Product Environmental Profile

Compact NS400 to NS630

PEP ecoPASSPORT®

Schneider Electric

Product Environmental Profile - PEP

Product Overview

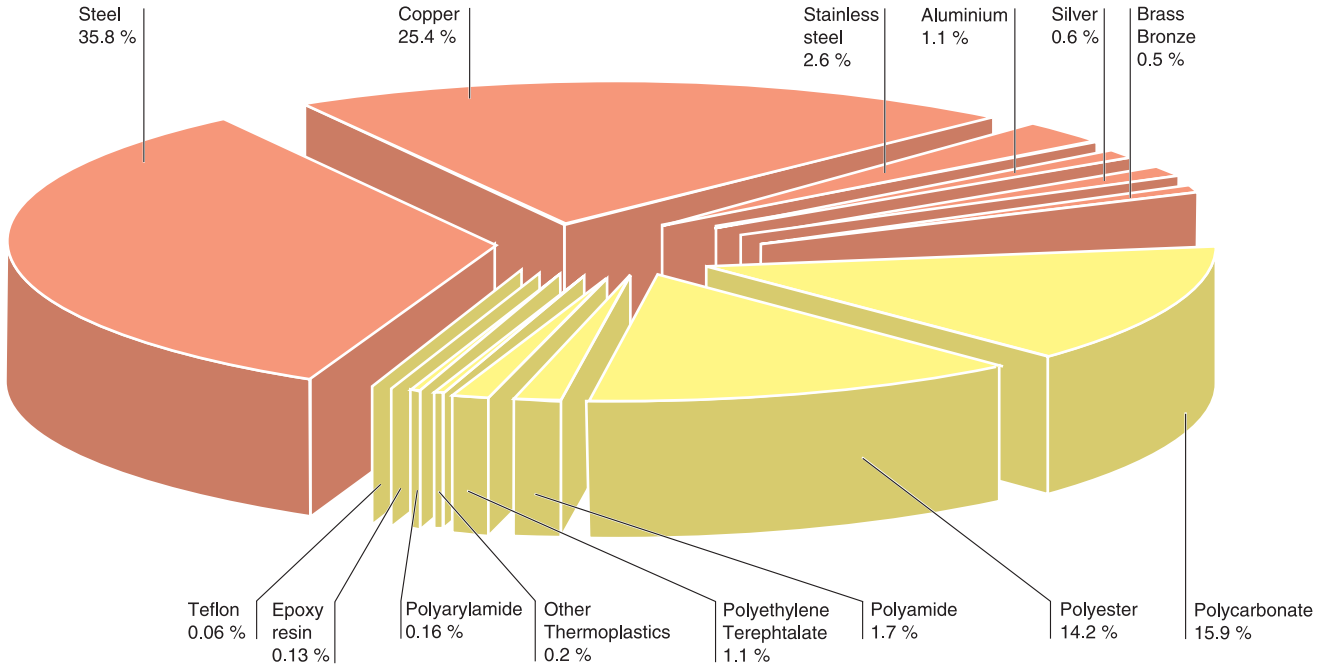
The Compact NS400 to NS630 range of circuit breakers is designed to guarantee the protection of all low-voltage electrical applications between 400 A and 630 A.
The Product Environmental Profile (PEP) covers the entire range:

- Compact NS 3-pole or 4-pole fixed or draw out circuit breaker with a rating of 400 A to 630 A
- fitted with an electronic tripping device.

The representative product used for the analysis is the Compact NS400N STR23 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 product range is from 8600 g to 39500 g packaging not included. It is 16150 g for the LC1-F630 M7.
The constituent materials are distributed as follows:



Products of this range are designed in conformity with the requirements of the RoHS directive (European Directive 2002/95/EC of 27 January 2003) and do not contain, or in the authorised proportions, lead, mercury, cadmium, chromium hexavalent, flame retardant (polybromobiphenyles PBB, polybromodiphenylthers PBDE) as mentioned in the Directive.

Manufacturing

The products in the Compact NS400 to NS630 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 NS400N STR23 3P fixed circuit breaker is 365 g.
The packaging consists of a cardboard box (337 g). The weight includes the instructions for the device (28 g).
The product distribution flows have been optimised by setting up local distribution centres close to the market area.

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Utilization

The products in the Compact NS400 to NS630 range do not generate any environmental pollution requiring special precautionary measures (noise, emissions, etc.).
The dissipated power (loss of wattage due to the Joule effect) depends on the conditions under which the product is implemented and used.
This dissipated power is between 178 W for the Compact NS630 STR53 4P draw out circuit breaker and 57.6 W for the referenced Compact NS 400N STR23 3P fixed circuit breaker.
The heat dissipation accounts for less than 0.02 % of the power passing through the product.
The annual power consumption of a Compact NS 400N STR23 3P fixed circuit breaker is 201.8 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 NS400 to NS630 is superior to 79 %.
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 NS400 to NS600 circuit-breaker range can either be dismantled or crushed to facilitate the recovery of the various constituent materials.
Less than 0.2 % of the total product mass requires special recycling treatment.
The remaining 20.8 % of the total product mass is recovered as energy.
The circuit breakers in the Compact NS400 to NS630 range also include electronic tripping devices that can easily be disassembled and which must be sent to specialised treatment systems.
These details appear on the product end-of-life recovery sheet.

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 relates to the fixed Compact NS400N STR23 3P circuit breaker including:
- the Compact NS disconnecting box
- the electronic 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 NS400N STR23 3P fixed circuitbreaker			
		S = M + D + U	M	D	U
Raw Material Depletion	**Y-1**	**$2.55\ 10^{-12}$**	$2.52\ 10^{-12}$	$5.90\ 10^{-17}$	$3.79\ 10^{-14}$
Energy consumption	**MJ**	**$4.30\ 10^{4}$**	$4.94\ 10^{2}$	44.90	$4.25\ 10^{4}$
Water depletion	**dm^3**	**$5.83\ 10^{3}$**	$3.03\ 10^{2}$	$8.42\ 10^{-1}$	$5.53\ 10^{3}$
Global Warming	**g≈CO_2**	**$2.70\ 10^{6}$**	$2.87\ 10^{4}$	$3.41\ 10^{3}$	$2.67\ 10^{6}$
Ozone Depletion	**g≈CFC-11**	**$3.42\ 10^{-1}$**	$1.13\ 10^{-2}$	$3.96\ 10^{-4}$	$3.30\ 10^{-1}$
Photochemical Ozone Creation	**g≈C_2H_4**	**$9.53\ 10^{2}$**	9.25	3.04	$9.41\ 10^{2}$
Air acidification	**g≈H^+**	**$4.63\ 10^{2}$**	10.80	$6.29\ 10^{-1}$	$4.52\ 10^{2}$
Hazardous waste production	**kg**	**38.40**	$1.61\ 10^{-1}$	$2.27\ 10^{-4}$	38.20

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".

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System approach

As the product of the range are designed in accordance with the RoHS Directive (European Directive 2002/95/EC of 27 January 2003), they can be incorporated without any restriction within an assembly or an installation submitted to this Directive.

N.B.: please note that the environmental impacts of the product depend on the use and installation conditions of the product.
Impacts values given above are only valid within the context specified and cannot be directly used to draw up the environmental assessment of 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 (GW)

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 ethylene (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.
It is expressed in kg.

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

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