

Environmental Product Declaration

SYNCHROTECT® 5

Synchronizing and Paralleling Equipment and Systems



ABB

Organizational framework

ABB Switzerland Ltd forms a part of ABB's Automation Technology Products division. The company develops, manufactures and markets power electronic products and systems for ABB group customers world-wide and is responsible for several key product groups, including excitation and synchronizing systems, high power converters and frequency converters.

Environmental management:

The ISO 14001 international environmental management standard has been implemented and the Turgi factory has been certified since 1999. Lifecycle assessment is applied continuously to all product development.

The Turgi factory was awarded the ISO 9001 quality certificate in 1994 in recognition of its commitment to maintaining the high quality of its products and systems.

Product description:

SYNCHROTECT products are used for automatic synchronization of generators with power lines and for paralleling of synchronous lines. They are designed for fully-automatic paralleling or monitoring of paralleling (Synchrocheck) by means of dual-channel or single-channel systems.

Type of Material	Kg/Product
Aluminium	2.671
Special metals	0.306
Copper Flex	0.077
Steel	0.033
Glass, Ceramics, Metals Oxides	0.787
Polystyrene / Cardboard Box	0.224

Environmental performance

The data and calculations are in accordance with internal guidelines for performing LCA/EPDs. Regarding also environmental guidelines ISO TR14025, ISO14040, ISO14041, ISO14042 and ISO 14043.

Functional unit

The functional unit for the LCA is one SYNCHROTECT® 5 product.

System boundaries

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

Calculations are based upon an estimated lifetime of 20 years when operating 20 hours per year. A European mix of energy has been used for calculating energy consumption during manufacturing, use and disposal.

The SYNCHROTECT®5 single-channel system has been chosen as it represents the extremes of the range when calculating the Life Cycle Assessment.

Allocation unit

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

Resource utilization	Manufacturing	Transport	Use	Landfill	Recycled
Use of non-renewable resources (kg)					
Aluminium (Al)	2.72	-	-	2.72	0.37
Copper (Cu)	0.16	-	-	0.16	0.07
Iron (Fe)	0.02	-	-	0.02	0.02
Coal	13.03	13	0	15.10	8.90
Oil	9.80	5.18	2.4	12.20	9.40
Gas	1.61	0.12	0.16	1.770	0.96

Energy consumption and losses

	Manufacturing	Transport	Use	Landfill	Recycled
Use of renewable resources (kg)					
Hydro power	0.0265	-	0	0.0265	0.0265

Energy consumption and losses (MJ)

Electrical Energy					
(hydro & coal)	27	-	1.95	10	8
Heat Energy	-	2.74	-	91.5	88.8

Waste (kg)

Hazardous waste	0.2	-	-	0.2	0.2
Regular waste	0.065	-	-	0.065	0.790

Category of Impact	Unit	Manufacturing	Transport	Use	Disposal	Recycled
Global warming (GWP)	kg CO ₂	70.43	18.18	11.32	86.37	54.01
Acidification potential (AP)	kmol H ⁺	0.376	0.064	0.050	0.428	0.26
Ozone depletion (ODP)	kg CFC-11	0	0	0	0	0
Photochemical oxidants (POPC)	kg C ₂ H ₄	0.0147	0.003	0.002	0.018	0.0147
Eutrophication potential (NP)	kg O ₂	0.0228	0.010	0.005	0.0283	0.0226

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. A list of parts and components that can be fragmented and recycled can be obtained from the manufacturer. See references.

Manufacturing phase in relation to the total

It is to be observed that the environmental impact during the manufacturing phase is the most important. The manufacturing phase includes all transports of components from supplier to the manufacturing site.

References

- LCA report (LCA) 22 318
- 3BHT490301R0201, Pamphlet SYNCHROTACT®5
- 3BHB901067E01, Description SYNCHROTACT®5
- 3BHS109762E01, Operating Instructions
- Recycling Instructions are mentioned in operating instructions manual 3BHS109762E01, section 5

The above-mentioned documents are available upon request.

Category of Impact	Usage in % of total
Global warming (GWP)	81.54
Acidification potential (AP)	87.93
Ozone depletion (ODP)	0
Photochemical oxidants (POPC)	81.66
Eutrophication potential (NP)	80.56

GLOSSARY

Acidification, AP: Chemical alternation of the environment, resulting in hydrogen ions being produced more rapidly than they are dispersed or neutralized. Occurs mainly through fallout of sulphur and nitrogen compounds from combustion processes. Acidification can be harmful to terrestrial and aquatic life.

Eutrophication: Enrichment of bodies of water by nitrates and phosphates from organic material or surface runoff. This increases the growth of aquatic plants and can produce algal blooms that deoxygenate water and smother other aquatic life.

Global warming potential, GWP: The index used to translate the level of emissions of various gases into a common measure to compare their contributions to the absorption by the atmosphere of infrared radiation. GWPs are calculated as the absorption that would result from the emission of 1 kg of a gas to that of the emission of 1 kg of carbon dioxide over 100 years.

Ozone depletion potential, ODP: The index used to translate the level of emissions of various substances into a common measure to compare their contributions to the breakdown of the ozone layer. ODPs are calculated as the change that would result from the emission of 1 kg of a substance to that of the emission of 1 kg of CFC-11 (a freon).

Photochemical ozone creation, POCP: The index to translate the level of emissions of various gases into a common measure to compare their contributions to the change of ground-level ozone concentration. POCPs are calculated as the change that would result from the emission of 1 kg of a gas to that of the emission of 1 kg of ethylene.

Lifecycle assessment, LCA: A management tool for appraising and quantifying the total environment impact of products or activities over their entire lifecycle of particular materials, processes, products, technologies, services or activities. Lifecycle assessment comprises three complementary components: inventory analysis, impact analysis and improvement analysis.



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