Environmental Product Declaration

OT-switches

Brochure EPD_OT 1 GB 02_09
1SCC301004C0201

Organizational framework

Manufacturer:

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Low Voltage Products unit is a part of the Business Unit ATLV, Automation Technology Low Voltage. Low Voltage Products develops, manufactures and markets a comprehensive range of low voltage products and the most extensive assortment of low voltage systems in the market. Our customers include industry, panel builders, machine and equipment manufacturers, electrical contractors and electrical power plants.

Environmental management

OT-switches are manufactured at the Finish plant, which has been certified according to ISO 14001 since 1997 (the plant has been also certified according to the ISO 9001 quality management standard since 1993). Life cycle assessment is applied continuously to all product development.

Product description

The OT family comprises of the following sizes: 16 A, 25 A, 32 A, 45 A, 63 A, 80 A, 100 A and 125 A. The switches comply with the latest spesification of modern low voltage installations. One of the excellent features of OT switches is the operator independent quick-make / quick-break mechanism available in OT 45…125.

The table below lists the materials used and their quantities:

kg/product

Type of material	OT25	OT45	OT125
Polyamide 66, GF30	0,0193	0,0144	0,0394
Polyamide 66, other	0,0380	0,1218	0,1808
Steel	0,0202	0,0773	0,1304
Zinc	0,000486	0,00322	0,00276
Stainless Steel	0,006	0,0141	0,0174
Brass	0,00888	0,0482	-
Silver	0,000243	0,000624	0,000762
Copper	-	-	0,0898

Environmental performance

The data and calculations are based on LCA. Here are the baselines for the LCA calculation:

Functional unit

The functional unit is defined as A of rated operational current AC21.
OT25 25 A
OT45 45 A
OT125 125 A

System boundaries

The life cycle assessment covers all environmental aspects for extraction and production of raw materials, manufacturing of main parts, assembly of the switch, transportation and the use of the product, dismantling, fragmentation and disposal after end of life. It includes consumption of material and energy resources as well as emissions and waste generation.

The recycling of scrap is not included in the calculations.

The calculations are based upon an estimated life-time of 10 years when operating 3650 hours per year (10 hours per day, 365 days, load factor 70%). Energy during use is calculated from power loss. An European mix of energy has been used for calculating energy consumption during manufacturing, use and disposal.

This environmental product declaration is based on a life cycle assessment LCA. It has been conducted according to ISO 14040-43 series, with the EcoLab software from Nordic Port AB, Gothenburg, Sweden.

Allocation unit

The factor for allocation of common environmental aspects (such as manufacturing energy) during manufacturing is calculated as used working cost in relation to the total annual production volume for the manufacturing.

Resources utilization

Inventory	Manufacturing phase	Usage phase	End of life phase
OT25			
Use of non-renewable resources			
Iron (Fe) kg/A	0,001328	0,000000	0,000000
Copper (Cu) kg/A	0,000496	0,000000	0,000000
Silver (Ag) kg/A	0,000016	0,000000	0,000000
Cromium (Cr) kg/A	0,000029	0,000000	0,000000
Manganese (Mn) kg/A	0,000004	0,000000	0,000000
Nickel (Ni) kg/A	0,000016	0,000000	0,000000
Zinc (Zn) kg/A	0,000308	0,000000	0,000000
Coal kg/A	0,024964	0,503812	0,000000
Uranium (U) kg/A	0,000001	0,000019	0,000000
Oil MJ/A	0,23332	2,25475	0,000192
Gas MJ/A	0,20322	1,80770	0,000004
Use of renewable recources			
Hydro power MJ/A	0,00130	0,00000	0,00000
OT45			
Use of non-renewable resources			
Iron (Fe) kg/A	0,002933	0,000000	0,000000
Copper (Cu) kg/A	0,000704	0,000000	0,000000
Silver (Ag) kg/A	0,000013	0,000000	0,000000
Cromium (Cr) kg/A	0,000039	0,000000	0,000000
Manganese (Mn) kg/A	0,000004	0,000000	0,000000
Nickel (Ni) kg/A	0,000018	0,000000	0,000000
Zinc (Zn) kg/A	0,000482	0,000000	0,000000
Coal kg/A	0,026169	0,653089	0,000000
Uranium (U) kg/A	0,000001	0,000025	0,000000
Oil MJ/A	0,35933	2,92282	0,000316
Gas MJ/A	0,31819	2,34332	0,000009
Use of renewable recources			
Hydro power MJ/A	0,00258	0,00000	0,00000
OT125			
Use of non-renewable resources			
Iron (Fe) kg/A	0,001238	0,000000	0,000000
Copper (Cu) kg/A	0,000893	0,000000	0,000000
Silver (Ag) kg/A	0,000006	0,000000	0,000000
Cromium (Cr) kg/A	0,000017	0,000000	0,000000
Manganese (Mn) kg/A	0,000002	0,000000	0,000000
Nickel (Ni) kg/A	0,000007	0,000000	0,000000
Zinc (Zn) kg/A	0,000024	0,000000	0,000000
Coal kg/A	0,009587	1,058002	0,000000
Uranium (U) kg/A	0,0000003	0,000041	0,000000
Oil MJ/A	0,27405	4,73497	0,000185
Gas MJ/A	0,17036	3,79617	0,000005
Use of renewable recources			
Hydro power MJ/A	0,00161	0,00000	0,00000

Energy consumption and losses

Absolute requirements and requirement per unit of rated operational current

	Manufacturing phase (kWh/product)	Usege phase (kWh/product)	End of life phase phase (kWh/product)	Manufacturing phase (kWh/A)	Usege phase (kWh/A)	End of life phase (kWh/A)
OT25	2,001	45,99	0,0008	0,0801	1,8396	0,00004
OT45	3,514	107,31	0,0016	0,0781	2,3847	0,00004
OT125	3,548	482,90	0,0015	0,0284	3,8632	0,00001

The European electricity mix is defined as being 10% gas, 15% hydro, 36% nuclear, 10% oil, 19% stone coal and 10% lignite coal.

Waste

Regular waste (to landfill)
kg/A

	OT25	OT45	OT125
During manufacturing	0,001064	0,001238	0,000535
At final disposal	0,003725	0,006213	0,003692

OT 25 OT 45 OT 125

The classification data for emissions

OT25
Impact/product

	Manufacture	Use	End of life
GWP100 (CO2 kg)	1,6316	23,3035	0,0706
AP (SO2 kg)	0,0098	0,1457	0,0000
ODP (CFC-11 kg)	0,0000	0,0000	0,0000
POCP (Ethylen kg)	0,0003	0,0051	0,0000
NP (Phosphate kg)	0,0007	0,0063	0,0000

OT25
Impact/A

	Manufacture	Use	End of life
GWP100 (CO2 kg/A)	0,0653	0,9321	0,0028
AP (SO2 kg/A)	0,0004	0,0058	0,0000
ODP (CFC-11 kg/A)	0,0000	0,0000	0,0000
POCP (Ethylen kg/A)	0,0000	0,0002	0,0000
NP (Phosphate kg/A)	0,0000	0,0003	0,0000

OT45
Impact/product

	Manufacture	Use	End of life
GWP100 (CO2 kg)	3,6821	54,3747	0,2258
AP (SO2 kg)	0,0218	0,3400	0,0000
ODP (CFC-11 kg)	0,0000	0,0000	0,0000
POCP (Ethylen kg)	0,0007	0,0120	0,0000
NP (Phosphate kg)	0,0019	0,0146	0,0000

OT45
Impact/A

	Manufacture	Use	End of life
GWP100 (CO2 kg/A)	0,0818	1,2083	0,0050
AP (SO2 kg/A)	0,0005	0,0076	0,0000
ODP (CFC-11 kg/A)	0,0000	0,0000	0,0000
POCP (Ethylen kg/A)	0,0000	0,0003	0,0000
NP (Phosphate kg/A)	0,0000	0,0003	0,0000

OT125
Impact/product

	Manufacture	Use	End of life
GWP100 (CO2 kg)	5,4227	244,6862	0,3508
AP (SO2 kg)	0,0322	1,5298	0,0001
ODP (CFC-11 kg)	0,0000	0,0000	0,0000
POCP (Ethylen kg)	0,0008	0,0542	0,0005
NP (Phosphate kg)	0,0029	0,0659	0,0000

OT125
Impact/A

	Manufacture	Use	End of life
GWP100 (CO2 kg/A)	0,0434	1,9575	0,0028
AP (SO2 kg/A)	0,0003	0,0122	0,0000
ODP (CFC-11 kg/A)	0,0000	0,0000	0,0000
POCP (Ethylen kg/A)	0,0000	0,0004	0,0000
NP (Phosphate kg/A)	0,0000	0,0005	0,0000

Additional qualifying factors

Recycling and disposal

The main parts of the product can be recycled. Some parts need to be fragmented to separate different types of material. No recycling in LCA calculation.

Usage phase in relation to the total

It is to be observed that the environmental impact during the usage phase is the most important. As an example, GWP for the usage phase is 96-99 % of total GWP.

References

- LCA report
- ECOLAB program
- Technical Brochure (OETL 1A GB 98-11) SwitchLine, LoadBreakSwitches, Switch-Disconnectors

The above mentioned documents are available on request.

Glossary

Acidification, AP

Acidification originates from the emissions of sulphur dioxide and oxides of nitrogen. In the atmosphere, these oxides react with water vapour and form acids which subsequently fall down to the earth in the form of rain or snow or as dry depositions. Acidification potential translates the quantity of emission of substances into a common measure to compare their contributions to the capacity to release hydrogen ions.

Eutrophication

Nutrients (mainly nitrogen and phosphorus) from sewage outfalls and fertilised farmland accelerate the growth of algae and other vegetation in water. The degradation of organic material consumes oxygen, resulting in oxygen deficiency and fish kill. Eutrophication translates the quantity of emission of substances into a common measure expressed as the oxygen required for the degradation of dead biomass.

Global warming potential, GWP

Some of the gases in the earth's atmosphere (in particular water vapour and carbon dioxide) have an ability to absorb infrared radiation. They do not prevent sunlight reaching the earth's surface, but they do trap some of the infrared radiation emitted back into space, causing an increase in the surface temperature. Global Warming Potential, GWP100, translates the quantity of emission of gases into a common measure to compare their contributions – relative to carbon dioxide – to the absorption of infrared radiation in 100 years perspective.

Life cycle assessment, LCA

A management tool for appraising and quantifying the total environmental impact of products or activities over their entire life cycle of particular materials, processes, products, technologies, services or activities. Life cycle assessment comprises three complementary components – inventory analysis, impact analysis and improvement analysis.

Ozone depletion potential, ODP

Ozone forms a layer in the stratosphere protecting plants and animals from much of the sun's harmful UV-radiation. The ozone levels have declined as a consequence of CFCs and halons released into the atmosphere. A depletion of the ozone layer will increase the UV-radiation at ground level. Ozone depletion potential translates the quantity of emission of gases into a common measure to compare their contributions – relative to CFC-11 (a freon) – to the breakdown of the ozone layer.

Photochemical ozone creation, POCP

Photochemical ozone or ground level ozone is formed by the reaction of volatile organic compounds and nitrogen oxides in the presence of heat and sunlight. Ground-level ozone forms readily in the atmosphere, usually during hot summer weather. Photochemical ozone creation potential translates the quantity of emission of gases into a common measure to compare their contributions – relative to ethylene – to the formation of photochemical oxidants.

EPD_OT 1 GB 02_09
1SCC301004C0201
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The technical data and dimensions are valid at the time of printing. We reserve the right to subsequent alterations.

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