Product Environmental Profile

TeSys LR9-F..57 to LR9-F..81
Thermal Overload protective relay

PEP ecoPASSPORT®

Schneider Electric

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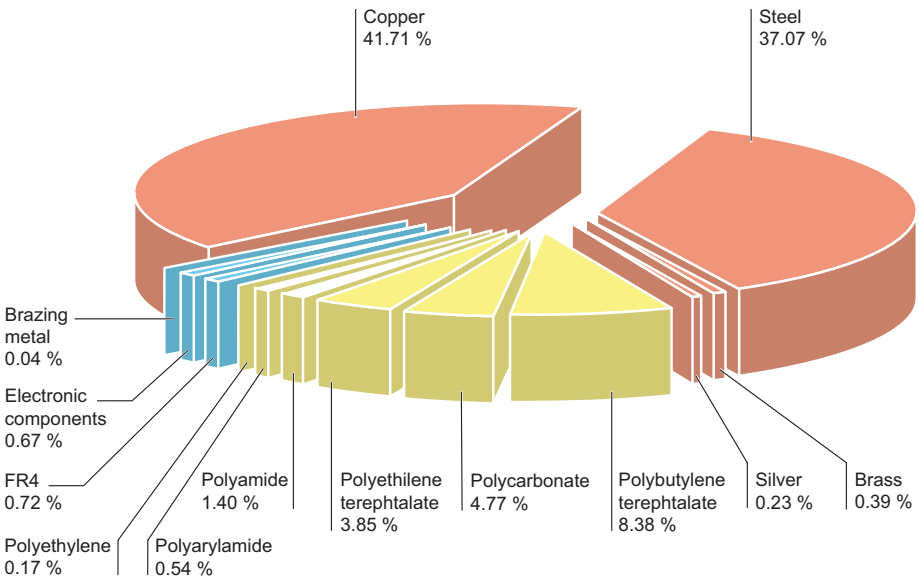
Product Overview

The main purpose of the TeSys LR9-F thermal overload relays range is to detect overload currents in order to protect the load.
This range covers 3-poles thermal overload relays for utilization with currents between 30 and 630 A.
The representative product used for the analysis is the thermal overload relays TeSys LR9-F7375.
This product is representative of the environmental impacts of all the other products in the same range for which similar technologies are 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 products in the considered range (TeSys LR9-F between 30 and 630 A) are of identical design. Their weight extends between 970 and 4160 g, excluding packaging. The weight of the studied product is 1816 g excluding packaging. The constituent materials are as follows:



Substance assessment

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 30 to 630 A TeSys LR9-F product family is manufactured on Schneider Electric production sites, which have set up an ISO 14001 certified environmental management system.

Distribution

Packaging has been designed with a view to reducing its overall weight and volume, while complying with the European Union packaging directive 94/62/EC.
The packaging for the TeSys LR9-F7375 is of 246 g. It is made of 228 g of cardboard and of 18 g of paper.
The product distribution flows are optimized by the location of local distribution centers close to the market areas.

Product Environmental Profile - PEP

Utilization

The 30 to 630 A TeSys LR9-F product family does not cause any pollution requiring special precautions for use (noise, emissions,...).

The power dissipation within the electronic circuit is not mesurable in practice. However, as the consumption of the current transformers used in the product being 100 mA under 20 V, the corresponding apparent power of 2 VA value was used to determine the corresponding environmental impacts.
This dissipated power is of about 1/100.000e of the power of the motor protected by the LR9_F7375 (200 kW under 440 V).

End of life

At the end of their life, the TeSys LR9-F range from 30 to 630 A can either be dismantled or crushed to make better use of the various constituent materials.

By dismantling, the recycling potential is greater than 95 %.
This percentage includes the metallic materials and marked plastic parts compliant with current regulations which can be dismantled and a small PCB which can easily be dismantled in order to be sent to a specific treatment channel.

Environmental impacts

The Life Cycle Assessment (LCA) was carried out using EIME software (Environmental Information and Management Explorer) version 3.0 and its version 5.4 database.

The assumed service life of the product is 20 years with a utilisation rate of the installation of 30 % (that is 8 h per day). The European electric power model is used.

The scope of the analysis consists of the product referenced TeSys LR9-F7375 in the international catalog. The environmental impacts were analyzed during the Manufacturing (M) (raw material processing), Distribution (D) and Use (U) phases.

Presentation of the environmental impacts of the product

Environmental indicators	Unit	ACV of a TeSys LR9-F7375			
		S = M + D + U	M	D	U
Raw material depletion	**Y-1**	**3,80 10^{-13}**	3,79 10^{-13}	1,20 10^{-17}	9,89 10^{-16}
Energy depletion	**MJ**	**1,33 10^{+03}**	2,16 10^{+02}	8,64	1,11 10^{+03}
Water depletion	**dm^3**	**2,95 10^{+02}**	1,50 10^{+02}	8,35 10^{-01}	1,44 10^{+02}
Global warming potential	**g≈CO_2**	**8,42 10^{+04}**	1,40 10^{+04}	7,51 10^{+02}	6,95 10^{+04}
Ozone depletion potential	**g≈CFC-11**	**1,24 10^{-02}**	3,35 10^{-03}	4,93 10^{-04}	8,60 10^{-03}
Photochemical ozone creatione	**g≈C_2H_4**	**31,15**	5,68	9,31 10^{-01}	24,53
Air acidification	**g≈H^+**	**16,81**	4,83	1,97 10^{-01}	11,79
Hazardous waste production	**kg**	**1,1**	1,04 10^{-01}	2,68 10^{-04}	9,96 10^{-01}

This Life Cycle Analysis showed that the product operating phase (U phase) has the greatest impact on most of the above-mentioned environmental criteria and the main influential parameters have been optimised at the design stage.

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^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.
It is expressed in kg.

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