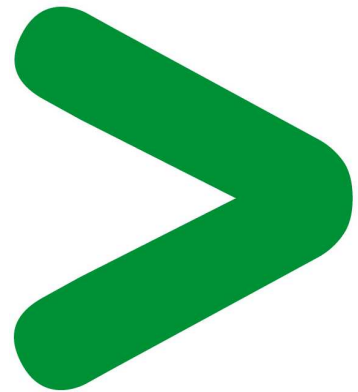


Product Environmental Profile

VEGETA (Turkey)

Vegetable oil filled MV/LV distribution transformer



Product Environmental Profile – PEP

Product overview

The main purpose of the Vegeta transformer is to supply reliable and safe voltage amplitude transformation to distribution network from MV to MV or from MV to LV (or vice versa for step up operation).

This range consists of: vegetable oil type filled distribution transformers up to and including 3150kVA power rating and &and 36kV maximum operating voltage, manufactured in Schneider Electric Turkey Transformer Plant.

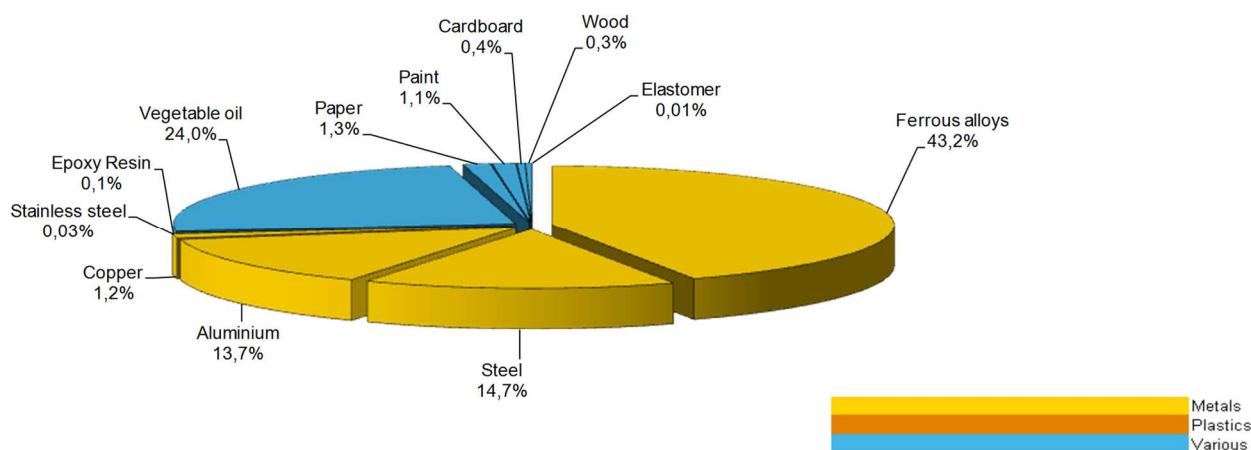
The representative product used for the analysis is vegetable oil type distribution transformer with ratings; 630kVA 10/0.4kV 50Hz 3 phases CoCk acc. to EN 50541-1 (level of load/no-load losses: 6500/860W), with hermetically sealed corrugated wall tank.

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 product range is from 400 kg and 8000 kg including packaging. It is 16651630 kg, including packaging, for the referent 630 kVA Vegeta Minera Ground Mounted transformers. The constituent materials are distributed as follows:



Substance assessment

Vegeta transformers are not included in scope of the RoHS according to sub-clause 2.4.e of European 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) . (<http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page>)

Manufacturing

Vegeta (Turkey) product range is manufactured at Schneider Electric Turkey production site on which an ISO14001 certified environmental management system has been established.

Distribution

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

The Vegeta transformer's packaging weight is 1 to 10 kg dependently on product size. It consists of wood material. For referent 630kVA product, the packaging weight is 5 kg as all consisting of wood.

Product Environmental Profile – PEP

Use

The products of Vegeta 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 635 W and 29700 W for the Vegeta product range. It is 7360 W at 100% load for the referenced reference 630kVA CoCk transformer.

This thermal dissipation represents less than 1.2% of the power which passes through the product.

Maintenance operations for Vegeta Transformer should be undertaken during the product's service life, according to Schneider Electric IOM (Installation & Operation & Maintenance) manual. Anyway, installation and maintenance activities of Vegeta transformers have negligible global impact.

End of life

At end of life, the products in Vegeta range have been optimized to decrease the amount of waste and allow recovery of the product components and materials.

This product range contains transformer vegetable oil & cellulosic papers and cardboard that should be separated from the stream of waste so as to optimize end-of-life treatment by special treatments. The location of these components and other recommendations are given in the End of Life Instruction document which is available for this product range on the Schneider-Electric Green Premium website [Green Premium website](http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page) (<http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page>).

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: 70%.

As described in the recyclability calculation method this ratio includes only metals 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 630kVA 10/0.4kV 50Hz 3 phases CoCk (acc. to EN 50541-1) transformer with hermetically sealed corrugated wall tank.
- Product packaging is included.
- Installation components: no special components included.
- Scenario for the Use phase: this product range is included in the category 1 (Energy Passing Product). Assumed service lifetime is 30 years and use scenario is; power dissipation is 7360 W at 100% load & 1750 W at 37% load, average loading rate during life time is 37% and service uptime percentage is 100%.
- The geographical representative area for the assessment is Europe and the electrical power model used for calculation is Europe model.
- End of life impacts are based on a worst case transport distance to the recycling plant (1000km)

Product Environmental Profile – PEP

Presentation of the product environmental impacts

Environmental indicators	Unit	For give the name and commercial reference or description of the representative product					
		S = M + D + I + U + E	M	D	I	U	E
Air Acidification (AA)	kg H+ eq	5,62E+01	1,73E+00	1,29E-02	0*	5,45E+01	2,15E-02
Air toxicity (AT)	m³	6,62E+10	2,91E+09	1,93E+07	0*	6,32E+10	3,21E+07
Energy Depletion (ED)	MJ	5,36E+06	1,41E+05	9,28E+02	0*	5,21E+06	1,55E+03
Global Warming Potential (GWP)	kg CO ₂ eq.	2,66E+05	8,67E+03	6,59E+01	0*	2,57E+05	1,10E+02
Hazardous Waste Production (HWP)	kg	5,25E+02	4,80E+02	8,15E-05	0*	4,48E+01	1,36E-04
Ozone Depletion Potential (ODP)	kg CFC-11 eq.	5,98E-02	1,09E-03	1,25E-07	0*	5,87E-02	2,08E-07
Photochemical Ozone Creation Potential (POCP)	kg C ₂ H ₄ eq.	2,00E+01	4,13E+00	1,64E-02	0*	1,59E+01	2,73E-02
Raw Material Depletion (RMD)	Y ⁻¹	7,57E-12	4,09E-12	1,35E-15	0*	3,48E-12	2,24E-15
Water Depletion (WD)	dm³	7,35E+05	6,28E+04	6,84E+00	0*	6,72E+05	1,14E+01
Water Eutrophication (WE)	kg PO ₄ ³⁻ eq.	2,54E+00	1,08E-01	1,22E-04	0*	2,44E+00	2,04E-04
Water Toxicity (WT)	m³	1,16E+05	1,72E+03	2,82E+01	0*	1,14E+05	4,69E+01

*0 means less than 0.01% of impact on the life cycle

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 5.3 and with its database version 2013-02.

The Use phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.

Extrapolation

According to this environmental analysis, proportionality rules may be used to evaluate the impacts of other products of this range.

For different power ratings or loss levels, the difference in the global impacts can be seen in below table as percentage. For the power ratings not indicated in the table, the difference can be estimated with linear extrapolation. The impacts changing in different loss levels for power rating other than reference 630kVA will be in same variation than changing in different loss levels of 630kVA.

POWER RATING LOSS LEVEL	100kVA CoCk	630kVA AoAk	630kVA CoCk (reference)	630kVA EoDk	1250kVA CoCk	2000kVA CoCk	2500kVA CoCk
Air Acidification (AA)	26%	73%	100%	138%	182%	290%	354%
Air toxicity (AT)	26%	74%	100%	138%	182%	289%	354%
Energy Depletion (ED)	26%	73%	100%	139%	182%	290%	355%
Global Warming Potential (GWP)	26%	73%	100%	138%	182%	290%	355%
Hazardous Waste Production (HWP)	38%	156%	100%	87%	167%	207%	296%
Ozone Depletion Potential (ODP)	26%	72%	100%	139%	183%	291%	355%
Photochemical Ozone Creation Potential (POCP)	29%	89%	100%	128%	179%	275%	345%
Raw Material Depletion (RMD)	33%	120%	100%	108%	175%	243%	321%
Water Depletion (WD)	27%	78%	100%	135%	182%	285%	352%
Water Eutrophication (WE)	26%	74%	100%	138%	181%	289%	355%
Water Toxicity (WT)	26%	72%	100%	139%	183%	291%	355%

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 ₂ H 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 PO ₄ ³⁻ (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 10.3 and TT02 V18 procedures in compliance with ISO14040 series standards

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