Compact NS100 to NS250

Product Environmental Profile

a brand of Schneider Electric

Merlin Gerin

Product Environmental Profile - PEP

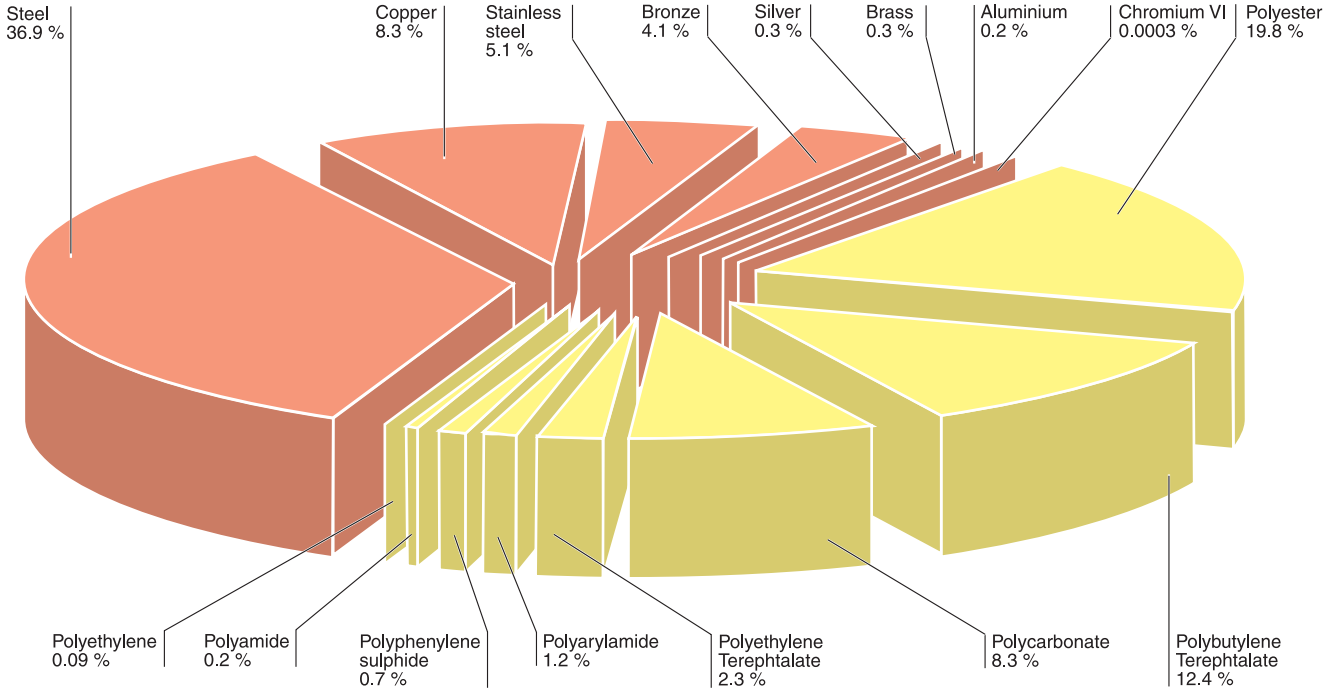
Product overview

The Compact NS100 to NS250 range of circuit breakers is designed to guarantee the protection of all low-voltage electrical applications between 16 A and 250 A.
The Product Environmental Profile (PEP) covers the entire range:
- *Compact NS100 to NS250 3-pole or 4-pole fixed or draw out circuit breakers / switches*
- *fitted with a thermomagnetic tripping device.*

The representative product used for the analysis is the Compact NS160N TM160D three-pole fixed circuit breaker. The environmental impacts of this referenced product are representative of the impacts of the other products in the range for which the same technology is used.
The environmental analysis was performed in conformity with ISO 14040 "Environmental management: Life cycle assessment – Principle and framework".
This analysis takes the stages in the life cycle of the product into account.

Constituent materials

The mass of the products in the range is from 1790 g (NS100N 3P) to 6030 g (NS250N 4P drawout) not including the packaging.
It is 1825 g for the Compact NS160N TM160D 3P fixed circuit breaker.
The constituent materials are distributed as follows:



All necessary steps have been taken with our services, suppliers and subcontractors to ensure that the materials used in the composition of the Compact NS100 to NS250 product range do not contain any substances prohibited by the legislation that was in force (1) when the product or range was put on the market.

***(1)** According to the list available on request.*

Manufacturing

The products in the Compact NS100 to NS250 range are manufactured at Schneider Electric's Moirans (France) and Montmélian (France) production sites which have established an ISO 14001 certified environmental management system.

Distribution

The packaging conforms to the European Union packaging directive.
It was designed to optimise both its weight and volume.
The weight of the packaging of the Compact NS160N TM160D 3P fixed circuit breaker is 147.4 g.
The packaging consists of a cardboard box (129.6 g). The weight includes the instructions for the device (17.8 g).
The product distribution flows will be optimised by setting up local distribution centres close to the market areas.

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Utilization

The products in the Compact NS100 to NS250 range do not generate any environmental pollution requiring special precautionary measures (noise, emissions, etc.).
The dissipated power depends on the conditions under which the product is implemented and used.
For the Compact NS100 to NS250 product range, this dissipated power (loss of wattage due to the Joule effect) is between 8.76 W (NS100 3P 16 A) and 81.25 W (NS250N 4P 250 A).
The power dissipated by the Compact NS160N TM160D 3P circuit breaker referenced is 41.8 W.
The heat dissipation accounts for less than 0.03 % of the power passing through the product.
The annual power consumption of a Compact NS160N TM160D 3P fixed circuit breaker is 146.6 kWh, assuming that it is operating at 80 % of the load for 14 hours and 20 % of the load for 10 hours.

End of life

The recycling potential of the range of products Compact NS100 to NS250 is superior to 85 %.
The percentage includes ferrous and non-ferrous materials, thermoplastics and thermosetting plastics that do not contain halogenated flame retardants.
At end of life, the products in the Compact NS100 to NS250 circuit-breaker range can either be dismantled or crushed to facilitate the recovery of the various constituent materials.
The remaining 15 % of the total product mass is recovered as energy.
The products in the Compact NS100 to NS250 range require no special recycling treatment.

Environmental impacts

The EIME (Environmental Impact and Management Explorer) software, version 1.6, and its database, version 5.4, were used for the Life Cycle Assessment (LCA).
The assumed service life of the product is 20 years and the European electrical power model is used.

The life cycle assessment of the Compact NS160N TM160D 3P 160 A fixed circuit breaker includes:
- the Compact NS disconnecting box
- the thermomagnetic tripping device.

The environmental impacts were analysed for the Manufacturing (M) phases, including the processing of raw materials, and for the Distribution (D) and utilization (U) phases.

Presentation of product environmental impacts
Data calculated for product use for a period of 20 years.

Environmental indicators	Unit	For a Compact NS160N TM160D 3P circuit breaker			
		S = M + D + U	M	D	U
Raw Material Depletion	**Y-1**	**$3.96\ 10^{-13}$**	$3.69\ 10^{-13}$	$2.67\ 10^{-17}$	$2.75\ 10^{-14}$
Energy consumption	**MJ**	**$3.11\ 10^{4}$**	$3.24\ 10^{2}$	20.30	$3.08\ 10^{4}$
Water Depletion	**dm^3**	**$4.11\ 10^{3}$**	98.80	$3.80\ 10^{-1}$	$4.01\ 10^{3}$
Global Warming	**g≈CO_2**	**$1.95\ 10^{6}$**	$1.69\ 10^{4}$	$1.54\ 10^{3}$	$1.93\ 10^{6}$
Ozone Depletion	**g≈CFC-11**	**$2.42\ 10^{-1}$**	$2.48\ 10^{-3}$	$1.78\ 10^{-4}$	$2.39\ 10^{-1}$
Photochemical Ozone Creation	**g≈C_2H_4**	**$6.91\ 10^{2}$**	7.77	1.37	$6.82\ 10^{2}$
Air Acidification	**g≈H^+**	**$3.32\ 10^{2}$**	4.42	$2.83\ 10^{-1}$	$3.27\ 10^{2}$
Hazardous Waste Production	**kg**	**27.90**	$1.64\ 10^{-1}$	$1.02\ 10^{-4}$	27.70

The utilization phase (phase U) has the greatest impact of all the life cycle phases of the product. It corresponds to the impacts associated with electricity production during this phase. Schneider Electric takes all the necessary measures required to optimise this parameter.
This analysis takes into account the consummations and the emissions of the product in all the phases of the life cycle: Manufacturing "M" including the elaboration of raw materials, Distribution "D" and Use "U".
Voluntarily, and to comply with the European directives, a new innovative tripping device design and a targeted choice of materials will ensure that all sensitive substances are eliminated from 2006 onwards.

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System approach

The environmental impact values given above are only valid within the context specified. They cannot be used directly to compile the environmental report on the installation.

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 Potential (GWP)

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.

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 methane (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^+.

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.

We are committed to safeguarding our planet by "Combining innovation and continuous improvement to meet the new environmental challenges".

Schneider Electric Industries SAS
89, boulevard Franklin Roosevelt
F - 92500 Rueil-Malmaison (France)
Tel : +33 (0)1 41 29 85 00

http://www.schneider-electric.com

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