BOMBARDIER

Environmental Product Declaration

EBI Lock 950 – Interlocking System

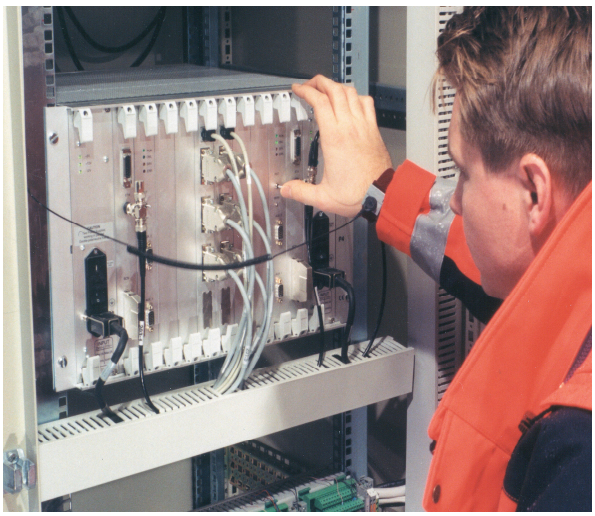
Product description

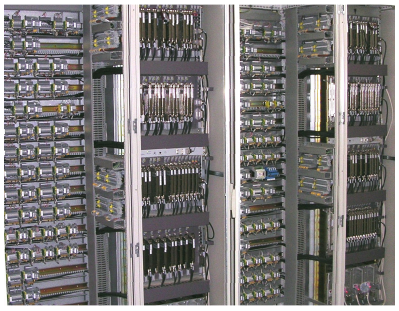
*EBI** Lock 950 computer based interlocking systems supervise and control wayside objects such as signals, point machines and level crossing protection equipment. The interlocking system receives among others, route commands from traffic control centres or local control systems, and sends indications or status reports back. The interlocking system checks that conditions for the commands are fulfilled, locks routes, and releases them after the train passes.

EBI Lock 950 systems comprise an interlocking computer, an on-line back up computer and centrally located or distributed object controllers. Object controllers provide the interface to the wayside units and are located with the interlocking computers in racks or cabinets holding printed circuit boards, power supplies, connectors and cables.

The computer based interlocking techniques have replaced the older relay techniques which used mercury. The phase out of this heavy metal with its negative environmental impact has led to great improvements in environmental performance.

Standard products and components are used therefore meaning they are easy to assemble and modify according to needs.





Manufacturing materials (kg)	Total per *EBI* Lock	The Weight [%]	Recyclability [%]
Steel	384	72,6	100
Copper	43	8,16	100
Polymers	42	7,92	98
Iron	24	4,55	100
Aluminium	4	0,73	100
Other material	32	6,00	35
Total	**528**	**100**	**96**

Materials in need of special treatment at End-of-life are 33 kg.

System boundaries

The information overleaf is based on a Life Cycle Assessment (LCA) of a fully mounted cabinet 3NSS004544-12. The assessment can be applied to the racks holding the central interlocking computers since these hold the same type of equipment in lower volumes than what is used in an Object controller cabinet.

The LCA covers environmental aspects for the extraction and production of the raw materials used, transportation of major parts to the assembly plant, and energy consumption for final assembly (1 kWh) and the use phase (6132 kWh). It also covers the end-of-life activities. No replacement of materials is expected during the lifetime.

End-of-life

Recyclability calculations are based on existing recycling processes that are commercially available and technically possible today. Energy recovery is included in the recyclability rate that is estimated to be 96 %.

Environmental Profile – Results from LCA according to ISO 14040

The functional unit is one Object controller cabinet in service for 20 years.

Resource utilisation

Primary energy resources (kWh)	Manufacturing	Use	End-of-life	Total life cycle
Non Renewable				
Nuclear	0,465	2852	0	2852
Oil	0,020	126	0	126
Coal	0,019	122	0	122
Gas	0,002	17	0	17
Renewable				
Hydropower	0,469	2880	0	2881
Biomass	0,019	120	0	120
Wind power	0,002	12	0	12

Material (kg) Resources	Manufacturing	Use	End-of-life	Total life cycle
Steel	384	0	-384	0
Copper	43	0	-43	0
Polymers	42	0	-41	1
Iron	24		-24	0
Aluminium	4	0	-4	0
Other material	32	0	-11	21
Total	**528**	**0**	**-507**	**22**

Impact categories to which all the emissions are grouped:

Environmental impact categories	Unit	Manufacturing	Use	End-of-life	Total life cycle
Global warming potential (GWP)	kg CO_2 equiv.	1405	318	-742	981
Ozone Depletion Potential (ODP)	kg CFC 11 equiv.	0,000004	0,000186	-0,000002	0,00019
Acidification (AP)	mol H+ equiv.	184	74	-84	174
Eutrophication (NP)	kg O_2 equiv.	23	5	-6	22
Photochemical Oxidant formation (POCP)	kg Ethene equiv.	0,18	0,15	-0,07	0,26

The **material resources** cover the materials used for manufacturing of the object controller cabinet.
The **energy resources** cover energy needed during manufacturing and use of the Object controller cabinet. A Swedish electricity mix is assumed, which includes a variety of energy resources during the manufacture and use phase.
The **materials in need of special treatment** are identified according to knowledge of existing recycling processes that are commercially available and technically possible today.
Manufacture covers the materials and energy needed for assembly of the Object controller cabinet.
Use covers the predicted and estimated processes during the use phase.
End-of-life covers recycling, incineration with energy recovery and landfill. Credit for recyclability of metals and polymers is achieved by deducting the impact of production of the same virgin material or energy.
Total sums up the manufacture, use and end-of-life phase.

Included in the LCA:

- Data for raw materials used throughout the life cycle
- Transportation of main components to final assembly
- Energy consumption during assembly and use

Not included:

- Manufacturing processes at suppliers
- The raw material waste produced in the manufacturing process
- Effects of possible accidents
- Energy and emissions for the end-of-life treatment

This EPD is performed according to ISO 14021
For further details regarding the LCA, see 3EST 7-3122 Life Cycle Assessments of RCS products ver 1.0