



NZM2 Molded Case Circuit Breaker (UL) with Electronic Trip Unit and STD Technology

Representative product	NZMH2-VE250-NA (Y7-271153) Product Category: Circuit Breakers
Description of the product	Eaton Moeller series NZM molded case circuit breaker with electronic trip unit is designed to protect the installation from overload and short circuits. It is used in unearthed supply systems up to 690 V.
Homogeneous Environmental Families Covered	The PEP concerns following product offerings from Eaton Moeller series NZM molded case circuit breaker with electronic trip unit as mentioned below: • Series: NZM Circuit Breaker • Switching Capacity: H (High), L (Limiter), N (Normal), S (Strong) • Rated Current - Classic Full Electronic (VE): 100 A, 160 A, 250 A • Rated Current - Classic Motor Electronic (ME): 90 A, 140 A, 200 A • No. of Poles: 3 • Type of Region: NA (North America)
Functional unit	“Protect the installation from overloads and short circuits in a circuit with rated voltage 690V, rated current 250A, with 3 poles, a rated breaking capacity 20 kA, and 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	2.70E+00 Kg (With packaging)		
Category PEP Material	Material constituent	Mass (kg)	% Contribution
Plastic	Polycarbonate	5.14E-01	19.0%
Plastic	Unsaturated Polyester Resin	4.85E-01	17.9%
Metal	Steel	4.33E-01	16.0%
Metal	Copper	4.27E-01	15.8%
Metal	Stainless Steel	2.55E-01	9.4%
Plastic	Polyamide66 GF30	1.65E-01	6.1%
Other	Cardboard	9.54E-02	3.5%
Other	Electronics	7.52E-02	2.8%
Plastic	Polyamide 66	5.91E-02	2.2%
Other	Wood	5.83E-02	2.2%
Plastic	Polybutylene Terephthalate70 GF-30	2.50E-02	0.9%
Plastic	Polyurethane	2.10E-02	0.8%
Other	Paper	1.90E-02	0.7%
Plastic	Polyamide 6	1.71E-02	0.6%
Other	Label	1.53E-02	0.6%
Other	Miscellaneous	3.88E-02	1.4%
Total		2.70E+00	100.0%

Substance Assessment
The representative product is compliant with the EU-RoHS Directive (2011/65/EU) with exemption and the product does contain lead and Perfluoro butane 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 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 v6.2.2 with database version CODDE-2024-04. 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 Romania. 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, United States is considered as per PCR rules.
Installation Phase	Product is installed in North America, United States. Installation of product and treatment of packaging waste are considered in this phase. There is no installation energy consumption for reference product.
Use Phase	Reference lifetime: 20 Years Usage profile: The product has power loss of 51.56 W at full load condition. For Industrial applications considering 50% of the loading rate and 30% of the use time rate, total losses are 677.498 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 End of life is considered as per 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 CO2 eq.	3.50E+02	2.33E+01	8.62E-01	3.59E-01	3.25E+02	1.46E+00	0.00E+00
Climate change - fossil fuels (GWP-f)	kg CO2 eq.	3.50E+02	2.33E+01	8.62E-01	7.08E-02	3.24E+02	1.46E+00	0.00E+00
Climate change – biogenics (GWP-b)	kg CO2 eq.	7.35E-01	-1.97E-02	0.00E+00	2.88E-01	4.64E-01	3.15E-03	0.00E+00
Climate change - land use and land use transformation (GWP-lu)	kg CO2 eq.	7.12E-04	7.12E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ozone depletion (ODP)	kg eq. CFC-11	4.69E-06	3.29E-06	1.13E-09	2.41E-09	1.29E-06	1.04E-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.	1.71E+00	2.03E-01	2.86E-02	4.22E-04	1.47E+00	8.94E-03	0.00E+00
Freshwater eutrophication (EP-fw)	kg P eq.	1.77E-03	1.19E-03	2.98E-07	5.53E-08	5.81E-04	3.06E-06	0.00E+00
Marine aquatic eutrophication (EP-m)	kg of N eq.	2.14E-01	1.72E-02	6.81E-03	1.04E-04	1.87E-01	2.33E-03	0.00E+00
Terrestrial eutrophication (EP-t)	mole of N eq.	2.52E+00	1.85E-01	7.46E-02	1.36E-03	2.23E+00	2.98E-02	0.00E+00
Photochemical ozone formation (POCP)	kg of NMVOC eq.	7.07E-01	6.48E-02	1.92E-02	2.94E-04	6.16E-01	6.64E-03	0.00E+00
Depletion of abiotic resources – elements (ADPe)	kg eq. Sb	1.76E-02	1.75E-02	3.10E-08	5.03E-09	4.33E-05	8.73E-08	0.00E+00
Depletion of abiotic resources - fossil fuels (ADP-f)	MJ	7.77E+03	5.12E+02	1.10E+01	1.30E+00	7.22E+03	2.21E+01	0.00E+00
Water scarcity (WDP)	m3 of eq.. deprivation worldwide	3.36E+01	1.83E+01	2.86E-03	2.90E-03	1.52E+01	1.11E-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	8.08E+02	2.42E+01	1.41E-02	9.71E-02	7.82E+02	1.29E+00	0.00E+00
Use of renewable primary energy resources used as raw materials	MJ	3.85E+00	3.85E+00	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	8.12E+02	2.81E+01	1.41E-02	9.71E-02	7.82E+02	1.29E+00	0.00E+00
Use of non-renewable primary energy, excluding non-renewable primary	MJ	7.73E+03	4.75E+02	1.10E+01	1.30E+00	7.22E+03	2.21E+01	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
energy resources used as raw materials								
Use of non-renewable primary energy resources used as raw materials	MJ	3.76E+01	3.76E+01	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	7.77E+03	5.12E+02	1.10E+01	1.30E+00	7.22E+03	2.21E+01	0.00E+00
Use of secondary materials	kg	2.16E-05	2.16E-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	m3	7.84E-01	4.26E-01	6.65E-05	1.13E-04	3.54E-01	3.15E-03	0.00E+00
Hazardous waste disposed of	kg	1.47E+02	1.36E+02	0.00E+00	7.14E-02	7.03E+00	4.08E+00	0.00E+00
Non-hazardous waste disposed of	kg	5.99E+01	1.14E+01	2.65E-02	1.01E-02	4.83E+01	1.68E-01	0.00E+00
Radioactive waste disposed of	kg	3.30E-02	2.13E-02	1.84E-05	4.17E-06	1.15E-02	8.06E-05	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	5.95E-01	5.95E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	2.46E-03	2.46E-03	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	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.	7.73E-02	7.73E-02	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	1.28E-05	1.82E-06	1.51E-07	2.94E-09	1.08E-05	6.03E-08	0.00E+00

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
Ionizing radiation, human health	kBq of U235 eq.	5.12E+02	1.93E+02	1.80E-03	2.90E-02	3.18E+02	4.40E-01	0.00E+00
Ecotoxicity, fresh water	CTUe	2.08E+03	1.59E+03	5.18E-01	1.65E+00	4.45E+02	4.30E+01	0.00E+00
Human toxicity, cancer effects	CTUh	3.50E-06	3.40E-06	1.29E-11	1.22E-11	3.82E-08	6.67E-08	0.00E+00
Human toxicity, non-cancer effects	CTUh	2.80E-06	1.79E-06	2.86E-10	4.99E-10	9.86E-07	2.51E-08	0.00E+00
Impacts related to land use/soil quality	-	1.11E+01	5.13E+00	0.00E+00	1.35E-03	5.98E+00	3.04E-02	0.00E+00
Total use of primary energy during the life cycle	MJ	8.58E+03	5.40E+02	1.10E+01	1.40E+00	8.00E+03	2.34E+01	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 and End-of-Life:

Part Number	Product Description	Phases	GWP (kg CO ₂ eq.)	GWP-f (kg CO ₂ eq.)	GWP-b (kg CO ₂ eq.)	GWP-lu (kg CO ₂ eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m ³ eq.)
Y7-271153 (Reference)	NZMH2-VE250-NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-118968	NZMH2-ME140-NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-118969	NZMH2-ME200-NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-118967	NZMH2-ME90-NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-271151	NZMH2-VE100-NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													

Part Number	Product Description	Phases	GWP (kg CO ₂ eq.)	GWP- f (kg CO ₂ eq.)	GWP- b (kg CO ₂ eq.)	GWP- lu (kg CO ₂ eq.)	ODP (kg CFC- 11 eq.)	AP (mol H+ eq.)	EP- fw (kg P eq.)	EP- m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP- e (kg Sb eq.)	ADP- f (MJ)	WDP (m ³ eq.)
Y7-271152	NZMH2-VE160- NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-118965	NZMN2-ME140- NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-118966	NZMN2-ME200- NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-118964	NZMN2-ME90- NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-271148	NZMN2-VE100- NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-271149	NZMN2-VE160- NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-271150	NZMN2-VE250- NA	Manufacturing	1.00												
		Distribution													
		Installation													
		End of Life													
		Module-D													
Y7-107848	NZMH2-VE250- BT-NA	Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												
		Installation	0.95												
		End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
		Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Y7-142425	NZMH2-ME140- BT-NA	Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												
		Installation	0.95												
		End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
		Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Y7-142426	NZMH2-ME200- BT-NA	Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												
		Installation	0.95												
		End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
		Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Y7-142424		Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04

Part Number	Product Description	Phases	GWP (kg CO ₂ eq.)	GWP- f (kg CO ₂ eq.)	GWP- b (kg CO ₂ eq.)	GWP- lu (kg CO ₂ eq.)	ODP (kg CFC- 11 eq.)	AP (mol H+ eq.)	EP- fw (kg P eq.)	EP- m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP- e (kg Sb eq.)	ADP- f (MJ)	WDP (m ³ eq.)
	NZMH2-ME90-BT-NA	Distribution	1.14												
		Installation	0.95												
		End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
		Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Y7-107846	NZMH2-VE100-BT-NA	Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												
		Installation	0.95												
		End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
Y7-107847	NZMH2-VE160-BT-NA	Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												
		Installation	0.95												
Y7-142422	NZMN2-ME140-BT-NA	End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
		Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												
Y7-142423	NZMN2-ME200-BT-NA	Installation	0.95												
		End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
		Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
Y7-142421	NZMN2-ME90-BT-NA	Distribution	1.14												
		Installation	0.95												
		End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
		Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Y7-107843	NZMN2-VE100-BT-NA	Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												
		Installation	0.95												
		End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
Y7-107844	NZMN2-VE160-BT-NA	Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												
		Installation	0.95												
Y7-107845	NZMN2-VE250-BT-NA	End of Life	1.14	1.14	1.24	1.00	1.21	1.17	1.08	1.17	1.17	1.17	1.17	1.17	1.22
		Module-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		Manufacturing	1.12	1.12	0.27	1.00	1.00	1.04	1.00	1.09	1.09	1.09	1.00	1.34	1.04
		Distribution	1.14												

Multiplying Factors for Use Phase for homogenous products:

Part Number	Product Description	Use Phase Extrapolation Factors
Y7-271153 (Reference)	NZMH2-VE250-NA	1.00
Y7-142425	NZMH2-ME140-BT-NA	0.31
Y7-118968	NZMH2-ME140-NA	0.31
Y7-142426	NZMH2-ME200-BT-NA	0.64
Y7-118969	NZMH2-ME200-NA	0.64
Y7-142424	NZMH2-ME90-BT-NA	0.13
Y7-118967	NZMH2-ME90-NA	0.13
Y7-107846	NZMH2-VE100-BT-NA	0.16
Y7-271151	NZMH2-VE100-NA	0.16
Y7-107847	NZMH2-VE160-BT-NA	0.41
Y7-271152	NZMH2-VE160-NA	0.41
Y7-107848	NZMH2-VE250-BT-NA	1.00
Y7-142422	NZMN2-ME140-BT-NA	0.31
Y7-118965	NZMN2-ME140-NA	0.31
Y7-142423	NZMN2-ME200-BT-NA	0.64
Y7-118966	NZMN2-ME200-NA	0.64
Y7-142421	NZMN2-ME90-BT-NA	0.13
Y7-118964	NZMN2-ME90-NA	0.13
Y7-107843	NZMN2-VE100-BT-NA	0.16
Y7-271148	NZMN2-VE100-NA	0.16
Y7-107844	NZMN2-VE160-BT-NA	0.41
Y7-271149	NZMN2-VE160-NA	0.41
Y7-107845	NZMN2-VE250-BT-NA	1.00
Y7-271150	NZMN2-VE250-NA	1.00

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 Number	EATO-00210-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	09-2024	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 »			