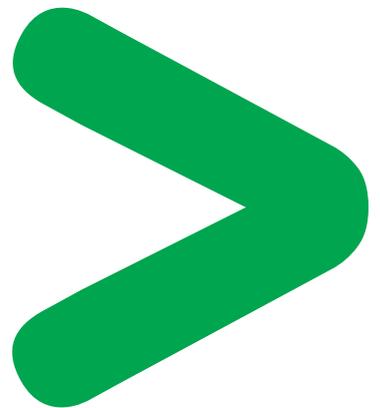


Product Environmental Profile

Vigirex RH10P to RH99P
with associated sensors



Product Environmental Profile - PEP

Product Overview

The Vigirex RH10P to RH99P range of earth leakage protection relays with associated sensors is designed to detect and measure the earth leakage current in an electrical installation. The relays interrupt the supply of power to the supervised network and protect the personnel against direct and indirect contact; they also protect property against fire hazards. The Product Environmental Profile (PEP) covers the entire range:

- Vigirex RH10P to RH99P earth leakage protection relays (built-in)
- associated current sensors.

The representative product used for the study is the Vigirex RH99P earth leakage protection relay with an MA120 toroid sensor.

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.

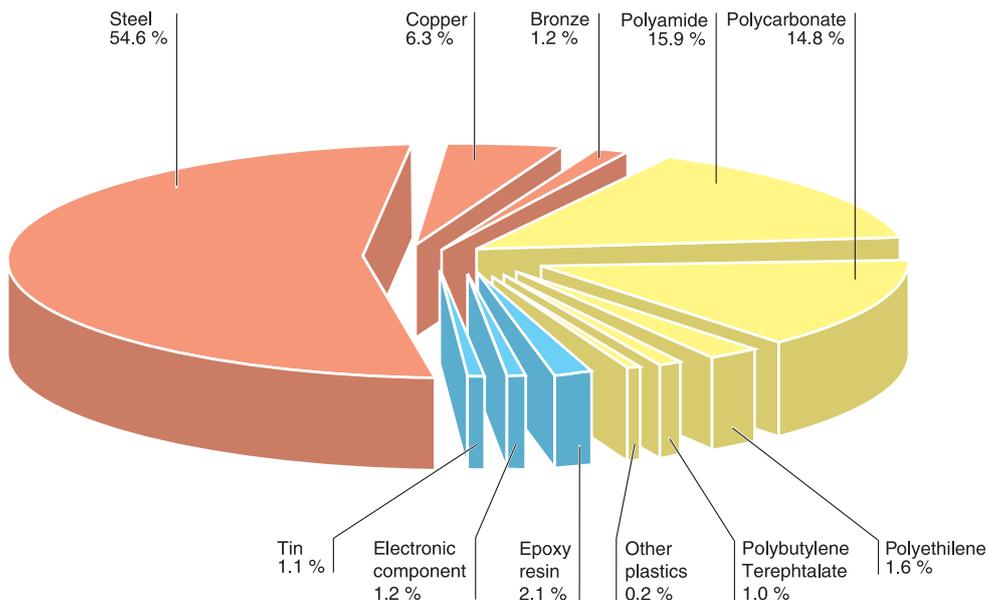
Constituent materials

The design and size of the Vigirex RH-P product range are identical.

The mass of the protection relays is 250 g.

The mass of the associated sensors is between 120 g (TA30 toroid) and 2230 g (GA300 toroid). The mass of the Vigirex RH99P protection relay with an MA120 toroid is 687 g without packaging.

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 Vigirex RH-P range with associated sensors are manufactured at Schneider Electric production sites which have established an ISO 14001 certified environmental management system.

Distribution

The packaging complies with the European Union packaging directive; it was designed to optimise its weight and volume.

The packaging weight of the Vigirex RH99P protection relay with an MA120 toroid is 136 g. The packaging consists of a cardboard box (86 g). The weight includes the instructions for the device (50 g).

The product distribution flows have been optimised by setting up local distribution centres close to the market areas.

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Utilization

The products in the Vigirex RH-P range with associated sensors do not generate any environmental pollution requiring special precautionary measures (noise, emissions, etc.).

The power consumption for the whole Vigirex RH-P product range with associated sensors is 4 W.

The annual power consumption of a Vigirex RH99P protection relay with an MA120 toroid is 35 kWh, assuming a typical daily operation at 100 % of the load for 24 hours.

End of life

The potential for recycling products in the Vigirex RH-P range with associated sensors is greater than 85 %.

This percentage includes ferrous and non-ferrous materials, and also marked plastics that do not contain halogenated flame retardants.

At end of life, the products in the Vigirex RH-P range with associated sensors can either be dismantled or crushed to facilitate the recovery of the various constituent materials.

Vigirex RH-P earth leakage protection relays contain three 19.6 cm², 18 cm² and 37.7 cm² electronic cards.

They must be sent to specialised treatment systems.

The total mass of the electronic cards with their components is 30.4 g.

The percentage of recyclability changes according to the size of the sensors. The remaining mass of the total product matter is recovered energetically.

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 Vigirex RH99P protection relay with an MA120 toroid sensor including:

- the Vigirex RH99P earth leakage protection relay.
- an MA120 toroid type associated current sensor.

This analysis takes the product usage and emissions into account in the life cycle phases: Manufacturing "M" including the processing of raw materials, Distribution "D" and Utilisation "U".

Presentation of product environmental impacts

Data calculated for product utilisation of 20 years.

Environmental indicators	Unit	For a Vigirex RH99M with an MA120 sensor			
		S = M + D + U	M	D	U
Raw Material Depletion	Y-1	4.70 10 ⁻¹⁴	4.05 10 ⁻¹⁴	8.11 10 ⁻¹⁸	6.59 10 ⁻¹⁵
Energy Depletion	MJ	7.51 10 ³	1.14 10 ²	6.17	7.39 10 ³
Water Depletion	dm ³	1.03 10 ³	64.6	1.16 10 ⁻¹	9.62 10 ²
Global Warming Potential	g≈CO ₂	4.71 10 ⁵	6.88 10 ³	4.68 10 ²	4.64 10 ⁵
Ozone Depletion	g≈CFC-11	5.82 10 ⁻²	8.20 10 ⁻⁴	5.43 10 ⁻⁵	5.73 10 ⁻²
Photochemical Ozone Creation	g≈C ₂ H ₄	1.68 10 ²	4.13	4.17 10 ⁻¹	1.64 10 ²
Air Acidification	g≈H ⁺	79.9	1.23	8.64 10 ⁻²	78.6
Hazardous Waste Production	kg	6.73	8.89 10 ⁻²	3.11 10 ⁻⁵	6.64

The analysis shows that except for the "Depletion of natural resources" (RMD) indicator, the utilisation phase (phase U) has the greatest impact on the other 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.

The maximum difference between the EIME impacts of the Vigirex RH-P product range with associated sensors (toroids: TA30 to GA300) is less than 6 %.

The impacts of the "Depletion of natural resources" (RMD) indicator are associated with the Manufacturing phase (phase M) and specifically that of the electronic cards that represent 96 % of the impacts of this indicator.

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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 dm³.

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 CO₂.

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 (C₂H₄).

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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