Product Environmental Profile

TeSys LC1 K09-K16
Contactor range

PEP ecoPASSPORT®

Schneider Electric

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Product Overview

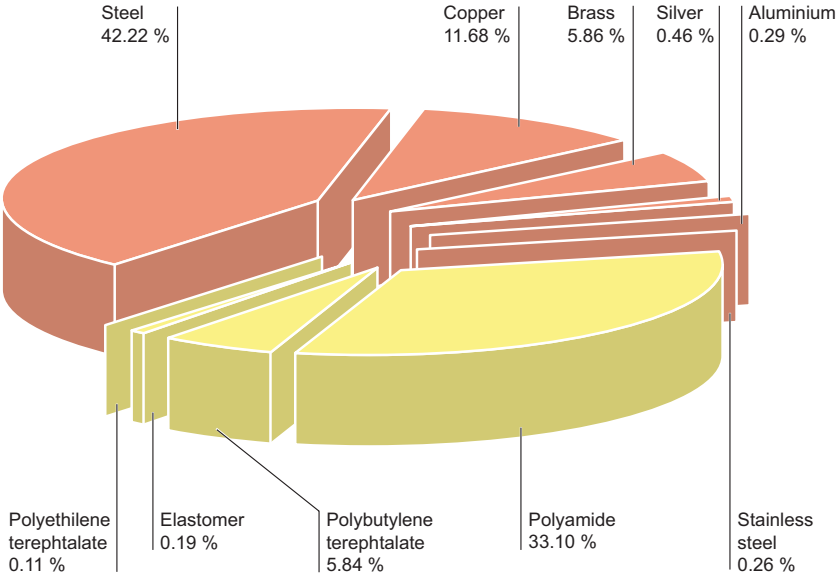
The purpose of the contactors TeSys LC1 K09-K16 is to make and break currents up to 16 A for motor loads and up to 20 A for resistive loads at voltages up to 690 V AC.
This range consists of the following contactors:

- three-pole and four-pole
- contactors powered by voltages of 12 to 690 V AC.

This document covers the following generic references in the TeSys K range: K09, K12 et K16.
The representative product used for the study is the contactor with the reference TeSys LC1 K0910M7.
This contactor is representative of the environmental impacts of all the other products in the 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 mass of the products in the range is from 165 g to 220 g, not including the packaging. It is 167 g for the TeSys LC1 K0910M7 contactor analysed. The constituent materials are distributed 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 TeSys k product range is manufactured at a Schneider Electric production site operating an ISO 14001 certified environmental management system.

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Distribution

The weight and volume of the packaging have been reduced, in compliance with the European Union's 94/62/EC packaging directive.
The weight of the packing of the TeSys LC1 K0910M7 contactor is 10.8 g.
It consists of 10.6 g of cardboard and of a 0.2 g sticky paper label.
The product distribution flows have been optimised by setting up local distribution centres close to the market areas.
The impact of transporting the products is included in the environmental analysis.

Utilization

The products in the TeSys k range do not generate any environmental pollution requiring special precautionary measures (noise, emissions, etc.). The heat dissipation depends on the conditions under which the product is implemented and operated.
The dissipated power spread out from 6 W to 7.8 W at a current of 20 A (joule effect in the poles and consumption of the coil) for the TeSys k range. It is 1.5 Wh for the TeSys LC1 K0910M7 referenced under a 30 % utilization ratio at a 9 A rated current.
This power dissipation is less than 0.04 % of the power of the motor controlled by this contactor (4 kW at 400 V that is 1.5/4000).
These products are silent and produce no waste material when used.

End of life

At end of life, the products in the TeSys k range can either be dismantled or crushed to facilitate the recovery of the various constituent materials.
The recycling potential is more than 65 %. The percentage includes the metallic materials RoHS compliant and marked plastic parts.

Environmental impacts

The EIME (Environmental Impact and Management Explorer) software, version 2.4, and its database, version 5.4, were used for the Life Cycle Assessment (LCA).
The estimated service life of the product is 20 years under the rated current and its assumed duty ratio is 30 % (8 h per day). The European electrical power model was used.
The analysis focused on the TeSys LC1 K0910M7 referenced product from the international catalogue.
The environmental impacts were analysed for the Manufacturing (M) phase, including the processing of raw materials, and for the Distribution (D) and Utilization (U) phases.

Presentation of the environmental impacts of the product

Environmental indicators	Unit	For a TeSys LC1K0910M7			
		S = M + D + U	M	D	U
Raw material depletion	Y-1	**6.86 10^{-14}**	6.78 10^{-14}	1.00 10^{-18}	7.66 10^{-16}
Energy depletion	MJ	**8.77 10^{+02}**	17.1	7.22 10^{-01}	8.59 10^{+02}
Water depletion	dm^3	**1.23 10^{+02}**	11.1	6.98 10^{-02}	1.12 10^{+02}
Global warming potential	g≈CO_2	**5.49 10^{+04}**	9.36 10^{+02}	62.8	5.39 10^{+04}
Ozone depletion potential	g≈CFC-11	**6.84 10^{-03}**	1.35 10^{-04}	4.13 10^{-05}	6.67 10^{-03}
Photochemical ozone creatione	g≈C_2H_4	**19.8**	7.38 10^{-01}	7.79 10^{-02}	19
Air acidification	g≈H^+	**9.38**	2.24 10^{-01}	1.65 10^{-02}	9.14
Hazardous waste production	kg	**7.77 10^{-01}**	4.78 10^{-03}	2.24 10^{-05}	7.72 10^{-01}

The life cycle analysis showed that the utilization phase (phase U) is the life cycle phase that has the greatest impact on the majority of the environmental indicators.
The heat dissipation, which is an important parameter, was optimised at the design stage to reduce these environmental impacts.

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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 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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