# Product Environmental Profile

## TeSys GV3 Motor Circuit-Breakers


PEP ecopassport®

Schneider Electric

## Product Environmental Profile – PEP

# Product overview

**The functional unit:** The main function of the TeSys GV3P/L Motor Circuit Breakers is to provide control and protection from 5.5 kW to 30 kW motors with voltages up to 690V A.C. It has a maximum short-circuit breaking capacity of 100 kA. The functional unit provides this service for a period of 20 years through the system specified by the TeSys GV3P/L Motor Circuit Breakers reference product.

These products include GV3P thermal-magnetic and GV3L magnetic circuit breakers.
This document covers the following generic references for the TeSys GV3 range:

- GV3P13 to GV3P65
- GV3L25 to GV3L65.

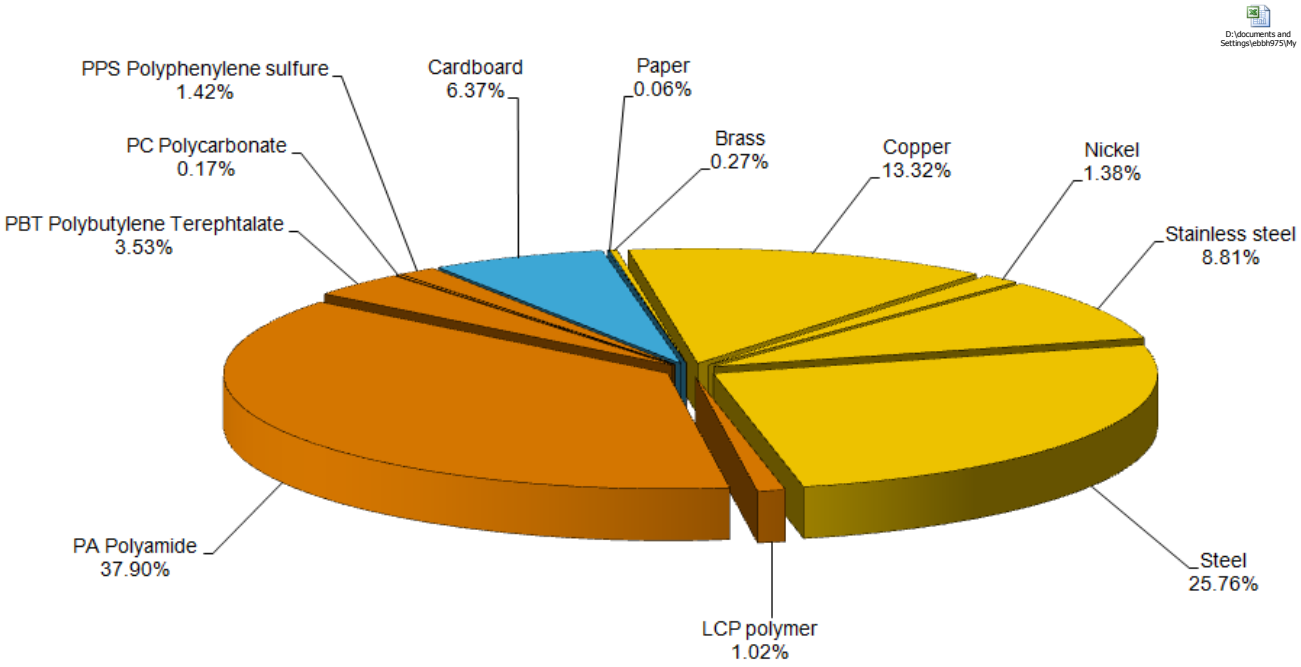
The representative product used for the analysis was the Thermal-Magnetic Circuit Breaker, reference **GV3P65**.

The environmental impacts of this referenced product are representative of the impacts of the other products of the range which are developed with a similar technology.

The environmental analysis was performed in conformity with ISO 14040.

# Constituent materials

The mass of the TeSys GV3P/L Motor Circuit Breakers product range is from 700 g and 950 g including packaging. It is **960 g** for the **Thermal-Magnetic Circuit Breaker, Reference GV3P65**. The constituent materials are distributed as follows:




# Substance assessment

Products of this range are designed in conformity with the requirements of the European RoHS Directive 2011/65/EU and do not contain, or only contain in the authorised proportions, lead, mercury, cadmium, hexavalent chromium or flame retardants (polybrominated biphenyls - PBB, polybrominated diphenyl ethers - PBDE) as mentioned in the Directive

Details of ROHS and REACH substances information are available on the Schneider-Electric Green Premium website . (http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page )

# Manufacturing

The TeSys GV3P/L Motor Circuit Breakers product range is manufactured at a Schneider Electric production site in Dijon (France) on which an ISO14001 certified environmental management system has been established. Laser technology is used to mark the products, thus limiting the use of inks.

# Distribution

The weight and volume of the packaging have been optimized, based on the European Union's packaging directive.

The Thermal-Magnetic Circuit Breaker, Reference GV3P65 product packaging weight is ***60.6 g*****.** It consists of Paper (0.6 g), Cardboard (60 g).

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.

# Use

The products of the TeSys GV3P/L Motor Circuit Breakers range do not generate environmental pollution (noise, emissions) requiring special precautionary measures in standard use.

The dissipated power depends on the conditions under which the product is implemented and used. This dissipated power is between 0 W and 30 W for the TeSys GV3P/L Motor Circuit Breakers product range. It is 0.72 W at a current of 65 A (Joule effect in the poles and thermo magnetic trip unit) at 30% load in Active mode (30% of the time) and 0 W in OFF mode (at 70% of the time) for the referenced Thermal-Magnetic Circuit Breaker, Reference GV3P65. The power dissipation is much less than a thousandth of the power of the motor controlled by this circuit breaker (30 kW at 400 V, i.e. 8/30000).

This thermal dissipation represents less than **0.1%** of the power which passes through the product.

The product range does not require special maintenance operations.

# End of life

At end of life, the products in the TeSys GV3P/L Motor Circuit Breakers have been optimized to decrease the amount of waste and allow recovery of the product components and materials.

This product range doesn’t need any special end-of-life treatment. According to countries’ practices this product can enter the usual end-of-life treatment process.

The recyclability potential of the products has been evaluated using the “ECO DEEE recyclability and recoverability calculation method” (version V1, 20 Sep. 2008 presented to the French Agency for Environment and Energy Management: ADEME).

According to this method, the potential recyclability ratio without packaging is: **48%.**

As described in the recyclability calculation method this ratio includes only metals and plastics which have proven industrial recycling processes.

# Environmental impacts

Life cycle assessment has been performed on the following life cycle phases: Materials and Manufacturing (M), Distribution (D), Installation (I) Use (U), and End of life (E).
Modeling hypothesis and method:

- The calculation was performed on **Thermal-Magnetic Circuit Breaker, Reference GV3P65**.
- Product packaging is included.
- Installation components: No special components included.
- Scenario for the Use phase: this product range is included in the category ***''Energy passing product''.*** Assumed service lifetime is **20 years** and use scenario is: Product dissipation is 0.72 W 30% load in Active mode and 0 W in OFF mode, loading rate is 30%, service uptime is 30% and service OFF time is 70%.
- The geographical representative area for the assessment is Europe and the electrical power model used for calculation is European model.
- End of life impacts are based on a worst case transport distance to the recycling plant (1000km)

### Presentation of the product environmental impacts

| Environmental indicators | Unit | For Thermal-Magnetic Circuit Breaker, Reference GV3P65 | | | | | |
|---|---|---|---|---|---|---|---|
| | | S = M + D + I + U + E | M | D | I | U | E |
| Air Acidification (AA for PEP) | kg H+ eq | 6.12E-03 | 1.25E-03 | 3.04E-05 | 0.00E+00 | 4.83E-03 | 1.22E-05 |
| Air Toxicity (AT for PEP) | $m^3$ | 8.09E+06 | 2.42E+06 | 4.51E+04 | 0.00E+00 | 5.60E+06 | 1.81E+04 |
| Energy Depletion (ED for PEP) | MJ | 5.40E+02 | 8.41E+01 | 2.28E+00 | 0.00E+00 | 4.53E+02 | 8.74E-01 |
| Global Warming Potential (GWP for PEP) | kg $CO_2$ eq. | 2.75E+01 | 4.92E+00 | 1.62E-01 | 0.00E+00 | 2.24E+01 | 6.21E-02 |
| Hazardous Waste Production (HWP for PEP) | kg | 1.10E-01 | 1.06E-01 | 2.00E-07 | 0.00E+00 | 3.84E-03 | 7.68E-08 |
| Ozone Depletion Potential (ODP for PEP) | kg CFC-11 eq. | 5.48E-06 | 3.89E-07 | 3.06E-10 | 0.00E+00 | 5.09E-06 | 1.18E-10 |
| Photochemical Ozone Creation Potential (POCP for PEP) | kg $C_2H_4$ eq. | 3.48E-03 | 2.04E-03 | 4.17E-05 | 0.00E+00 | 1.38E-03 | 1.55E-05 |
| Raw Material Depletion (RMD for PEP) | Y-1 | 5.76E-14 | 5.72E-14 | 3.30E-18 | 0.00E+00 | 3.02E-16 | 1.27E-18 |
| Water Depletion (WD for PEP) | $dm^3$ | 1.36E+02 | 7.81E+01 | 1.68E-02 | 0.00E+00 | 5.83E+01 | 6.44E-03 |
| Water Eutrophication (WE for PEP) | kg $PO_4^{3-}$ eq. | 2.12E-03 | 1.91E-03 | 3.00E-07 | 0.00E+00 | 2.13E-04 | 1.15E-07 |
| Water Toxicity (WT for PEP) | $m^3$ | 1.21E+01 | 2.03E+00 | 6.90E-02 | 0.00E+00 | 9.95E+00 | 2.65E-02 |

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 5 and with its database version CODDE-2014-04.

The **USE (U)** phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.
According to this environmental analysis, proportionality rules may be used to evaluate the impacts of other products of this range: “For other products in this family the impact of the Hazardous Waste Production (HWP), Raw Material Depletion (RMD) and Water Eutrophication (WE) may be proportionally extrapolated based on the ratio of the product’s and reference product’s mass. For the impacts of the Air toxicity (AT), Photochemical Ozone Creation Potential (POCP) and Water Depletion (WD), half of the impacts may be proportionally extrapolated based on the ratio of the products’ mass, and half may be proportionally extrapolated based on the ratio of the products’ electricity use. For all remaining product categories the impacts may be proportionally extrapolated based on the ratio of the product’s electricity use”.

# System approach

As the products of the range are designed in accordance with the European RoHS Directive 2011/65/EU, they can be incorporated without any restriction in an assembly or an installation subject to this Directive.
Please note that the values given above are only valid within the context specified and cannot be used directly to draw up the environmental assessment of an installation.

# Glossary

| | |
|---|---|
| **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 $H^+$. |
| **Air Toxicity (AT)** | This indicator represents the air toxicity in a human environment. It takes into account the usually accepted concentrations for several gases in the air and the quantity of gas released over the life cycle. The indication given corresponds to the air volume needed to dilute these gases down to acceptable concentrations. |
| **Energy Depletion (ED)** | This indicator gives the quantity of energy consumed, whether it is from fossil, hydroelectric, nuclear or other sources. It takes into account the energy from the material produced during combustion. It is expressed in MJ. |
| **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 $CO_2$. |
| **Hazardous Waste Production (HWP)** | This indicator quantifies 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. |
| **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 ($C_2H_4$). |
| **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. |
| **Water Depletion (WD)** | This indicator calculates the volume of water consumed, including drinking water and water from industrial sources. It is expressed in $dm^3$. |
| **Water Eutrophication (WE)** | Eutrophication is a natural process defined as the enrichment in mineral salts of marine or lake waters or a process accelerated by human intervention, defined as the enrichment in nutritive elements (phosphorous compounds, nitrogen compounds and organic matter). This indicator represents the water Eutrophication of lakes and marine waters by the release of specific substances in the effluents. It is expressed in grams equivalency of PO43-(phosphate). |
| **Water Toxicity (WT)** | This indicator represents the water toxicity. It takes into account the usually accepted concentrations for several substances in water and the quantity of substances released over the life cycle. The indication given corresponds to the water volume needed to dilute these substances down to acceptable concentrations. |

PEP achieved with Schneider-Electric TT01 V10.4 and TT02 V20 procedures in compliance with ISO14040 series standards

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|---|---|---|---|---|
| Registration N° : **SCHN-2015-145** | | | | Applicable PCR : PEP–PCR–ed 2.1-EN-2012 12 11<br>PSR0005-ed1-EN-2012 12 11 |
| Verifier accreditation N° : VH25 | | | | Program information: www.pep-ecopassport.org |
| Date of issue: December-2015 | | | | Period of validity: 4 years |
| Independent verification of the declaration and data, according to ISO 14025:2006 | | | | |
| Internal | | External | X | |
| In compliance with ISO 14025:2006 type III environmental declarations | | | | |
| PCR review was conducted by an expert panel chaired by J. Chevalier (CSTB). | | | | |
| The elements of the actual PEP cannot be compared with elements from another program. | | | | |

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