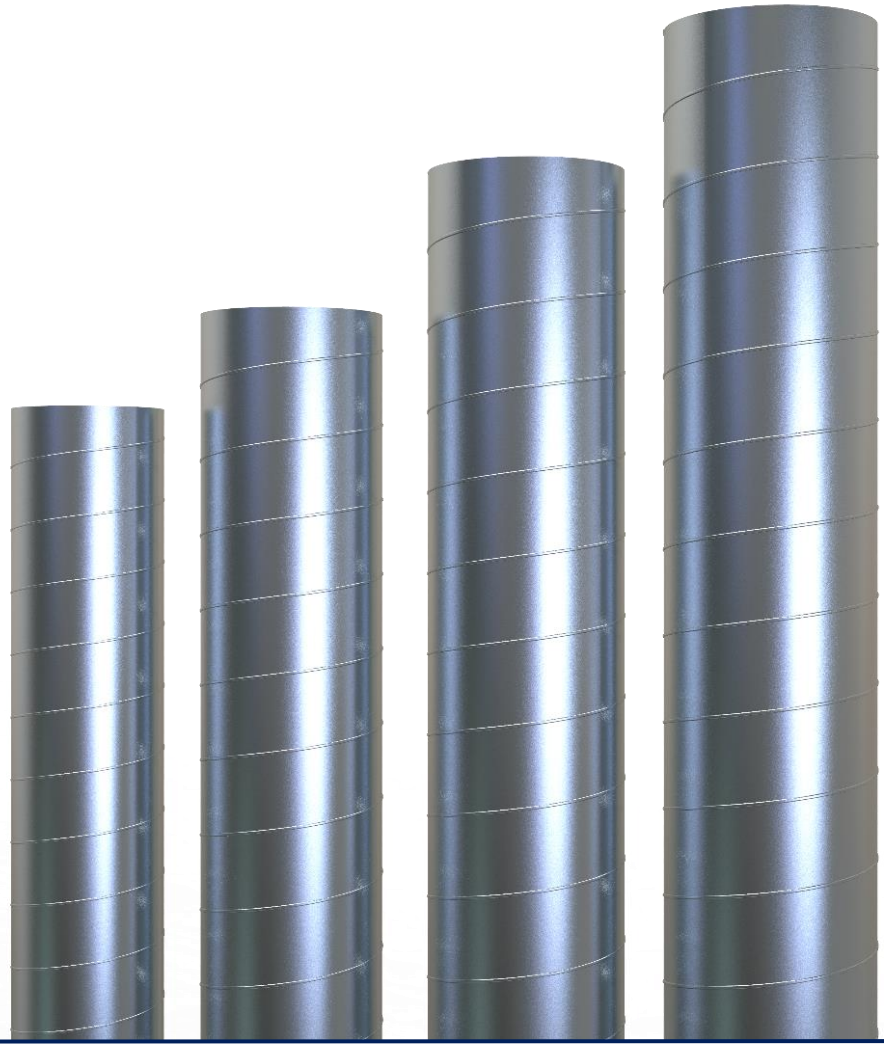
ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930



FOLDED CIRCULAR VENTILATION DUCTS

HALLSTRÖMS VERKSTÄDER AB

Programme: The International EPD® System, www.environdec.com	*Programme operator: EPD International AB*	*EPD registration number: S-P-07750*
Geographical scope: Sweden	*Publication date: 2022-12-02*	*Valid until: 2027-12-02*

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Hallströms Verkstäder AB
Address	Näldenvägen 23, 835 40 Nälden
Contact details	info@hallstroms.se
Website	http://www.hallstroms.se

PRODUCT IDENTIFICATION

Product name	Folded circular ventilation ducts
Additional label(s)	Hallströms VENT
Product number / reference	Not applicable
Place(s) of production	Ås, Sweden
CPC code	412

The International EPD System

EPDs within the same product category but from different programmes may not be comparable. An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

EPD INFORMATION

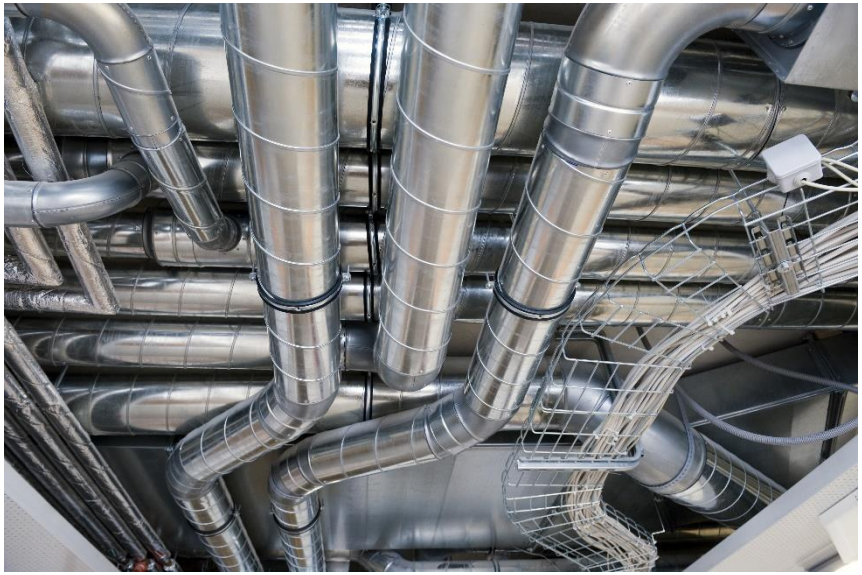
The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	The International EPD System
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. In addition, the Int'l EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021) is used.
EPD author	Felix Meyer, Gidås Sustainability Agency
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification ☐ EPD process certification ☑ EPD verification
Third party verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD number	S-P-07750
Publication date	2022-12-02
EPD valid until	2027-12-02

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Folded circular ventilation ducts made of galvanized steel, DX51D+Z275. This EPD covers only the ducts themselves, and does not include fittings or other components needed to complete a system which these ventilation ducts may be part of.



PRODUCT APPLICATION

Used as an integrated part in building ventilation systems for comfort and industrial applications.

TECHNICAL SPECIFICATIONS

The reference service life of the product is highly dependent on the conditions of use, average lifespan under normal conditions is minimum 50 years. This is an estimated value based on experience and scientific facts about galvanized steel.

PRODUCT STANDARDS

Produced according to EN 1506 and EN 12237. The product is certified for airtightness class D. Type approval 1666/78. Organisation is certified according to ISO 9001:2015. Material standard SS EN 10346:2015.

PHYSICAL PROPERTIES OF THE PRODUCT

Dimensions range from Ø80 mm to Ø1250 mm. The steel used in production varies in thickness from 0.4 mm to 0.9 mm and the final product varies because of this from 0.9 kg to 32.0 kg per meter. The declared unit in this EPD refers to the dimension of Ø125 mm. Applying the results on other dimensions can be done by using the product variation table on page 12 in this document.

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at the manufacturer website: http://hallstroms.se/shop/category/2.

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Galvanized steel	1.4	20	0	Sweden
Total	**1.4**	**20 %**	**0 %**	-
Packaging				
Pipe end plastic cover	0.0005	0	0	Sweden
Polypropylene lid	0.0045	0	0	Norway
Plastic tarp	0.0030	0	0	Finland
Plastic strap	0.0003	0	0	Sweden
Wooden hedge	0.0951	0	100	Sweden
Total	**0.1035**	**0 %**	**92 %**	-

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0.1 % (1000 ppm).

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The product stage A1-A3 includes:

- Upstream raw material acquisition, transport, and processing of product components
- Transport of product components to manufacturing plant
- The production process at the manufacturing plant including energy and electricity consumption.
- Waste generation from the production process including waste processing up to the end-of-waste state or disposal of waste residues
- Production of packaging

Relevant upstream material, transport and processes of the product components were primarily acquired from product specific EPD data. EPDs not fulfilled according to the standards EN 15804+A1 and +A2 received further modelling with generic data for A1+A2 compliance and representation.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The finished product from the plant is sent through various logistic platforms to the customer by truck (>32 t, EURO5). Plastic and wooden waste from the packaging is assumed to be incinerated with energy recovery.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The end-of-life stage C1-C4 & D includes:

- Deconstruction/demolition (C1)
- Transport to waste management facility (C2)
- Waste processing for reuse, recovery and/or recycling (C3)
- Waste disposal (C4)

Waste processing and disposal credits are assigned to module D.

Module D includes reuse, recovery and/or recycling potentials conveyed as benefits and net impacts.

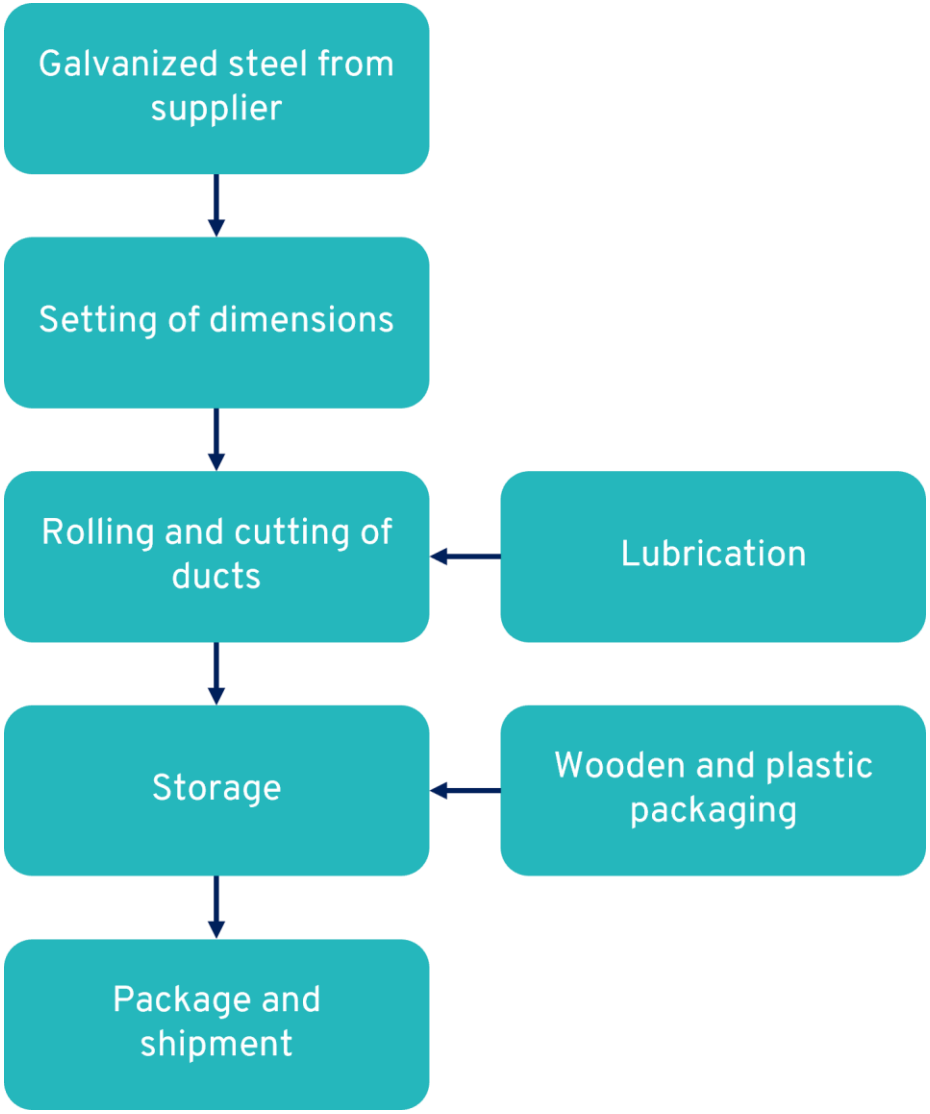
After dismantling the ventilation system at the end of its service life, the scrap metal is assumed to be transported by truck to a waste treatment facility, where the majority of the steel is recycled. The rest is deposited on a landfill.

MANUFACTURING PROCESS

Hallströms Verkstäder AB purchases galvanized steel coils (DX51D+Z275) which are shipped to the factory by truck.

The steel coils are already slitted into suitable dimensions before arriving on site. The material can therefore be fed directly into a machine with preset dimensions for the pipe model that is to be produced. This process is driven by electricity, though the machine also consumes a small amount of emulsion for lubrication. A small amount of water is used to dilute the emulsion.

Finished pipes are placed in wooden hedges and plastic protection is put on the ends of each pipe. Wooden hedges are custom made pallets with wooden barriers which prevent the pipes from falling of the pallet. Another larger polypropylene lid or hood for weather protection is placed on the wooden hedge which is also fixed with plastic straps so that the pipes are held in place during transport. The pipes are then stored until they are transported to the customer by truck.



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2021

DECLARED UNIT

Declared unit	1 m
Mass per declared unit	1,4 kg
Reference service life	50

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,0475

SYSTEM BOUNDARY

This EPD covers the cradle to gate with options scope with the following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x	x	x
EU		SE	SE	SE	-	-	-	-	-	-	-	SE	SE	SE	SE	SE		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = ND.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5 % of energy usage or mass.

ALLOCATIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.

3. Allocation should be based on economic values.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 - standard.

Allocation was applied to the electricity consumption during production, where information was provided by the manufacturer that 6 % of the facility's electricity consumption should be allocated to the manufacturing of ventilation ducts.

ASSUMPTIONS AND VARIABILITY

Site-specific data from the reference year acted as the primary source of collection. If inputs or outputs were unknown or unavailable, industry-based and/or similar product EPD datasets were utilized for full compliance with EN15804 +A1 and +A2.

Modelling of data was primarily based on product specific EPDs. Where manufacturer specific data are missing generic data from Ecoinvent was used. This is mostly due to lack of supplier specific data for EN15803+A2 datasets. When generic data was used a systematic assessment was carried out.

Variation between +A1 impact results and +A2 is 2,4 % which is below the 10 % limit according to the programme operator.

Large truck (EURO 5, >32 tons) has been adopted within most transport modules in the analysis, unless more specific data was available and provided by the manufacturer. The waste fractions are assumed to go directly to the nearest facility for final disposal, which is assumed to 250 km for most materials based on estimations provided by the manufacturer.

Particulates from wood chipping processes were assumed to be negligible.

The International EPD System additional data requirements

Data specificity and GWP-GHG variability for GWP-GHG for A1-A3.

Supply-chain specific data for GWP-GHG	92 %
Variation in GWP-GHG between products	Not relevant
Variation in GWP-GHG between sites	Not relevant

ENVIRONMENTAL IMPACT DATA

Note: additional environmental impact data may be presented in annexes.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2eq	3,32E00	9,36E-02	-2,20E-01	3,19E00	8,80E-02	2,56E-01	ND	ND	ND	ND	ND	ND	ND	1,56E-03	3,18E-02	1,39E-03	5,91E-04	-1,96E00
GWP – fossil	kg CO_2eq	3,31E00	9,35E-02	4,34E-02	3,44E00	8,88E-02	1,14E-01	ND	ND	ND	ND	ND	ND	ND	1,54E-03	3,18E-02	1,35E-03	5,90E-04	-1,68E00
GWP – biogenic	kg CO_2eq	8,21E-03	6,78E-05	-2,64E-01	-2,56E-01	6,45E-05	1,42E-01	ND	ND	ND	ND	ND	ND	ND	7,15E-06	2,31E-05	3,66E-05	1,17E-06	-2,76E-01
GWP – LULUC	kg CO_2eq	2,12E-03	2,82E-05	1,24E-04	2,27E-03	2,67E-05	8,55E-05	ND	ND	ND	ND	ND	ND	ND	1,14E-05	9,57E-06	2,86E-06	1,75E-07	-9,52E-04
Ozone depletion pot.	kg CFC_{-11}eq	2,08E-07	2,20E-08	3,93E-09	2,34E-07	2,09E-08	8,74E-09	ND	ND	ND	ND	ND	ND	ND	3,81E-10	7,48E-09	1,25E-10	2,43E-10	-8,04E-08
Acidification potential	mol H^+eq	4,17E-02	3,94E-04	2,76E-04	4,24E-02	3,73E-04	1,33E-03	ND	ND	ND	ND	ND	ND	ND	1,52E-05	1,34E-04	8,29E-06	5,60E-06	-8,08E-03
EP-freshwater[3)]	kg Peq	2,05E-04	7,60E-07	1,94E-06	2,07E-04	7,22E-07	6,48E-06	ND	ND	ND	ND	ND	ND	ND	1,81E-08	2,59E-07	1,34E-07	7,13E-09	-9,67E-05
EP-marine	kg Neq	4,08E-03	1,19E-04	6,31E-05	4,27E-03	1,12E-04	1,45E-04	ND	ND	ND	ND	ND	ND	ND	6,52E-06	4,03E-05	1,37E-06	1,93E-06	-1,72E-03
EP-terrestrial	mol Neq	1,48E-01	1,31E-03	8,22E-04	1,51E-01	1,24E-03	4,71E-03	ND	ND	ND	ND	ND	ND	ND	7,19E-05	4,45E-04	1,62E-05	2,12E-05	-1,78E-02
POCP (“smog”)	kg NMVOCeq	1,61E-02	4,22E-04	8,37E-04	1,73E-02	3,99E-04	5,76E-04	ND	ND	ND	ND	ND	ND	ND	1,96E-05	1,43E-04	4,32E-06	6,17E-06	-8,38E-03
ADP-minerals & metals	kg Sbeq	2,21E-04	1,59E-08	1,20E-06	2,22E-04	1,52E-06	6,83E-06	ND	ND	ND	ND	ND	ND	ND	4,90E-09	5,43E-07	9,68E-09	5,39E-09	-2,50E-05
ADP-fossil resources	MJ	3,57E01	1,16E-02	1,44E00	3,71E01	1,38E00	1,27E00	ND	ND	ND	ND	ND	ND	ND	3,92E-02	4,95E-01	2,66E-02	1,65E-02	-1,62E01
Water use[2)]	m^3eq depr.	1,93E00	5,40E-03	1,13E-01	2,05E00	5,14E-03	6,31E-02	ND	ND	ND	ND	ND	ND	ND	2,96E-04	1,84E-03	3,30E-04	7,62E-04	-8,51E-01

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) EN 15804+A2 disclaimer: the results for Abiotic depletion, Water use and optional indicators except Particulate matter, and Ionizing radiation human health, these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicators mentioned (Frischknecht et al., 2000). 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO_4eq.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4,41E-70	8,46E-09	5,00E-09	4,54E-07	8,03E-09	1,47E-08	ND	ND	ND	ND	ND	ND	ND	3,87E-10	2,88E-09	4,74E-11	1,09E-10	-1,32E-07
Ionizing radiation[5)]	kBq U235eq	1,02E-01	6,35E-03	2,83E-02	1,37E-01	6,04E-03	5,45E-03	ND	ND	ND	ND	ND	ND	ND	7,80E-04	2,16E-03	2,23E-04	6,76E-05	-1,32E-02
Ecotoxicity (freshwater)	CTUeq	1,62E02	1,11E00	8,27E-01	1,64E02	1,06E00	5,08E00	ND	ND	ND	ND	ND	ND	ND	1,86E-02	3,78E-01	1,90E-02	1,04E-02	-7,87E01
Human toxicity, cancer	CTUh	2,66E-08	2,85E-11	2,81E-11	2,66E-08	2,70E-11	8,05E-10	ND	ND	ND	ND	ND	ND	ND	5,62E-13	9,67E-12	7,87E-13	2,46E-13	-7,73E-09
Human tox. non-cancer	CTUh	2,18E-07	1,32E-09	6,76E-10	2,20E-07	1,25E-09	6,78E-09	ND	ND	ND	ND	ND	ND	ND	1,35E-11	4,48E-10	1,77E-11	7,60E-12	1,23E-07
SQP	-	8,44E00	2,19E00	1,24E-01	1,08E01	2,09E00	4,35E-01	ND	ND	ND	ND	ND	ND	ND	7,87E-04	7,47E-01	8,09E-04	2,80E-02	-4,20E00

4) SQP = Land use related impacts/soil quality. 5) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy	MJ	2,30E00	1,51E-04	1,10E00	3,40E00	1,74E-02	1,19E-01	ND	ND	ND	ND	ND	ND	ND	9,87E-03	6,23E-03	4,78E-03	1,33E-04	-1,21E00
Renew. PER as material	MJ	0,00E00	0,00E00	2,26E00	2,26E00	0,00E00	6,77E-02	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Total use of renew. PER	MJ	2,30E00	1,51E-04	3,36E00	5,66E00	1,74E-02	1,87E-01	ND	ND	ND	ND	ND	ND	ND	9,87E-03	6,23E-03	4,78E-03	1,33E-04	-1,21E00
Non-re. PER as energy	MJ	3,71E01	1,16E-02	1,09E00	3,82E01	1,38E00	1,31E00	ND	ND	ND	ND	ND	ND	ND	3,92E-02	4,95E-01	2,66E-02	1,65E-02	-1,62E01
Non-re. PER as material	MJ	0,00E00	0,00E00	3,51E-01	3,51E-01	0,00E00	1,05E-02	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Total use of non-re. PER	MJ	3,71E01	1,16E-02	1,44E00	3,86E01	1,38E00	1,32E00	ND	ND	ND	ND	ND	ND	ND	3,92E-02	4,95E-01	2,66E-02	1,65E-02	-1,62E01
Secondary materials	kg	7,46E-02	0,00E00	6,81E-05	7,46E-02	0,00E00	2,24E-03	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	3,56E-01
Renew. secondary fuels	MJ	5,99E-23	0,00E00	0,00E00	5,99E-23	0,00E00	1,80E-24	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Non-ren. secondary fuels	MJ	7,04E-22	0,00E00	0,00E00	7,04E-22	0,00E00	2,11E-23	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Use of net fresh water	m^3	5,95E-03	2,17E-06	8,02E-04	6,76E-03	2,88E-04	2,42E-04	ND	ND	ND	ND	ND	ND	ND	6,95E-06	1,03E-04	7,86E-06	1,80E-05	-2,04E-02

6) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	4,47E-02	1,15E-05	2,09E-03	4,68E-02	1,34E-03	1,80E-03	ND	ND	ND	ND	ND	ND	ND	3,56E-05	4,81E-04	0,00E00	1,54E-05	-5,49E-01
Non-hazardous waste	kg	6,11E-02	1,01E-03	5,83E-02	1,20E-01	1,48E-01	2,32E-02	ND	ND	ND	ND	ND	ND	ND	6,59E-04	5,32E-02	0,00E00	1,12E-01	-4,86E00
Radioactive waste	kg	5,84E-04	7,96E-08	1,21E-05	5,96E-04	9,48E-06	1,90E-05	ND	ND	ND	ND	ND	ND	ND	4,18E-07	3,40E-06	0,00E00	1,09E-07	-1,53E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Materials for recycling	kg	0,00E00	0,00E00	6,44E-03	6,44E-03	0,00E00	7,75E-02	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	1,29E00	0,00E00	0,00E00
Materials for energy rec	kg	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	8,70E-02	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Exported energy	MJ	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2eq	3,31E00	9,35E-02	4,34E-02	3,44E00	8,88E-02	1,14E-01	ND	ND	ND	ND	ND	ND	ND	1,54E-03	3,18E-02	1,35E-03	5,90E-04	-1,68E00

8) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator Is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

PRODUCT VARIATIONS

The information presented in the table below can be used for scaling the results of the different environmental impacts in the LCA to other dimensions offered by Hallströms Verkstäder AB. The dimension that was used for calculating data specific to the declared unit in this EPD (125 mm) has been marked with a different background colour.

Diameter [mm]	Wall thickness [mm]	Length [m]	Mass [kg/m]	Conversion factor
80	0,4	3,0	0,9	0,64
100	0,4	3,0	1,1	0,79
125	0,4	3,0	1,4	1,00
160	0,4	3,0	1,8	1,29
200	0,45	3,0	2,6	1,86
250	0,45	3,0	3,2	2,29
315	0,5	3,0	4,5	3,21
400	0,55	3,0	6,3	4,50
500	0,6	3,0	8,3	5,93
630	0,7	3,0	12,5	8,93
800	0,8	3,0	18,2	13,00
1000	0,9	3,0	25,6	18,29
1250	0,9	3,0	32,0	22,86

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation.

Scenario parameter	Value
Electricity data source and quality	LCA study for country specific electricity mixes based on IEA, (OneClick LCA, 2022)
Electricity CO_2e / kWh	0.0487
District heating data source and quality	Not applicable
District heating CO_2e / kWh	Not applicable

BIBLIOGRAPHY

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

Ecoinvent database v3.6 (2019) and One Click LCA database.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

IES EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021) is used.

Folded circular ventilation ducts LCA background report 2022-09-27.

R., Frischknecht, A., Braunschweig, P., Hofstetter, and P., Suter, 2000, Human health damages due to ionising radiation in life cycle impact assessment, Environmental Impact Assessment Review, Vol 20(2), pp. 159-189.

ABOUT THE MANUFACTURER

Hallströms Verkstäder AB is a Swedish manufacturer of ventilation systems for comfort and industrial applications located in Nälden and Ås, which are both communities in Jämtland, Sweden. The ventilation tubes for which this EPD is created are made of galvanized steel with a service life of 50 years or more. The benefits of using galvanized steel ventilation systems are the long service life expectancy and the protection from external influences such as corrosion. The material is also very light, which aids in the transportation and installation of the product.

The products are used for ventilation purposes in for instance off-shore applications, chemical industries, the food and pharmaceutical industry, arenas, dwellings and more.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Hallströms Verkstäder AB
EPD author	Felix Meyer
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD program operator	The International EPD System
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Construction products

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

Why does verification transparency matter? Read more online.

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD verification started on	2022-10-27
EPD verification completed on	2022-12-02
Supply-chain specific data %	92 %
Approver of the EPD verifier	The International EPD System

Author & tool verification	Answer
EPD author	Felix Meyer
EPD Generator module	Construction products
Independent software verifier	Ugo Pretato, Studio Fieschi & soci Srl
Software verification date	2021-05-11

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of

- the data collected and used in the LCA calculations,
- the way the LCA-based calculations have been carried out,
- the presentation of environmental data in the EPD, and
- other additional environmental information, as present

with respect to the procedural and methodological requirements in ISO 14025:2010 and EN 15804:2012+A2:2019.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Silvia Vilčeková, Silcert, s.r.o.

VERIFICATION AND REGISTRATION (ENVIRONDEC)

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
PCR	PCR 2019:14 Construction products, version 1.11
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Third party verifier	Silvia Vilčeková, Silcert, s.r.o.
	Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up during EPD validity involves third party verifier	☐ yes ☑ no

THE INTERNATIONAL EPD® SYSTEM

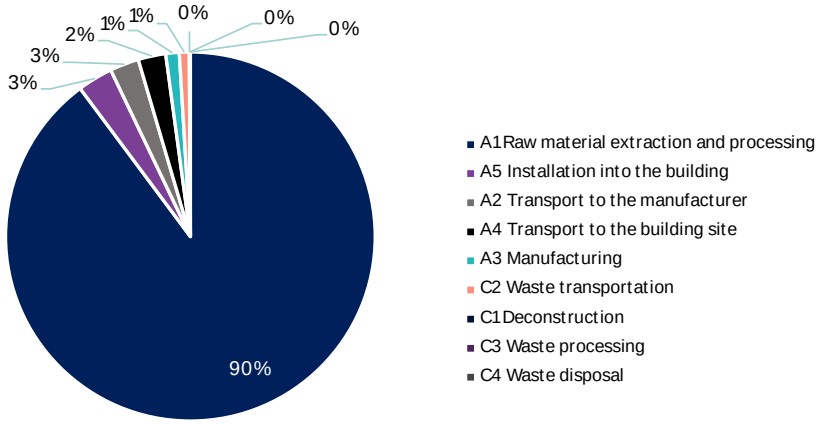
EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

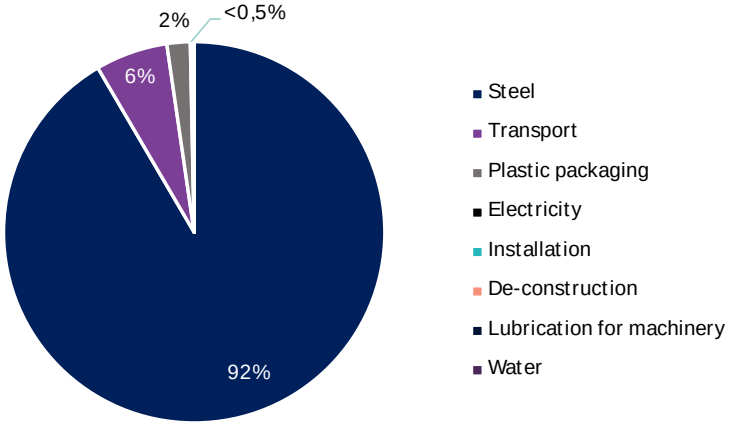
Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2eq	3,49E00	7,52E-04	4,21E-02	3,53E00	8,80E-02	1,16E-01	ND	ND	ND	ND	ND	ND	ND	1,54E-03	3,15E-02	1,32E-03	5,79E-04	-1,62E00
Ozone depletion Pot.	kg CFC_{-11}eq	1,72E-11	1,39E-10	3,31E-09	3,47E-09	1,66E-08	1,58E-09	ND	ND	ND	ND	ND	ND	ND	3,72E-10	5,94E-09	1,40E-10	1,92E-10	-6,79E-08
Acidification	kg SO_2eq	7,30E-03	2,30E-06	2,00E-04	7,50E-03	1,81E-04	2,53E-04	ND	ND	ND	ND	ND	ND	ND	2,63E-06	6,47E-05	6,45E-06	2,33E-06	-6,50E-03
Eutrophication	kg PO_4^3eq	7,58E-04	3,93E-07	6,10E-05	8,19E-04	3,65E-05	3,92E-05	ND	ND	ND	ND	ND	ND	ND	7,24E-07	1,31E-05	4,27E-06	4,52E-07	-4,33E-03
POCP (“smog”)	kg C_2H_4eq	8,89E-04	1,23E-07	1,29E-05	9,02E-04	1,14E-05	2,88E-05	ND	ND	ND	ND	ND	ND	ND	2,36E-07	4,10E-06	2,75E-07	1,71E-07	-9,31E-04
ADP-elements	kg Sbeq	2,21E-04	1,59E-08	1,20E-06	2,22E-04	1,52E-06	6,83E-06	ND	ND	ND	ND	ND	ND	ND	4,90E-09	5,43E-07	9,68E-09	5,39E-09	-2,50E-05
ADP-fossil	MJ	3,57E01	1,16E-02	1,44E00	3,71E01	1,38E00	1,27E00	ND	ND	ND	ND	ND	ND	ND	3,92E-02	4,95E-01	2,66E-02	1,65E-02	-1,62E01

ANNEX 2 : LIFE-CYCLE ASSESSMENT RESULT VISUALIZATION

Global warming potential – Life cycle stages



Global warming potential fossil kgCO_2eq – Classifications*



*Data points *Electricity, Installation, De-construction, Lubrication for machinery* and *Water* collectively account for less than 0,5 % of GWP.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF