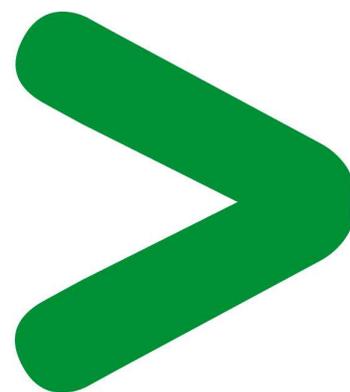


# Product Environmental Profile

Detuned Reactor



# Product Environmental Profile - PEP

## Product overview

The main purpose of the detuned reactor is to protect the capacitor and prevent amplification of the harmonics present on the network.

This range consists of: 119 products from 5 Kvar to 150 Kvar, Voltage from 230 to 690 and frequency from 50 to 60.

The representative product used for the analysis is Detuned Reactor 400V 50HZ 50KVAR 190HZ, reference LVR07500A40T.

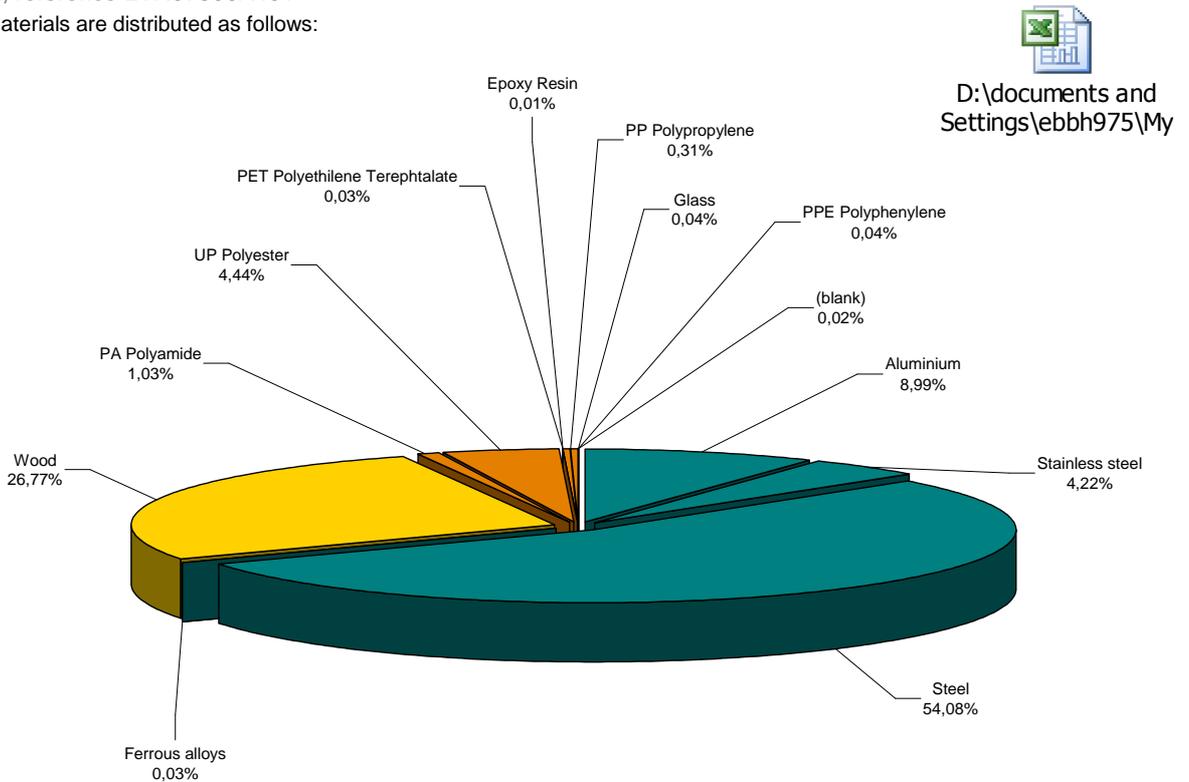
The environmental impacts of this referenced product are representative of the impacts of the other products of the range which are developed with a similar technology.

The environmental analysis was performed in conformity with ISO 14040.

## Constituent materials

The mass of the product range is from 14000 g and 65 000 g including packaging. It is 31750 g for the Detuned Reactor 400V 50HZ 50KVAR 190HZ, reference LVR07500A40T.

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 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

## Manufacturing

Detuned reactor is manufactured at a production site which complies with the regulations governing industrial sites.

## Distribution

The weight and volume of the packaging have been optimized, based on the European Union's packaging directive. The Detuned reactor packaging weight is 8500 g. It consists of 100% wood.

# Product Environmental Profile - PEP

## Use

The products of the Detuned reactor 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 100 W and 800 W for Detuned reactor product range. It is 320 W for the referenced Detuned Reactor 400V 50HZ 50KVAR 190HZ, reference LVR07500A40T.

This thermal dissipation represents less than 0,8% of the power which passes through the product.

## End of life

At end of life, the products in the Detuned reactor 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 "Codde- BV 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 is: 0%.

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 the Detuned Reactor 400V 50HZ 50KVAR 190HZ, reference LVR07500A40T
- product packaging: is included
- installation components: no special components included.
- scenario for the Use phase: this product range is included in the category Category 1 (Energy passing product): (assumed service life is 20 years and use scenario is: Product dissipation is 320W, loading rate is 100% and service uptime percentage is 50%) model.
- The geographical representative area for the assessment is European 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 give the name and commercial reference or description of the representative product					
		S = M + D + I + U + E	M	D	I	U	E
Raw Material Depletion	Y-1	4,72E-13	1,08E-13	5,17E-17	0,00E+00	3,64E-13	6,47E-17
Energy Depletion	MJ	3,24E+05	2,52E+03	37,926	0,00E+00	3,21E+05	4,74E+01
Water depletion	dm <sup>3</sup>	4,70E+04	5,74E+02	3,601	0,00E+00	4,64E+04	4,50E+00
Global Warming	g≈CO <sub>2</sub>	1,64E+07	1,52E+05	3,00E+03	0,00E+00	1,62E+07	3,76E+03
Ozone Depletion	g≈CFC-11	9,09E-01	2,46E-02	2,12E-03	0,00E+00	8,80E-01	2,66E-03
Air Toxicity	m <sup>3</sup>	2,72E+09	3,16E+07	5,66E+05	0,00E+00	2,69E+09	7,08E+05
Photochemical Ozone Creation	g≈C <sub>2</sub> H <sub>4</sub>	5,54E+03	55,366	2,567	0,00E+00	5,48E+03	3,21E+00
Air acidification	g≈H <sup>+</sup>	2,21E+03	23,11	3,83E-01	0,00E+00	2,19E+03	4,79E-01
Water Toxicity	dm <sup>3</sup>	4,65E+06	2,84E+04	3,76E+02	0,00E+00	4,62E+06	4,70E+02
Water Eutrophication	g≈PO <sub>4</sub>	4,08E+01	2,669	4,99E-02	0,00E+00	38,062	6,25E-02
Hazardous waste production	kg	2,77E+02	8,327	1,12E-03	0,00E+00	2,69E+02	1,40E-03

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version V4.0, and with its database version V11.0.

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

Depending on the impact analysis, the environmental indicators (without RMD) of other products in this family may be proportional extrapolated by energy consumption values". For RMD, impact may be proportional extrapolated by mass of the product.

## System approach

Optimize energy consumption, increase power availability, insure efficiency and productivity

### Increasing available power

A high power factor optimizes an electrical installation by allowing better use of the components. The power available at the secondary of a MV/LV transformer can therefore be increased by fitting power factor correction equipment on the low voltage side.

The table opposite shows the increased available power at the transformer output through improvement of the Power Factor from 0.7 to 1.

Power factor	Increased available power
0.7	0%
0.8	+14%
0.85	+21%
0.90	+28%
0.95	+36%
1	+43%

### Reducing installation size

Installing power factor correction equipment allows conductor cross-section to be reduced, since less current is absorbed by the compensated installation for the same active power.

The opposite table shows the multiplying factor for the conductor cross-section with different power factor values.

Power factor	Cable cross-section multiplying factor
1	1
0.80	1.25
0.60	1.67
0.40	2.50

As the products 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 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

<b>Raw Material Depletion (RMD)</b>	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.
<b>Energy Depletion (ED)</b>	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.
<b>Water Depletion (WD)</b>	This indicator calculates the volume of water consumed, including drinking water and water from industrial sources. It is expressed in dm <sup>3</sup> .
<b>Global Warming (GW)</b>	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 <sub>2</sub> .
<b>Ozone Depletion (OD)</b>	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.
<b>Air Toxicity (AT)</b>	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.
<b>Photochemical Ozone Creation (POC)</b>	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 <sub>2</sub> H <sub>4</sub> ).
<b>Air Acidification (AA)</b>	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 <sup>+</sup> .
<b>Water Toxicity (WT)</b>	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.
<b>Hazardous Waste Production (HWP)</b>	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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PEP achieved with Schneider-Electric TT01 V5 and TT02 V15 procedures in compliance with ISO14040 series standards

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PEP established according to PEPecopassport PCR : PEP- PCR-ed 2-EN-2011 12 09 rules

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