



ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Lindab A/S (Denmark)
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-2990-1667-EN
Registration number:	NEPD-2990-1667-EN
ECO Platform reference number:	-
Issue date:	27.08.2021
Valid to:	27.08.2026

Circular ventilation duct, folded
Lindab Safe & Safe Click

Lindab A/S (Denmark)

www.epd-norge.no



General information

Product:

Circular ventilation duct, folded
Lindab Safe & Safe Click

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Declaration number:

NEPD-2990-1667-EN

Place of production:

Duct manufacturing sites: Haderslev, Hvidovre, Viby J

ECO Platform reference number:**Management system:**

ISO 9001, ISO 14001

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
PART A: Construction products and services Ver 2
PART B: PCR NPCR 030

Organisation no:

DK33124228

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Issue date:

27.08.2021

Valid to:

27.08.2026

Declared unit:

N/A

Year of study:

2020

Declared unit with option:

1 meter of product, circular ventilation duct, dimension 125

Comparability:

EPD of construction products may not be comparable if they not comply with same version of EN 15804 and seen in a building context.

Functional unit:

N/A

The EPD has been worked out by:

The EPD has been worked out together with Lisa Hallberg, consultant at IVL, and by using the IVL EPD-tool.

<sign>

**Verification:**

The CEN Norm EN 15804 serves as the core PCR. Independent verification of the declaration and data, according to ISO 14025:2010

internal external

Third party verifier: FORCE Technology



Charlotte Merlin, Senior project leader
(Independent verifier approved by EPD Norway)



Håkon Hauan
(Managing Director EPD-Norway)

Product

Product description:

Folded circular ventilation ducts made of galvanized steel

Product specification:

The material composition of the declared product is given below:

Materials	kg	%
Galvanized steel, DX51D+Z275	1,41	100

Technical data:

Folded circular ventilation ducts made of galvanized steel, DX51D+Z275. Produced according to EN 1506 and EN 12237. The products are Eurovent certified for airtightness class D.

Market:

Denmark

Reference service life, product:

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 steel.

Reference service life, building:

Not declared

LCA: Calculation rules

Declared unit:

1 meter of product dimension 125

Data quality:

Specific data for the product composition is provided by product management and Lindab Steel AB. Data for production of the declared product were collected for EPD development from each site in the stated year for the study. Background data is based on registered Gabi/sphera database 2021.1 and ecoinvent 3.7. Generic data from worldsteel is applied for the production of galvanized steel sheet.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Energy, water, packaging material and waste are allocated equally among all products through mass allocation.

System boundary:

Cradle to Gate with options. Mandatory stages: A1-A3, A4, C1-C4, D

Cut-off criteria:

All raw materials and all the essential energy is included. All hazardous and toxic materials and substances are considered in the inventory even though they are below the cut off criteria.

Scenarios

Scenarios have been developed to account for downstream processes such as demolition and waste treatment in accordance with the requirements of EN 15804 and NPCR 030 Part B. See more information on next page.

Life cycle of the product



LCA: Process description and scenarios

A1 Raw material supply

This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process. The raw material supply covers production of steel and packaging materials.

A2 Transport to the manufacturer

The raw materials are transported by train, truck and boat to the manufacturing site.

A3 Manufacturing

Lindab Steel

- Steel coils are received and quality control is performed.
- The most suitable coil is selected for the manufacturing orders, to minimize scrap.

- The coil is slitted into correct dimensions for duct production. Before slitting an extra quality control is performed.
- Width and burrs are controlled on the slitted coils.
- Every slitted coil gets a unique ID number for traceability.
- The slitted coils are packed and sent to the duct manufacturing site by truck.

Duct manufacturing site

- Slitted coils are received from Lindab Steel and reception control is performed.
- The correct slitted coil is selected according to the manufacturing order. The unique ID number is connected to the manufacturing order for traceability.
- The slitted coil is rigged in the tube forming machine, followed by quality control of the first produced duct. If approved, the machine is set in auto mode.
- Quality controls are performed every hour.
- Produced ducts are placed in a hedge, labelled with manufacturing order number, and then stored.
- Ducts are picked in the warehouse, and sent to the customer with truck.

A4 Transport to the building site

This module includes transport from the production gate to the building site. Transport is calculated on the basis of a scenario with the parameters described in the table.

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy l/tkm	Value (l/t)
Truck	44%	Long distance truck	300	0,028 l/tkm	8,4

End of life C1-C4, D

A recycling rate of 95%, based on the R2 factor in PEF for construction steel, has been assumed for the product. That is to be seen as the proportion of the material in the product that will be recycled (or re-used) in a subsequent system. External scrap in the raw material is also deducted and accounts for 12,7%. Hence the net flow to be credited is module D is 82%. This is illustrated in the table below per declared unit.

C1, C3, C4	Unit	Value	D	Unit	Value
Hazardous waste disposed	kg	N.R.	Values of scrap (Worldsteel 2018)	1,16	kg
Collected as mixed construction waste	kg	N.R.	Global dataset is used since most accurate data available from GaBi database.		
Reuse	kg	N.R.			
Recycling	kg	1,34			
Energy recovery	kg	N.R.			
To landfill	kg	0,07			

C2					
Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy l/tkm	Value (l/t)
Truck	44%	Long distance truck	150	0,028 l/tkm	4,2

LCA: Results

Result is valid for the declared unit, 1 meter of circular ventilation duct dimension 125. LCA results for other dimensions is shared at page 5.

System boundaries (X=included, MND= module not declared, MNR=module not relevant)																	
Product stage			Assembly stage		Use stage								End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Retubishment	Operational energy use	Operational water use	De-contruction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
																	A1
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x

Environmental impact								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-total	kg CO ₂ -eqv	3,13E+00	4,68E-02	3,44E-02	2,34E-02	3,62E-03	1,03E-03	-1,97E+00
GWP-f	kg CO ₂ -eqv	4,09E+00	3,37E-02	3,42E-02	1,68E-02	3,59E-03	1,06E-03	-1,97E+00
GWP-b	kg CO ₂ -eqv	-9,66E-01	4,05E-02	-4,43E-05	2,03E-02	1,17E-06	-3,07E-05	-1,28E-03
GWP-luluc	kg CO ₂ -eqv	1,39E-03	0,00E+00	2,83E-04	0,00E+00	2,49E-05	3,11E-06	2,84E-04
ODP	kg CFC11-eqv	9,81E-10	4,73E-10	4,42E-18	2,36E-10	9,33E-18	4,12E-18	-3,28E-15
AP	mole H+ eqv	1,03E-02	4,54E-04	1,99E-04	2,27E-04	3,48E-05	7,56E-06	-3,53E-03
EP-fw	kg P-eqv	1,09E-05	8,14E-06	1,03E-07	4,07E-06	1,03E-08	1,78E-09	-4,03E-07
EP-m	kg N-eqv	2,41E-03	2,83E-04	9,75E-05	1,42E-04	1,70E-05	1,96E-06	-5,27E-04
EP-T	mole N-eqv	2,51E-02	2,69E-03	1,08E-03	1,35E-03	1,88E-04	2,15E-05	-5,13E-03
POCP	kg NMVOC-eqv	8,03E-03	4,26E-04	1,88E-04	2,13E-04	4,97E-05	5,93E-06	-2,69E-03
ADP-mm	kg Sb-eqv	2,20E-05	2,91E-07	2,63E-09	1,45E-07	3,95E-09	1,00E-10	-4,28E-06
ADP-f	MJ	4,10E+01	5,92E-01	4,60E-01	2,96E-01	7,02E-02	1,41E-02	-1,72E+01
WDP	m ³	1,50E+00	3,21E-03	3,00E-04	1,61E-03	6,73E-04	1,13E-04	-3,86E-01

GWP-total Climate Change - total; GWP-f Climate Change - fossil; GWP-b Climate Change - biogenic; GWP-luluc Climate Change - land use and land use change; ODP Ozone depletion; AP Acidification; EP-fw Eutrophication aquatic freshwater; EP-m Eutrophication aquatic marine; EP-T Eutrophication aquatic terrestrial; POCP Photochemical ozone formation; ADP-mm Depletion of abiotic resources - minerals and metals; ADP-f Depletion of abiotic resources - fossil fuels; WDP Waster use

Environmental impact - extra information								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP GHG AR5	kg CO ₂ -eqv	3,97E+00	3,22E-02	3,38E-02	1,61E-02	3,52E-03	1,04E-03	-1,88E+00

GWP GHG AR5 Global warming potential (GWP), excl biogenic carbon;

Resource use								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	1,27E+01	6,98E-01	2,57E-02	3,49E-01	5,17E-03	1,89E-03	1,58E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,27E+01	6,98E-01	2,57E-02	3,49E-01	5,17E-03	1,89E-03	1,58E+00
PENRE	MJ	4,10E+01	5,92E-01	4,61E-01	2,96E-01	7,04E-02	1,41E-02	-1,72E+01
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	4,10E+01	5,92E-01	4,61E-01	2,96E-01	7,04E-02	1,41E-02	-1,72E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	6,62E-02	0,00E+00	2,94E-05	4,32E-02	1,93E-05	3,47E-06	-8,67E-03

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM Use of renewable primary energy resources used as raw materials; PERT Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); PENRE Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM Use of non-renewable primary energy resources used as raw materials; PENRT Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; FW Net use of fresh water

End of life - Waste								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
HWD	kg	2,00E-03	0,00E+00	2,32E-11	1,03E-08	3,93E-12	1,49E-12	4,78E-09
NHWD	kg	1,43E-01	0,00E+00	6,85E-05	6,28E-05	1,89E-05	7,00E-02	2,05E-01
RWD	kg	3,67E-04	0,00E+00	5,57E-07	2,67E-07	9,07E-07	1,48E-07	6,19E-07

HWD Hazardous waste disposed; NHWD Non hazardous waste disposed; RWD Radioactive waste disposed

End of life - Output flow								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	8,34E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	2,66E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU Components for re-use; MFR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Biogenic Carbon Content			
Material	Amount per declared unit	Unit	Kg carbon/declared unit
Cardboard	0,1402	kg	4,20E-02
Wood	0,104	kg	4,60E-02

Different product variations

The information in below table is used for scaling the LCA results of the different environmental impacts to other dimensions.

Diameter [mm]	Wall thickness [mm]	Length [m]	Material	Specific weight [kg/m]
63	0,5	3	Galvanized steel	0,89
80	0,45	3	Galvanized steel	0,91
100	0,45	3	Galvanized steel	1,14
112	0,45	3	Galvanized steel	1,28
125	0,45	3	Galvanized steel	1,41
140	0,5	3	Galvanized steel	1,76
150	0,5	3	Galvanized steel	1,89
160	0,5	3	Galvanized steel	2,02
180	0,5	3	Galvanized steel	2,26
200	0,5	3	Galvanized steel	2,56
224	0,5	3	Galvanized steel	2,87
250	0,5	3	Galvanized steel	3,18
280	0,55	3	Galvanized steel	3,92
300	0,55	3	Galvanized steel	4,20
315	0,55	3	Galvanized steel	4,41
355	0,55	3	Galvanized steel	4,96
400	0,55	3	Galvanized steel	6,01
450	0,6	3	Galvanized steel	7,37
500	0,7	3	Galvanized steel	9,54
560	0,7	3	Galvanized steel	10,68
600	0,7	3	Galvanized steel	11,45
630	0,7	3	Galvanized steel	12,02
710	0,8	3	Galvanized steel	15,50
800	0,8	3	Galvanized steel	17,40
900	0,9	3	Galvanized steel	21,70
1000	0,9	3	Galvanized steel	24,10
1120	0,9	3	Galvanized steel	27,00
1250	0,9	3	Galvanized steel	30,20
1400	1,25	3	Galvanized steel	48,00
1500	1,25	3	Galvanized steel	51,40
1600	1,25	3	Galvanized steel	54,80

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process(A3). In Sweden wind power is used in all manufacturing plants.

Manufacturing country	Data source	Amount	Unit
Denmark	GaBi/Sphera database 2021.1	0,378	CO ₂ -eq/kWh

Dangerous substances




The product contains no substances given by the REACH Candidate list or the Norwegian priority list

Indoor environment

The product has not been tested for emissions to indoor climate, but the product is not likely to cause an emissions to the indoor environment.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
EN 1506	Ventilation for buildings - Sheet metal air ducts and fittings with circular cross-section - Dimensions
EN 12237	Ventilation for buildings - Ductwork - Strength and leakage of circular sheet metal ducts
PCR PART A	Construction products and services Ver 2
NPCR 030:2021	Part B for ventilation components
LCA report	Lindab EPD LCA report EN 15804-A2

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