow Indicators: Mandatory

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	2.62E+03	1.86E+02	1.07E-01	7.90E-01	2.43E+03	9.57E+00	0.00E+00
Use of renewable primary energy resources used as raw materials	MJ	2.89E+01	2.89E+01	0.00E+00	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	2.65E+03	2.14E+02	1.07E-01	7.90E-01	2.43E+03	9.57E+00	0.00E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	2.53E+04	2.66E+03	8.31E+01	1.06E+01	2.24E+04	1.67E+02	0.00E+00
Use of non-renewable primary energy resources used as raw materials	MJ	2.24E+02	2.24E+02	0.00E+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	2.56E+04	2.89E+03	8.31E+01	1.06E+01	2.24E+04	1.67E+02	0.00E+00

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Use of secondary materials	kg	2.48E-05	2.48E-05	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	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	0.00E+00
Net use of fresh water	m^3	4.71E+00	3.58E+00	5.04E-04	9.05E-04	1.10E+00	2.54E-02	0.00E+00
Hazardous waste disposed of	kg	1.47E+03	1.41E+03	0.00E+00	5.73E-01	2.18E+01	3.21E+01	0.00E+00
Non-hazardous waste disposed of	kg	2.27E+02	7.53E+01	2.01E-01	8.12E-02	1.50E+02	1.28E+00	0.00E+00
Radioactive waste disposed of	kg	8.63E-02	4.98E-02	1.40E-04	3.37E-05	3.58E-02	6.19E-04	0.00E+00
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	4.96E+00	4.96E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	1.21E-02	1.21E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ by energy vector	3.93E-05	3.93E-05	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	0.00E+00
Biogenic carbon content of the associated packaging	kg of C.	6.40E-01	6.40E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Environmental Impact Indicators: Optional

Optional Environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Emission of fine particles	incidence of diseases	5.06E-05	1.56E-05	1.15E-06	2.36E-08	3.34E-05	4.65E-07	0.00E+00
Ionizing radiation, human health	kBq U^{235} eq.	3.70E+03	2.71E+03	1.36E-02	2.36E-01	9.86E+02	3.29E+00	0.00E+00
Ecotoxicity, fresh water	CTUe	3.67E+03	1.97E+03	3.92E+00	1.31E+01	1.38E+03	2.97E+02	0.00E+00
Human toxicity, cancer effects	CTUh	1.19E-05	1.16E-05	9.81E-11	9.69E-11	1.18E-07	1.22E-07	0.00E+00
Human toxicity, non-cancer effects	CTUh	2.75E-05	2.43E-05	2.17E-09	3.94E-09	3.06E-06	1.48E-07	0.00E+00
Impacts related to land use/soil quality	-	9.23E+01	7.35E+01	0.00E+00	1.10E-02	1.85E+01	2.48E-01	0.00E+00
Total use of primary energy during the life cycle	MJ	2.82E+04	3.10E+03	8.32E+01	1.14E+01	2.48E+04	1.76E+02	0.00E+00

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

Factors for Manufacturing, Distribution, Installation, End-Of-Life and Module-D phases:

Part Number	Product Description	Extrapolation Factors for Manufacturing, distribution, installation and End of Life phase	Use Phase Extrapolation Factors
Y7-271159 (Reference)	NZMH4-VE1200-NA (Reference)	1.00	1.00
Y7-271124	NZMH4-AE1000-NA	1.00	0.77
Y7-271125	NZMH4-AE1200-NA	1.00	1.00
Y7-271123	NZMH4-AE800-NA	1.00	0.49
Y7-271158	NZMH4-VE1000-NA	1.00	0.77
Y7-271157	NZMH4-VE800-NA	1.00	0.49
Y7-271121	NZMN4-AE1000-NA	1.00	1.03
Y7-271122	NZMN4-AE1200-NA	1.00	1.00
Y7-271120	NZMN4-AE800-NA	1.00	0.66
Y7-271155	NZMN4-VE1000-NA	1.00	1.03
Y7-271156	NZMN4-VE1200-NA	1.00	1.00
Y7-271154	NZMN4-VE800-NA	1.00	0.66

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Registration Number	EATO-00266-V01.01-EN	*Drafting rules*	PCR-ed4-EN-2021 09 06
Verifier accreditation Number	VH53	Supplemented by	PSR-0005-ed3.1-EN-2023 12 08
Date of issue	12-2024	*Information and reference documents*	www.pep-ecopassport.org
		Validity period	5 years
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 and 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 »			