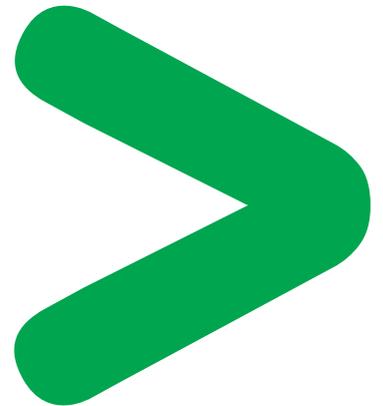


# Product Environmental Profile

Masterpact NW08 to NW40



# Product Environmental Profile - PEP

## Product Overview

The new Masterpact NW Power Circuit Breaker range is designed to guarantee the protection of all low voltage electrical applications between 800 A and 4000 A.

The Product Environmental Profile (PEP) covers the entire range:

- Masterpact NW 3-pole or 4-pole, fixed or draw out circuit breaker / switch with a rating of 800 A to 4000 A
- fitted with a Micrologic A, P or H Control Unit and auxiliaries
- manual or remote control.

The representative product used for the analysis is the Masterpact NW 20 H1 three-pole draw out circuit breaker.

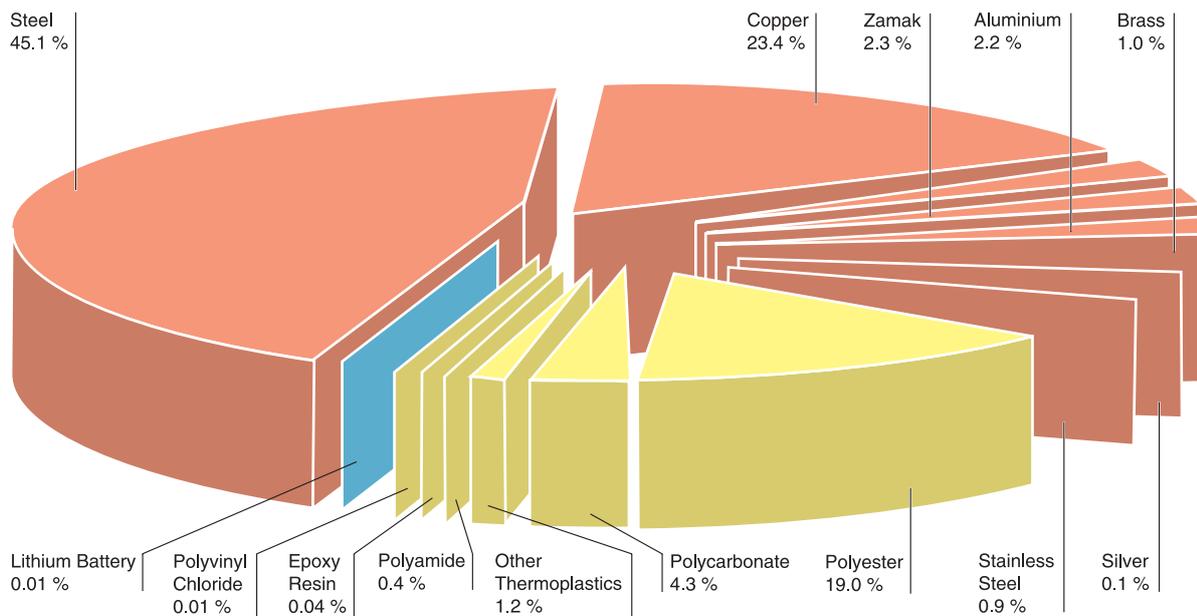
The environmental impacts of this referenced product are representative of the impacts of the other products in the range for which the same technology is used.

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 42 kg (fixed NW 08 N1 3P) to 98 kg (draw out NW 40 H3 4P) not including the packaging. It is 84.4 kg for the Masterpact NW 20 H1 3P draw out circuit breaker. 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 Masterpact NW 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 weight and volume of the packaging have been reduced in compliance with the European Union's packaging directive. The weight of the packaging of the Masterpact NW 20 H1 3P draw out circuit breaker is 11.2 kg. It consists of a cardboard box (1.6 kg) on a wood pallet (9 kg). The weight includes the instrument documentation (0.6 kg). The product distribution flows have been optimised by setting up local distribution centres close to the market areas.

# Product Environmental Profile - PEP

## Utilisation

The products in the Masterpact NW 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 62 W for the NW 08 N1 3P fixed circuit breaker and 900 W for the NW 40 H3 4P circuit breaker. The power dissipated by the Masterpact NW 20 H1 3P draw out circuit breaker referenced is 470 W. The heat dissipation accounts for less than 0.03 % of the power passing through the product.

The annual power consumption of a Masterpact NW 20 H1 3P draw out circuit breaker is 979.9 kWh with the hypothesis of a typical daily operation at 80 % of the load for 8 hours and 20 % for 16 hours.

## End of life

The recycling potential of the range of products Masterpact NW circuit breaker is superior to 87 %. 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 Masterpact NW 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 12.8 % of the total product mass is recovered as energy. The circuit breakers in the Masterpact NW range also include Micrologic electronic Control Units which can be disassembled and which must be sent to specialised treatment systems. The Micrologic control units contain a lithium battery that must be recovered by approved 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 scope of the analysis was limited to the Masterpact NW circuit breaker range:

- Masterpact NW disconnecting boxes
- Micrologic Control Units
- auxiliaries (MX and MN coils, etc.).

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 Masterpact NW 20 H1 3P draw out circuit breaker			
		S = M + D + U	M	D	U
Raw Material Depletion	Y-1	6,26 10 <sup>-12</sup>	6,08 10 <sup>-12</sup>	7,11 10 <sup>-16</sup>	1,84 10 <sup>-13</sup>
Energy consumption	MJ	2,14 10 <sup>5</sup>	6,43 10 <sup>3</sup>	5,39 10 <sup>2</sup>	2,07 10 <sup>5</sup>
Water Depletion	dm <sup>3</sup>	3,13 10 <sup>4</sup>	4,38 10 <sup>3</sup>	12,30	2,69 10 <sup>4</sup>
Global Warming	g≈CO <sub>2</sub>	1,35 10 <sup>7</sup>	4,15 10 <sup>5</sup>	4,12 10 <sup>4</sup>	1,30 10 <sup>7</sup>
Ozone Depletion	g≈CFC-11	1,71	1,09 10 <sup>-1</sup>	6,12 10 <sup>-3</sup>	1,60
Photochemical Ozone Creation	g≈C <sub>2</sub> H <sub>4</sub>	4,74 10 <sup>3</sup>	1,33 10 <sup>2</sup>	37,30	4,57 10 <sup>3</sup>
Air Acidification	g≈H <sup>+</sup>	2,34 10 <sup>3</sup>	1,32 10 <sup>2</sup>	8,32	2,20 10 <sup>3</sup>
Hazardous Waste Production	kg	1,88 10 <sup>2</sup>	2,24	3,50 10 <sup>-3</sup>	1,86 10 <sup>2</sup>

For example, compared with the old Masterpact M range, the Masterpact NW 10 H1 3P draw out product has the advantage of a targeted optimisation of the materials that has made it possible to reduce the "Depletion of natural resources" indicator by more than 44 %. The dissipated power has been reduced by 40%, which has reduced the impacts for the other indicators by between 38.8 % and 40.2 % (1).

(1) Comparison available on request.

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 consumptions 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".

The environmental impacts of the Masterpact NW circuit breaker are greatly reduced for all the indicators, thanks to an innovative contact design and an optimisation of the materials used.

# Product Environmental Profile - PEP

## 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<sup>3</sup>.

### 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<sub>2</sub>.

### 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<sub>2</sub>H<sub>4</sub>).

### 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<sup>+</sup>.

### 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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