

## Environmental Product Declaration

### EBI Cab 2000

#### Product description

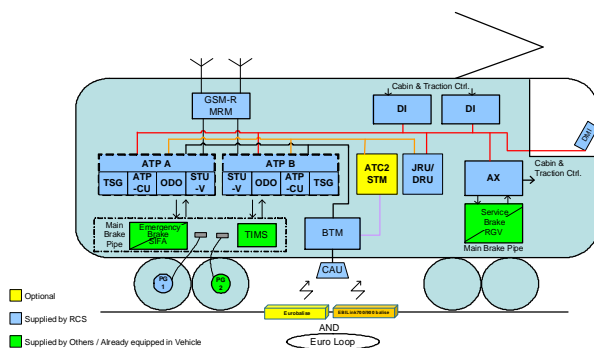
Bombardier *EBI Cab 2000* is a modern system for automatic train control (ATC). It supports the fast transmission and supervision of information about track and traffic conditions on the line ahead for main line operations. Exchanging information with the wayside equipment, the *EBI Cab* system increases safety, optimises traffic capacity and shortens headways.

*EBI Cab 2000* operates by supervising movement authority and infrastructure data received from wayside equipment. Drivers receive information about approaching target objects such as signals or points, the distance to the next target, the target speed and the maximum permitted speed between the train and the next target.

*EBI Cab 2000* has been developed for the lowest possible life cycle costs and is cost-effective to install and maintain. The system is comprised of tried and tested modern modules, which means that it can be easily upgraded and adapted to different customer requirements.



B1 - 1 EVC, 1 Antenna, 1 DMI [LOCO]



#### System boundaries

The Life Cycle Assessment (LCA) overleaf is based on the *EBI Cab 2000*. It covers environmental aspects for the extraction and production of the raw materials used, transportation of major parts to the assembly plant, the energy consumption for final assembly (22kWh) as well as the energy consumption during use phase. It also covers the end-of-life activities.

The calculated energy consumption during use phase for one *EBI Cab 2000* in service for 30 years is 18 458 kWh. The calculation is based on 9 hours of operation per day. No maintenance or 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 which is estimated to be 91 %. Furthermore the packaging materials used are made of 100% recycled material.

Manufacturing materials (kg)	Total per EBI Cab	The Weight [%]	Recyclability [%]
Aluminium	26,9	38,6	100
Polymers	10,7	15,3	99
Copper	4,3	6,2	100
Steel	3,0	4,2	100
Brass	2,9	4,1	98
Rubber	0,2	0,3	100
Other metals	3,8	5,5	97
Other material	18,0	25,8	68
<b>Total</b>	<b>69,8</b>	<b>100</b>	<b>91</b>

Other materials include electronics. Materials in need of special treatment at End-of-life are 17 kg.

### Environmental Profile – Results from LCA according to ISO 14040

The functional unit is one *EBI Cab* 2000 in service for 30 years.

#### Resource utilisation

Primary energy resources (kWh)	Manufacturing	Use	End-of-life	Total life cycle	Material (kg) Resources	Manufacturing	Use	End-of-life	Total life cycle
Non Renewable					Aluminium	26,9	0	-26,9	0
Nuclear	10,4	8584	0	8595	Polymers	10,7	0	-10,6	0,1
Oil	0,5	381	0	382	Copper	4,3	0	-4,3	0
Coal	0,5	368	0	369	Steel	3,0	0	-3,0	0
Gas	0,06	50	0	50	Brass	2,9	0	-2,8	0,1
Renewable					Rubber	0,2	0	-0,2	0
Hydropower	10,6	8671	0	8682	Other metals	3,8	0	-3,7	0,1
Biomass	0,4	360	0	361	Other material	18,0	0	-12,2	5,9
Wind power	0,05	37	0	37	Total	69,8	0	-63,7	6,2

#### 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 <sub>2</sub> equiv.	575	957	-320	1212
Ozone Depletion Potential (ODP)	kg CFC 11 equiv.	0,00005	0,00056	-0,000015	0,000595
Acidification (AP)	mol H+ equiv.	110	223	-62	271
Eutrophication (NP)	kg O <sub>2</sub> equiv.	9,4	15,3	-2,4	22,3
Photochemical Oxidant formation (POCP)	kg Ethene equiv.	0,15	0,46	-0,03	0,58

The material resources cover the materials used for manufacturing the *EBI Cab*.

The energy resources cover energy needed during manufacturing and use of the *EBI Cab*. A Swedish electricity mix including a variety of energy resources has been used in the calculations.

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 *EBI Cab*.

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

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This EPD is performed according to ISO 14021

For further details regarding the LCA, see 3EST 7-2122 Life Cycle Assessments of RCS products ver 1.1