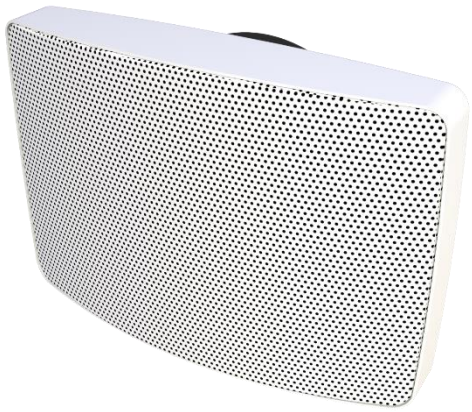
ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH
EN 15804+A2 & ISO 14025

HALTON OY

PRODUCT EPD
BOS SUPPLY AIR VALVE



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GENERAL INFORMATION

Manufacturer information

Manufacturer	Halton Oy
Address	Haltonintie 1-3, 47400 Kausala
Website	https://www.halton.com/

Product identification

Product name	BOS – Supply air valve
Declared unit	1 unit of finished product. The mass of 1 unit of BOS-100 product is 0,95 kg.
Place(s) of production	Ningbo, China

EPD information

Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	Rakennustieto Oy, RTS, Malminkatu 16 A 00100 Helsinki
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. RTS PCR 2024
EPD author	Kimmo Hyötynen, Halton Oy Haltonintie 1-3, 47400 Kausala Kerli Maiste, Jere Peltomäki, Granlund Oy Malminkaari 21 00701 Helsinki
EPD verification	Independent verification of this EPD and data, according to ISO 14025
EPD Verification date	26.09.2025
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EPD verifier	Anni Oviir, LCA Support - Rangi Maja OÜ
EPD publishing date	
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Verified according to the requirements of EN 15804+A2 (product category rules)

Independent verification of the declaration, according to EN ISO 14025:2010

☒ External	☐ Internal

Third party verifier:

Anni Oviir, LCA Support - Rangi Maja OÜ, Tallinn, Estonia

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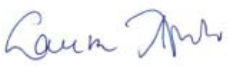


Laura Apilo
Managing Director

PRODUCT INFORMATION

Product description

Product name	BOS - Supply air valve,
Product code	BOS-100 BOS-125
Declared unit	1 unit of finished product. The mass of 1 unit of BOS-100 product is 0,95 kg.
Representative product	This EPD represents two BOS product variations: BOS-100 and BOS-125. EPD results are presented for BOS-100 product, which represents both product variations. The GWP-total A1-A3 results between the two product variations differ by less than 2 %. BOS-100 is chosen based on the conservatism approach.

The Halton BOS supply air valve is ideal for residential usage. Beautiful in design and best functionality also with low airflow rates. BOS is made of cold rolled and stainless steel, polymers and paint. This EPD represents two BOS product variations: BOS-100 and BOS-125. The mass of 1 unit of BOS-100 product is 0,95 kg, and BOS-125 is 0,93 kg. The GWP-total A1-A3 results between the two product variations differ by less than 2 %, with BOS-100 exhibiting higher GWP-total A1-A3 results. Therefore, BOS-100 is selected based on a conservative approach.

Product raw material composition and technical information

Main substances of the product are presented in table below.

MAIN MATERIALS OF BOS-100

Materials	Weight % per unit	Origin	Renewable content (%)	Non-renewable content (%)	Recycled material content (%)
Steel	94.5 %	GLO	0 %	100 %	0 %
Stainless steel	1.7 %	GLO	0 %	100 %	0 %
Polymers	3.0 %	GLO	0 %	100 %	0 %
Paint	0.7 %	GLO	0 %	100 %	0 %
Total mass of materials	**0,95 kg**				**0 %**

PACKAGING MATERIAL COMPOSITION

MAIN PACKAGING MATERIALS PER PRODUCT

Main packaging materials of products per unit of product are presented in table below.

Packaging material	Mass (kg)	Weight-%
Plastic	0,00004	4,6
Cardboard	0,0003	39,8
EUR-flat pallet	0,0005	55,6
TOTAL	0,0008	100

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

LIFE-CYCLE ASSESSMENT

Life-cycle assessment information

Period for data	1 year, 2023

Declared unit

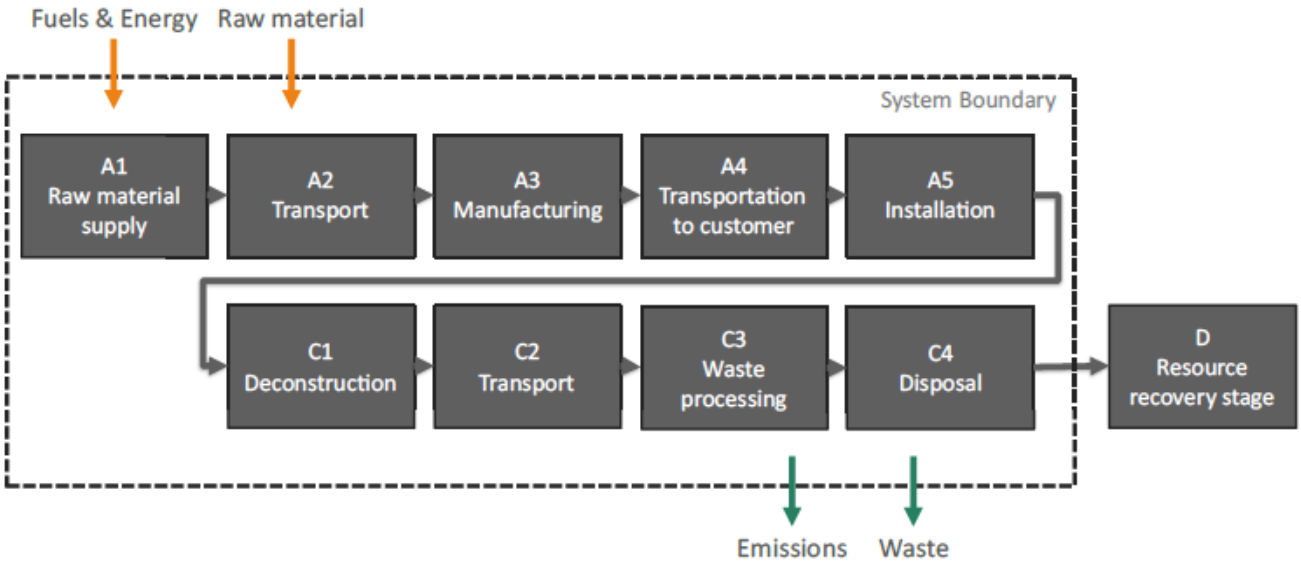
Declared unit	1 unit of finished product
Mass per declared unit	0,95 kg

System boundary

The studied system boundary was cradle-to-gate with options, modules C1-C4, module D and A4-A5. Studied system covers the following steps of life cycle according to EN 15804:

	Product Stage			**Construction Process Stage**		**Use Stage**							**End-of-Life Stage**				**Benefits and loads beyond the system boundary**		
	Raw material supply	Transport	Manufacturing	Transport to building	Installation to building	Use/applications	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
Included	X	X	X	X	X								X	X	X	X	X	X	X
Relevancy	R	R	R	R	R	NR	NR	NR	NR	NR	NR	NR	R	R	R	R	R	R	R

Mandatory
Mandatory as per the RTS PCR section 6.2.1 rules and terms
Optional modules based on scenarios



The study does not omit any life cycle stages, processes or data needs that are mandatory according to EN 15804 and RTS PCR. The study excludes following life cycle stages which are optional according to EN 15804 and RTS PCR.

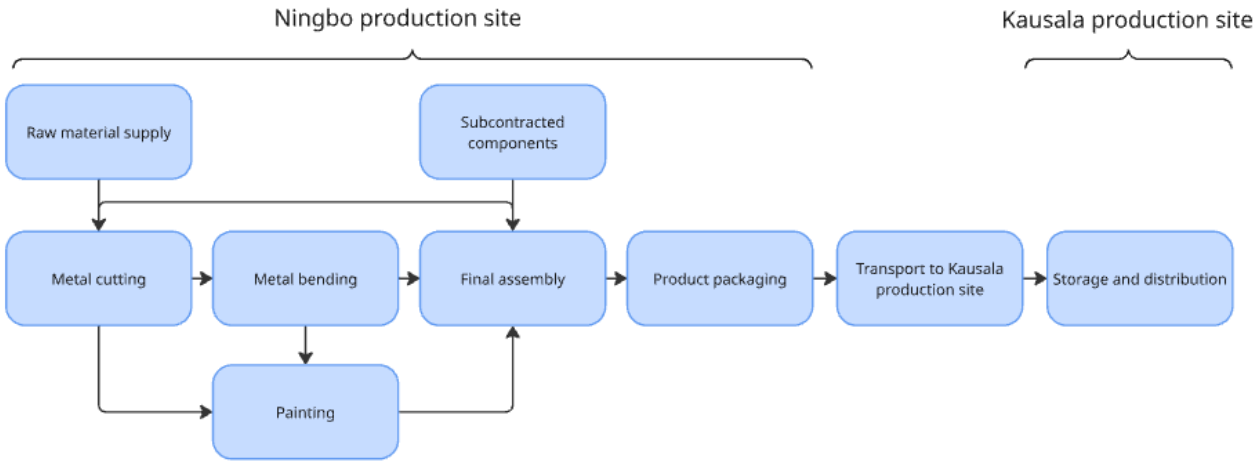
THE DETERMINATION OF END-OF-WASTE POINTS

Descriptions of End-of-Waste points that specify the system boundary are presented below.

- A1 module: No recycled raw materials were assumed to be used in the process.
- A3 module: The end of waste point of the production scraps is the point where it is processed to be ready to use in following life cycles. For example, for incinerated waste streams, it is the incineration of the materials, which results as energy that is then available for consumption in the following life cycle. For paper waste, it is ready to be used as secondary raw material after sorting.
- A5 module: End of waste point of the packaging materials in A5 module is the point where it is processed and to be ready to use in following life cycles.
- C3 module: End of waste point of the studied product is the step when materials are collected and handled in the sorting plant. For metal-based materials, the end of waste point is when materials are sorted and pressed and available to be used to replace primary steel

Production process

Production stage (A3) of Halton's subcontractor's production site in Ningbo covers the following manufacturing processes; raw material supply, metal cutting, metal bending, painting, assembly, final assembly, packaging the final product, transportation to Kausala production site, and storage and distribution of the final product. After that, products will be transported to the client. The production processes of studied products are shown below.



The production process of Halton's subcontractor's factory in Ningbo (China) production site.

Cut-off criteria

This study follows the cut-off criteria stated in RTS PCR and EN 15804 -standard. This study does not exclude any modules or processes which represent more than 1 % of the emissions of studied life cycle stage. The study does not exclude any hazardous materials or substances.

Excluded processes and the criteria for exclusion are given in the following table. Machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

Process excluded from study	Cut-off criteria	Quantified contribution from process
B1-B7 Use stage	Not relevant, nor mandatory stages as per RTS PCR	

Allocation, estimates and assumptions

Allocation rules used are made according to the ISO14044:2006. Allocation is avoided when possible and when necessary, allocation is made based on physical shares and also avoiding double calculations. Allocation is required if the production process produces more than one product and the flows of materials, energy and waste cannot be separately measured for the studied product. Allocation used in generic data sources follow the requirements of the EN 15804 -standard. It should be noticed that the allocation method 'allocation, cut-off by classification' has been used for Ecoinvent 3.10.1 data, which complies with EN 15804. Avoiding allocation could not be avoided for following inputs as the information was only measured on factory process level.

- Electricity: only measured on factory level.
- Packaging materials: only measured on factory level.

The inputs were allocated to studied product based on production volume (mass in kilograms).

According to EN 15804, flows leaving the system at the end-of-waste boundary of the product stage (A1-A3) are allocated as co-products. According to EN 15804, process that has a very low contribution to the overall revenue may be neglected in co-product allocation.

Steel and aluminium scrap collected from the cutting process is sent for recycling. This process has a low contribution to the overall revenue and may be neglected in co-product allocation. Contributions to the overall revenue of the order of 1 % are considered very low, therefore the co-product allocation is not required and not carried out. Other materials did not carry any benefits towards Halton's production. Hence, no other co-product allocations were made.

KEY ASSUMPTIONS

Transport to building (A4): Transport to building site was assessed based on the transportation distance from Halton's Kausala production site to Helsinki.

Installation to building (A5): The Installation to building A5 consists of only treatment of the packaging materials. It was assumed that 100 % of the pallets are sent to shredding. Plastics are assumed to be 100 % incinerated among municipal waste, and cardboard is sent to recycling.

C1-C4 End-of-life scenarios were assumed based on the common practices of construction products in Finland and product's market area in Europe.

C1 Deconstruction/demolition: During the demolition phase C1, the entire final product is dismantled, using the mass of the final product as the input data. The energy use (diesel usage) in the demolition stage is 1,30 kWh/t (Erlandsson, M. & Pettersson, D., 2015.)

C2 Transportation: Transportation distance 75 km road driving by lorry (SYKE 2021)

C3-4 Waste processing and disposal: It was assumed that products are collected, and the materials are separated.

- Steel and stainless-steel material recycling 90% and final disposal 10% (EURIC 2020).
- Plastics: 26,9 % to recycling, 49,6 % to energy recovery, 24 % landfill (Plastics Europe 2022).
- Rubber: According to SFS-EN 50693:2019 (Product category rules for life cycle assessments of electronic and electrical products and systems) rubber is sent to 50% energy recovery and 50% to landfill. In this case, it is assumed that the rubber is not removed from the final product, thus the EOL scenario for rubber is assumed to be 100% landfill.

Module D covers the net benefits and loads arising from the reuse of products or the recycling or recovery of energy from end-of-waste state materials.

- Energy recovery of waste polymers: Net energy production for electric energy was 3.93MJ/kg and for thermal energy it was 7.67MJ/kg.
- Recycling: Benefits from avoided primary raw material production due to the recycling of steel and polymer were included in the assessment. Only share of primary raw materials in the product composition were included to the module D.

Validation of data

The quality requirements for the life cycle assessment were set according to the EN ISO 14044 standard (4.2.3.6) and EN 15804 standard (6.3.7).

This LCA study follows the standard EN 15804:2012+A2:2019 and RTS PCR and no decisions are made based on the values. The study does not consider long-term emissions (i.e. over 100 years). Impact assessment characterization factors are aligned with EF 3.0. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

The calculations were conducted using One Click LCA -tool which is a cloud-based LCA software in compliancy with EN 15804 -standard.

PROCEDURED FOR COLLECTION PROCESS SPECIFIC DATA

Production specific data was collected directly from manufacturer's production plant. The data represents the production of the studied product at the plant from the materials transported to the facility and represents 1 year average. The data represents year 2023, which was the latest year with full year data. All gathered data was used without excluding categories in advance following the system boundaries set in earlier chapters.

CRITERIA FOR CHOOSING THE GENERIC DATA

Generic data that was used for upstream and downstream processes represents complementary data from Ecoinvent 3.10.1 database.

The datasets were chosen to represent the studied system as closely as possible. When available supplier specific information was used for instance in form of EN 15804 EPDs or emissions profile of local energy supplier. When supplier specific information was not available the information sources were chosen based on their technical and geographical representativeness. Only when country specific or European data has not been available has global level data been used (concerns mainly data from Ecoinvent 3.10.1)

As up-to-date data as possible was chosen and no more than five-year-old for producer specific data and ten years for generic data was used.

ENVIRONMENTAL IMPACT DATA

BOS-100

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO_2e	3,27E+00	2,1 E-02	1,85E-03	4,46E-04	7,63E-03	6,63E-02	1,4 E-03	-1,4 +00
GWP – fossil	kg CO_2e	3,26E+00	2,1 E-02	1,3 E-04	4,46E-04	7,63E-03	5,27E-02	1,4 E-03	-1,4 +00
GWP – biogenic	kg CO_2e	4,49E-03	4,81E-06	1,72E-03	4,5 E-08	1,5 E-06	1,36E-02	0,00E+00	-6,04E-04
GWP – LULUC	kg CO_2e	2,60E-03	9,50E-06	7,4 E-08	4,57E-08	3,4 E-06	1,58E-05	3,98E-07	-1,86E-04
Ozone depletion pot.	kg $CFC_{-11}e$	2,94E-08	3,1 E-10	4,68E-1	6,83E-1	1,1 E-10	1,36E-10	1,93E-1	-4,73E-09
Acidification potential	mol H^+e	2,3 E-02	7,2 E-05	1,96E-07	4,03E-06	2,60E-05	8,91E-05	4,84E-06	-5,60E-03
EP-freshwater[3)]	kg Pe	1,06E-03	1,65E-06	7,4 E-09	1,29E-08	5,94E-07	7,2 E-06	5,87E-08	-6,04E-04
EP-marine	kg Ne	5,4 E-03	2,38E-05	7,59E-08	1,87E-06	8,5 E-06	4,3 E-05	2,1 E-05	-1,2 E-03
EP-terrestrial	mol Ne	5,79E-02	2,59E-04	6,98E-07	2,05E-05	9,30E-05	2,5 E-04	2,00E-05	-1,3 E-02
POCP (“smog”)	kg NMVOCe	1,80E-02	1,07E-04	2,2 E-07	6,10E-06	3,83E-05	7,3 E-05	7,30E-06	-4,60E-03
ADP-minerals & metals	kg Sbe	1,86E-05	5,92E-08	1,60E-10	1,60E-10	2,1 E-08	3,30E-07	1,1 E-09	-1,3 E-05
ADP-fossil resources	MJ	4,77E+01	3,08E-01	4,83E-04	5,84E-03	1,1 E-01	1,4 E-01	1,64E-02	-1,28E+01
Water use[2)]	m^3e depr.	1,14E+00	1,5 E-03	1,1 E-05	1,46E-05	5,47E-04	6,56E-03	5,2 E-05	-2,36E-01

1)GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO_4e.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	2,87E+00	4,22E-03	-9,82E-03	3,70E-05	1,52E-03	2,60E-02	1,74E-04	-9,16E-01
Renew. PER as material	MJ	1,02E-02	0,00E+00	-1,02E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	2,88E+00	4,22E-03	-2,01E-02	3,70E-05	1,52E-03	2,60E-02	1,74E-04	-9,16E-01
Non-re. PER as energy	MJ	4,67E+01	3,08E-01	-9,70E-04	5,84E-03	1,11E-01	-6,09E-01	-3,22E-01	-1,26E+01
Non-re. PER as material	MJ	8,96E-01	0,00E+00	-2,24E-03	0,00E+00	0,00E+00	-6,79E-01	-2,14E-01	-2,28E-01
Total use of non-re. PER	MJ	4,76E+01	3,08E-01	-3,22E-03	5,84E-03	1,11E-01	-1,29E+00	-5,36E-01	-1,28E+01
Secondary materials	kg	3,61E-01	1,31E-04	4,19E-07	2,42E-06	4,71E-05	2,80E-04	4,37E-06	7,61E-01
Renew. secondary fuels	MJ	9,14E-04	1,67E-06	4,11E-09	6,34E-09	5,99E-07	2,03E-05	8,87E-08	-1,15E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,87E-02	4,55E-05	2,40E-07	3,86E-07	1,64E-05	1,09E-04	-1,98E-05	-3,22E-03

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	9,37E-01	5,22E-04	3,76E-06	6,50E-06	1,88E-04	2,54E-03	1,97E-05	-4,61E-01
Non-hazardous waste	kg	1,02E+01	9,66E-03	9,93E-05	8,85E-05	3,47E-03	1,25E-01	4,66E-02	-3,62E+00
Radioactive waste	kg	2,02E-04	6,57E-08	4,43E-10	6,34E-10	2,36E-08	4,99E-07	2,76E-09	1,26E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	3,82E-02	0,00E+00	3,30E-04	0,00E+00	0,00E+00	8,30E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	7,00E-04	0,00E+00	4,60E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	4,46E-04	0,00E+00	0,00E+00	1,67E-01	0,00E+00	0,00E+00

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	0,00036 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO_2.

Scenario documentation

MANUFACTURING ENERGY SCENARIO DOCUMENTATION

Site Location	Energy type	Object	GWP value	Data quality	Representativeness
China	Electricity	Electricity data quality and CO2 emission kg CO2 eq. / kWh	0,84 kg CO2e / kWh	Electricity, high voltage, production mix (Reference product: electricity, high voltage), East China grid, 2024, Ecoinvent 3.10.1	The processes included in the data set are well representative for the geography (China). Electricity data represents the China average for the presented technology.
Kausala, Finland	Electricity	Electricity data quality and CO2 emission kg CO2 eq. / kWh	0,0076 kg CO2e / kWh	Electricity production, nuclear, boiling water reactor (Reference product: electricity, high voltage), Finland, 2024, Ecoinvent 3.10.1	The processes included in the data set are well representative for the geography (Finland). Electricity data represents the Finnish average for the presented technology.
Kausala, Finland	District Heating	District heating data quality and CO2 emission kg CO2 eq. / kWh	0,0056 kgCO2e / MJ	Heat and power co-generation, biogas, gas engine (Reference product: heat, central or small-scale, other than natural gas) Finland, 2024, Ecoinvent 3.10.1	The datasets represent well the Finnish average for the presented technologies.

TRANSPORTATION SCENARIO

Parameter	Value
Fuel type and consumption of vehicle used for transport	Truck: diesel, maximum load capacity 34 t. Specific transport emissions 0,11 kgCO_2eq./tkm
Distance (km)	Average transport distance 207 km
Capacity utilization (%)	100 % for truck
Density of transported products (kg/m3)	Density varies depending on the mass and size of the product type
Volume capacity utilization factor	1

INSTALLATION OF THE PRODUCT IN THE BUILDING

The weights of the packaging materials of products are shown on page 5.

Parameter	Unit
Ancillary materials for installation (specified by material)	Disposable gloves (not included in the analysis due to insignificant amount)
Water use	0 m^3
Other resource use	0 kWh (energy use is insignificant)
Quantitative description of energy type (regional mix) and consumption during the installation process	
Waste materials generated by product installation	Packaging materials per 1 unit of products: Plastics 0,00004 kg Cardboard 0,0003 kg Wood 0,0005 kg

END-OF-LIFE SCENARIO FOR PRODUCT COMPONENTS

		BOS-100
Process flow		
Collection process specified by type	kg collected separately	0,95
	kg collected with mixed construction waste	0,0
Recovery system specified by type	kg for reuse	0,0
	kg for recycling	0,83
	kg for energy recovery	0,01
Disposal specified by type	kg material for final deposition	0,11
Assumptions for scenario development	units as appropriate	Waste materials are transported 75 km by truck to recycling facility with a truck capacity utilization of 45%

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One Click LCA EPD Generator for EPD Hub V3