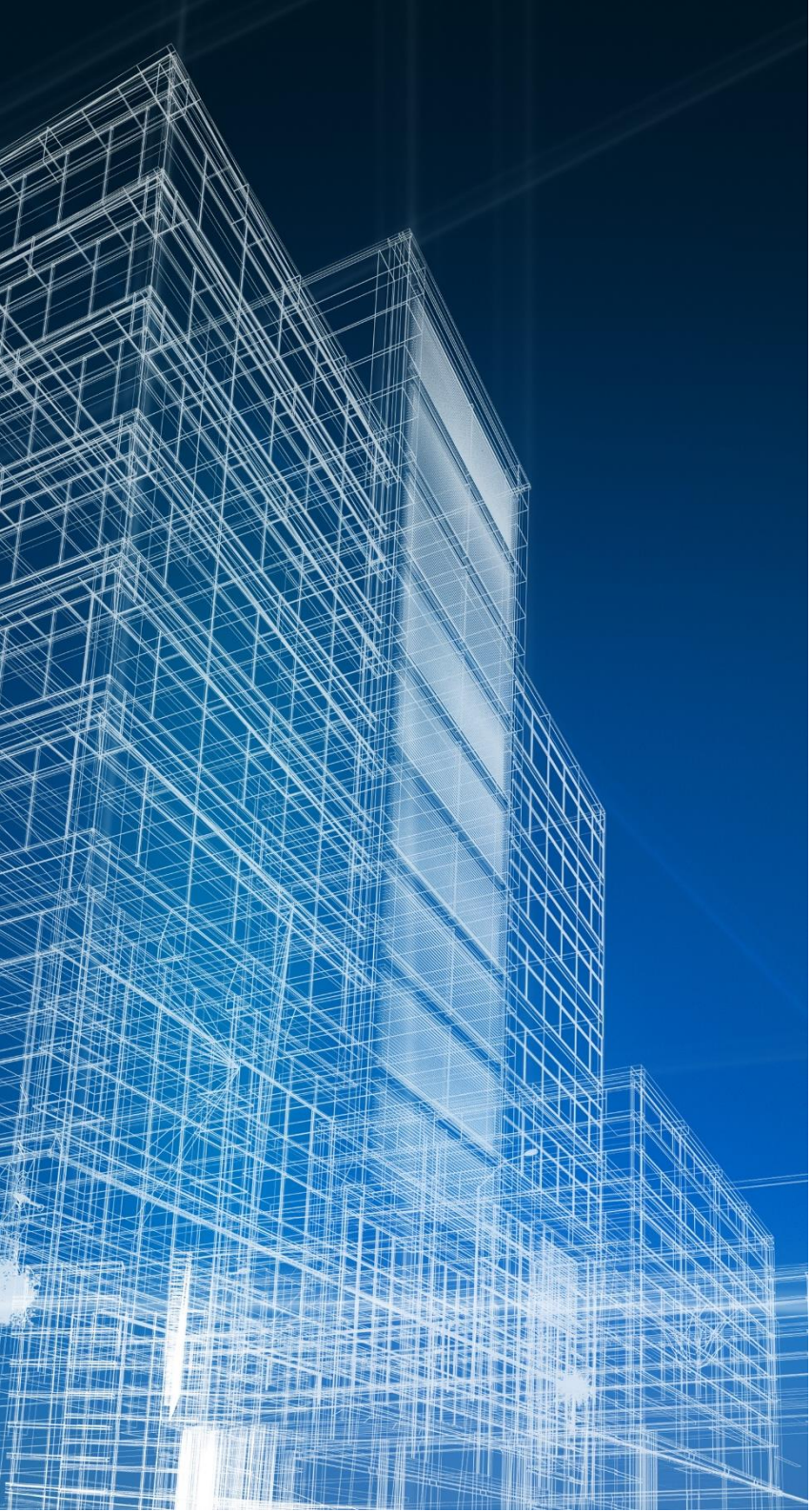


ENVIRONMENTAL PRODUCT DECLARATION

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

Louvre of aluminium

Lindab®

EPD HUB, HUB-1994

Published on 02.10.2024, last updated on 02.10.2024, valid until 02.10.2029

EPD Hub One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Lindab Ventilation A/S
Address	Langkaer 20, 6100 Haderslev, Denmark
Contact details	haderslev@lindab.dk
Website	https://www.lindab.dk

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Sister EPD
Parent EPD number	HUB-0840
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Alice Andersen
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Haiha Nguyen, as an authorized verifier acting for EPD Hub Limited

Lindab has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Louvres for air intake and outlet
Additional labels	H1
Product reference	-
Place of production	7800 Skive, Denmark
Period for data	2023
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	-

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	8.32E+00
GWP-total, A1-A3 (kgCO2e)	8.38E+00
Secondary material, inputs (%)	8.74
Secondary material, outputs (%)	4.55
Total energy use, A1-A3 (kWh)	50.8
Net fresh water use, A1-A3 (m3)	0.41

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Lindab is a leading ventilation company in Europe, offering solutions for energy-efficient ventilation and a healthy indoor climate. The products are characterised by high quality, ease of installation and environmental thinking.
Lindabs H1-louvre is manufactured by Klimatek A/S in Skive in Denmark for Lindab A/S. Klimatek A/S has several years of experience in manufacturing products for ventilation and climate systems. The key products of the production are louvres, dampers, and roof hoods.

PRODUCT DESCRIPTION

The H1-louvre is used as intake or outlet for ventilation systems. The grid is to fit into recesses to be used as air intake and exhaust air grille. The louvre consists of a mounting frame and a grill insert that is fixed. At the bottom of the louvre is located a drip strip.

The louvre comes in different dimensions. In appendix the weights of the louvre per dimension are illustrated.
The H1-louve is made of aluminium from EU. The aluminium has undergone a quality check before the production.

Further information can be found at www.lindab.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	100	EU
Minerals	-	-
Fossil materials	-	-
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	0.016

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg
Mass per declared unit	1 kg
Functional unit	-
Reference service life	30 years

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

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		
x	x	x	x	X	MND	MND	MND	MND	MND	MND	MND	x	x	x	X	x		
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 = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. This EPD also considers the material losses occurring during the manufacturing processes.

The manufacturing of the louvres takes place at Klimatek A/S in Skive in Denmark. The core production is cutting, bending, welding, and assembling of the louvres. The scrap from the production is collected by a waste handling company and recycled in a subsequent process.

The energy source for the production is from the local electricity grid in Denmark and wood pellets for heating.

The louvres are packed depending on the specific size on wood pallets and with recyclable plastic film around.

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 distance of transportation in Denmark corresponds to 200 km in average based on statistic of the deliveries.

The installation of the louvres is by hand tool and typically mounted with screws (A5). The impact of this process is within the cut-off criteria (< 1%).

The pallets and plastic for packaging are to go to inclination with energy recovery.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not consider the usage stage.

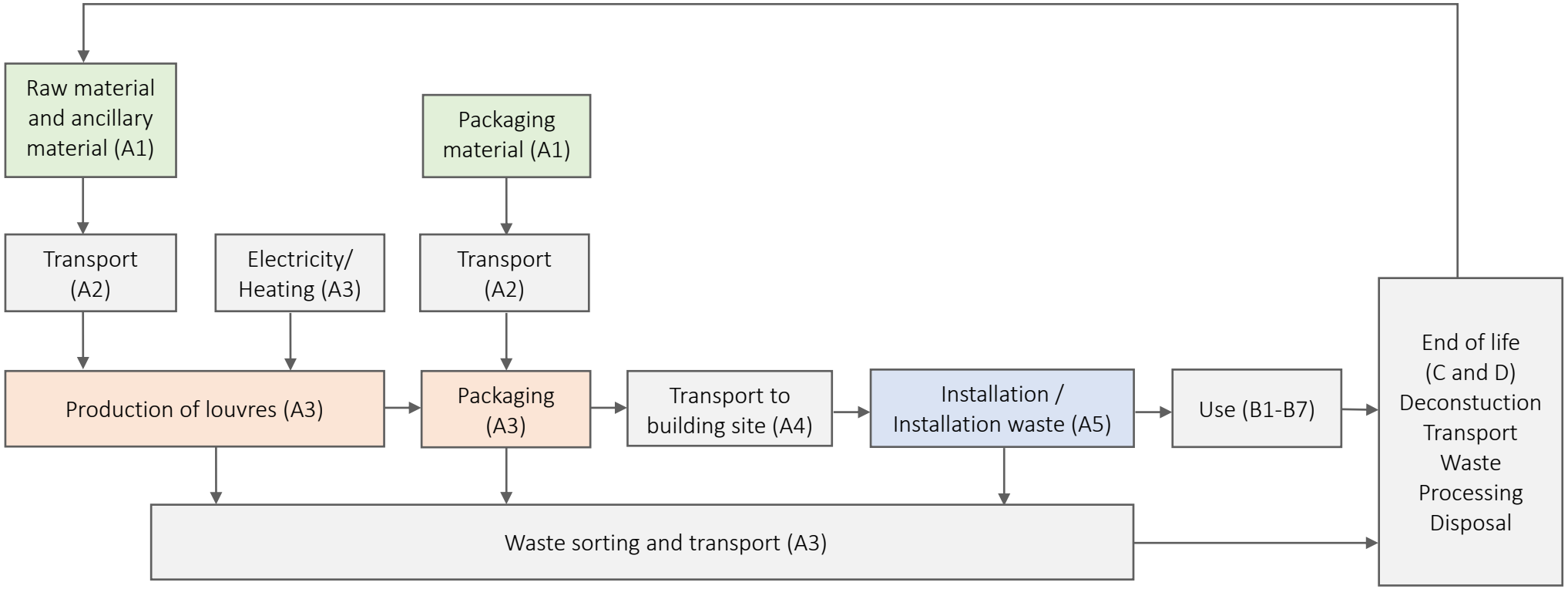
PRODUCT END OF LIFE (C1-C4, D)

It is assumed that the energy for deconstruction is 0,05 kWh, and the products will be transported to waste processing by trolly (C1-C2).

It is assumed that 95% of the aluminium will be recycled in a new product system to substitute virgin materials (C3, D). It is assumed the rest will be for landfill (C4).

Benefits and loads from the energy recovery processes of packaging materials are reported in module D.

MANUFACTURING PROCESS AND SYSTEM BOUNDARY



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard 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.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	-

The EPD contains factory data and does not do any averaging.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

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[1)]	kg CO_2e	7,64E+00	8,54E-02	6,53E-01	8,38E+00	2,50E-02	9,43E-02	MND	MND	MND	MND	MND	MND	MND	MNR	4,87E-03	-2,94E-02	1,12E-02	-2,39E+00
GWP – fossil	kg CO_2e	7,52E+00	8,54E-02	7,18E-01	8,32E+00	2,50E-02	3,56E-02	MND	MND	MND	MND	MND	MND	MND	MNR	4,87E-03	1,02E-02	1,33E-02	-2,28E+00
GWP – biogenic	kg CO_2e	4,98E-02	0,00E+00	-6,65E-02	-1,67E-02	9,66E-06	5,86E-02	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	-3,95E-02	-2,08E-03	-5,83E-02
GWP – LULUC	kg CO_2e	7,55E-02	3,44E-05	1,22E-03	7,68E-02	9,22E-06	6,56E-05	MND	MND	MND	MND	MND	MND	MND	MNR	1,81E-06	5,47E-06	1,01E-05	-5,82E-02
Ozone depletion pot.	kg CFC_{-11}e	5,54E-07	1,96E-08	4,20E-08	6,16E-07	5,75E-09	1,32E-09	MND	MND	MND	MND	MND	MND	MND	MNR	1,12E-09	4,32E-10	3,13E-09	-2,55E-07
Acidification potential	mol H^+e	5,08E-02	3,51E-04	8,88E-03	6,00E-02	1,06E-04	1,40E-04	MND	MND	MND	MND	MND	MND	MND	MNR	2,06E-05	3,73E-05	8,38E-05	-1,62E-02
EP-freshwater[2)]	kg Pe	2,86E-03	6,11E-07	1,72E-04	3,03E-03	2,05E-07	2,77E-06	MND	MND	MND	MND	MND	MND	MND	MNR	3,94E-08	2,38E-07	2,06E-07	-1,24E-04
EP-marine	kg Ne	7,39E-03	1,05E-04	1,85E-03	9,34E-03	3,14E-05	2,67E-05	MND	MND	MND	MND	MND	MND	MND	MNR	6,11E-06	4,06E-06	2,73E-05	-1,93E-03
EP-terrestrial	mol Ne	7,23E-02	1,16E-03	2,81E-02	1,02E-01	3,47E-04	3,42E-04	MND	MND	MND	MND	MND	MND	MND	MNR	6,74E-05	4,91E-05	3,00E-04	-2,31E-02
POCP ("smog")[3)]	kg NMVOCe	2,24E-02	3,55E-04	6,30E-03	2,90E-02	1,11E-04	8,16E-05	MND	MND	MND	MND	MND	MND	MND	MNR	2,15E-05	1,43E-05	9,44E-05	-7,74E-03
ADP-minerals & metals[4)]	kg Sbe	1,42E-05	3,03E-07	6,77E-06	2,13E-05	5,86E-08	4,01E-07	MND	MND	MND	MND	MND	MND	MND	MNR	1,19E-08	4,92E-07	4,86E-08	-5,77E-06
ADP-fossil resources	MJ	9,24E+01	1,27E+00	9,51E+00	1,03E+02	3,75E-01	4,92E-01	MND	MND	MND	MND	MND	MND	MND	MNR	7,31E-02	6,43E-02	2,45E-01	-3,55E+01
Water use[5)]	m^3e depr.	1,18E+00	5,93E-03	2,92E-01	1,48E+00	1,68E-03	2,36E-02	MND	MND	MND	MND	MND	MND	MND	MNR	3,28E-04	1,58E-03	3,57E-02	-4,75E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) 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 experience with the indicator.

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	0,00E+00	7,41E-09	4,95E-07	5,02E-07	2,88E-09	9,69E-10	MND	MND	MND	MND	MND	MND	MND	MNR	5,50E-10	6,07E-10	3,00E-09	-1,81E-07
Ionizing radiation[6)]	kBq U235e	0,00E+00	6,64E-03	1,12E-01	1,19E-01	1,79E-03	8,73E-03	MND	MND	MND	MND	MND	MND	MND	MNR	3,51E-04	7,21E-04	1,10E-03	-6,51E-01
Ecotoxicity (freshwater)	CTUe	0,00E+00	1,05E+00	3,34E+01	3,44E+01	3,37E-01	8,04E-01	MND	MND	MND	MND	MND	MND	MND	MNR	6,53E-02	2,54E-01	4,92E+00	-5,26E+01
Human toxicity, cancer	CTUh	0,00E+00	3,30E-11	8,10E-10	8,43E-10	8,29E-12	2,09E-11	MND	MND	MND	MND	MND	MND	MND	MNR	1,64E-12	7,01E-12	2,34E-11	1,48E-09
Human tox. non-cancer	CTUh	0,00E+00	1,07E-09	3,09E-08	3,19E-08	3,34E-10	6,26E-10	MND	MND	MND	MND	MND	MND	MND	MNR	6,48E-11	3,08E-10	4,53E-10	-1,07E-07
SQP[7)]	-	0,00E+00	8,86E-01	7,21E+01	7,30E+01	4,32E-01	5,36E-01	MND	MND	MND	MND	MND	MND	MND	MNR	8,15E-02	6,24E-02	3,57E-01	-2,52E+01

6) 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; 7) SQP = Land use related impacts/soil quality.

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[8)]	MJ	6,13E+01	1,85E-02	1,85E+01	7,98E+01	4,23E-03	3,59E-01	MND	MND	MND	MND	MND	MND	MND	MNR	8,43E-04	9,38E-03	4,54E-03	-2,03E+01
Renew. PER as material	MJ	0,00E+00	0,00E+00	5,33E-01	5,33E-01	0,00E+00	-5,33E-01	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	5,07E-01
Total use of renew. PER	MJ	6,13E+01	1,85E-02	1,90E+01	8,03E+01	4,23E-03	-1,74E-01	MND	MND	MND	MND	MND	MND	MND	MNR	8,43E-04	9,38E-03	4,54E-03	-1,98E+01
Non-re. PER as energy	MJ	9,24E+01	1,27E+00	9,35E+00	1,03E+02	3,75E-01	4,92E-01	MND	MND	MND	MND	MND	MND	MND	MNR	7,31E-02	6,42E-02	2,45E-01	-3,55E+01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	1,50E-01	1,50E-01	0,00E+00	-1,50E-01	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	9,24E+01	1,27E+00	9,50E+00	1,03E+02	3,75E-01	3,42E-01	MND	MND	MND	MND	MND	MND	MND	MNR	7,31E-02	6,42E-02	2,45E-01	-3,55E+01
Secondary materials	kg	8,74E-02	4,35E-04	2,82E-03	9,06E-02	1,04E-04	1,38E-04	MND	MND	MND	MND	MND	MND	MND	MNR	2,07E-05	4,19E-05	3,41E-04	3,91E-01
Renew. secondary fuels	MJ	0,00E+00	4,69E-06	2,29E-04	2,33E-04	1,05E-06	9,25E-07	MND	MND	MND	MND	MND	MND	MND	MNR	2,10E-07	1,56E-06	7,32E-06	-6,40E-05
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	4,02E-01	1,61E-04	5,67E-03	4,08E-01	4,86E-05	1,13E-03	MND	MND	MND	MND	MND	MND	MND	MNR	9,45E-06	4,59E-05	-1,96E-04	-1,03E-01

8) 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	1,42E+00	1,46E-03	4,39E-02	1,47E+00	4,98E-04	3,53E-03	MND	MND	MND	MND	MND	MND	MND	MNR	9,57E-05	1,01E-03	0,00E+00	-5,00E-01
Non-hazardous waste	kg	4,36E+00	2,57E-02	1,68E+00	6,06E+00	8,17E-03	1,21E-01	MND	MND	MND	MND	MND	MND	MND	MNR	1,58E-03	2,32E-02	9,50E-01	-5,20E+00
Radioactive waste	kg	1,30E-03	8,71E-06	3,94E-05	1,35E-03	2,51E-06	2,36E-06	MND	MND	MND	MND	MND	MND	MND	MNR	4,90E-07	2,58E-07	0,00E+00	-2,27E-04

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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	4,73E-01	0,00E+00	1,97E-01	6,70E-01	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	5,00E-02	0,00E+00	0,00E+00
Materials for energy rec	kg	2,51E-03	0,00E+00	0,00E+00	2,51E-03	0,00E+00	2,40E-01	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	2,10E-03	0,00E+00	0,00E+00	2,10E-03	0,00E+00	3,61E+00	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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[9)]	kg CO_2e	7,52E+00	8,54E-02	7,18E-01	8,32E+00	2,50E-02	3,56E-02	MND	MND	MND	MND	MND	MND	MND	MNR	4,87E-03	1,02E-02	1,33E-02	-2,28E+00

9) 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). In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.

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 reference standard, 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 digital background data for this EPD

Why does verification transparency matter? Read more online

This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

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 reference standard.

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.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
02.10.2024

VERIFIED ISO 14025

APPENDIX

For special geometry contact Lindab: www.lindab.dk

Weight in kilo per dimension

	L = Width mm																											
H = Heigth mm	**200**	**300**	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**	**1600**	**1700**	**1800**	**1900**	**2000**	**2100**	**2200**	**2300**	**2400**	**2500**	**2600**	**2700**	**2800**	**2900**
200	1,0	1,2	1,6	1,9	2,2	2,5	2,7	3,0	3,3	3,6	3,9	4,2	4,5	4,8	5,1	5,4	5,7	6,0	6,3	6,6	6,9	7,2	7,5	7,8	8,1	8,4	8,6	8,9
300	1,3	1,6	2,0	2,4	2,8	3,2	3,6	3,9	4,3	4,7	5,1	5,5	5,9	6,3	6,6	7,0	7,4	7,8	8,2	8,6	8,9	9,3	9,7	10,1	10,5	10,9	11,3	11,6
400	1,5	2,0	2,4	2,9	3,4	3,9	4,4	4,8	5,3	5,8	6,3	6,7	7,2	7,7	8,2	8,6	9,1	9,6	10,1	10,6	11,0	11,5	11,9	12,5	12,9	13,4	13,9	14,4
500	1,8	2,3	2,9	3,5	4,0	4,6	5,2	5,7	6,3	6,9	7,4	8,0	8,6	9,1	9,7	10,3	10,8	11,4	11,9	12,5	13,1	13,7	14,2	14,8	15,4	15,9	16,5	171,0
600	2,1	2,8	3,5	4,2	4,8	5,6	6,3	7,0	7,7	8,4	9,1	9,8	10,5	11,2	11,9	12,6	13,3	14,0	14,7	15,4	16,1	16,8	17,5	18,2	18,9	19,6	20,3	21,0
700	2,4	3,2	4,0	4,8	5,6	6,3	7,2	7,9	8,7	9,5	10,3	11,1	11,9	12,7	13,5	14,3	15,0	15,8	16,6	17,4	18,2	19,1	19,8	20,6	21,4	22,2	23,0	23,8
800	2,6	3,5	4,4	5,3	6,2	7,1	7,9	8,8	9,7	10,6	11,5	12,4	13,2	14,1	15,0	15,9	16,7	17,6	18,5	19,4	20,3	21,2	22,1	22,9	23,8	24,7	25,6	26,5
900	2,9	3,9	4,9	5,8	6,8	7,8	8,7	9,7	10,7	11,7	12,7	13,6	14,6	15,6	16,5	17,5	18,5	19,5	20,4	21,4	22,4	23,3	24,3	25,3	26,3	27,2	28,2	29,2
1000	3,2	4,3	5,3	6,4	7,4	8,5	9,6	10,6	11,7	12,8	13,8	14,9	15,9	17,0	18,0	19,1	20,2	21,3	22,3	23,4	24,5	25,5	26,6	27,6	28,7	29,8	30,8	31,9
1100	3,5	5,0	5,9	7,1	8,3	9,5	10,7	11,9	13,1	14,3	15,5	16,7	17,9	19,1	20,3	21,5	22,7	23,9	25,1	26,3	27,5	28,7	29,9	31,1	32,3	33,5	34,7	35,9
1200	3,8	5,5	6,3	7,6	8,9	10,2	11,5	12,8	14,1	15,4	16,7	17,9	19,2	20,5	21,8	23,1	24,4	25,7	27,0	28,3	29,6	30,9	32,1	33,4	34,7	36,0	37,3	38,6
1300	4,0	5,4	6,8	8,2	9,6	10,9	12,3	13,7	15,1	16,5	17,8	19,2	20,6	21,9	23,4	24,7	26,1	27,5	28,9	30,3	31,6	33,0	34,4	35,8	37,2	38,6	39,9	41,3
1400	4,3	5,8	7,2	8,7	10,1	11,6	13,1	14,6	16,1	17,5	19,0	20,5	21,9	23,4	24,9	23,4	27,8	29,3	30,8	32,3	33,7	35,2	36,7	38,1	39,6	41,1	42,6	44,0
1500	4,6	6,2	7,8	9,4	11,0	12,7	14,3	15,9	17,5	19,1	20,7	22,3	23,9	25,5	27,1	28,7	30,3	31,9	33,5	35,1	36,7	38,3	40,0	41,6	43,1	44,8	46,3	48,0
1600	4,9	6,6	8,3	10,0	11,7	13,4	15,1	16,8	18,5	20,2	21,9	23,6	25,3	27,0	28,7	30,3	32,0	33,7	35,4	37,1	38,8	40,5	42,2	43,9	45,6	47,3	49,0	50,7
1700	5,2	6,9	8,7	10,5	12,3	14,1	15,9	17,7	19,5	21,3	23,1	24,8	26,6	28,4	30,2	32,0	33,8	35,5	37,3	39,1	40,9	42,7	44,5	46,3	48,0	49,8	51,6	53,0
1800	5,4	7,3	9,2	11,1	12,9	14,8	16,7	18,6	20,4	22,3	24,2	26,1	27,9	29,8	31,7	33,6	35,5	37,3	39,2	41,1	43,0	44,9	46,8	48,6	50,5	52,4	54,2	56,1
1900	5,7	7,6	9,6	11,6	13,5	15,5	17,5	19,5	21,4	23,4	25,4	27,4	29,3	31,3	33,3	35,2	37,2	39,2	41,2	43,1	45,1	47,1	49,0	50,9	52,9	54,9	56,9	58,9
2000	6,0	8,1	10,2	12,3	14,4	16,5	18,6	20,7	22,8	24,9	27,0	29,2	31,3	33,4	35,5	37,6	39,7	41,8	43,9	46,0	48,1	50,2	52,3	54,4	56,5	58,6	60,7	62,8
2100	6,3	8,5	10,7	12,9	15,1	17,3	19,5	21,6	23,8	26,0	28,2	30,4	32,6	34,8	37,0	39,2	41,4	43,6	45,8	48,0	50,2	52,4	54,6	56,8	59,0	61,2	63,4	65,5
2200	6,5	8,8	11,1	13,4	15,7	18,0	20,3	22,6	24,8	27,1	29,4	31,7	34,0	36,3	38,5	40,8	43,1	45,4	47,7	49,9	52,3	54,5	56,8	59,1	61,4	63,7	65,9	68,3
2300	6,8	9,2	11,6	13,9	16,3	18,7	21,1	23,4	25,8	28,2	30,6	33,0	35,3	37,7	40,1	42,5	44,8	47,2	49,6	52,0	54,4	56,7	59,1	61,5	63,9	66,2	68,6	71,0
2400	7,2	9,7	12,2	14,7	17,2	19,7	22,2	24,7	27,3	29,7	32,3	34,8	37,3	39,8	42,3	44,8	47,3	49,8	52,3	54,9	57,4	59,9	62,4	64,9	67,4	69,9	72,4	74,9
2500	7,4	10,1	12,6	15,2	17,8	20,4	23,1	25,6	28,2	30,8	33,4	36,1	38,6	41,3	43,8	46,4	49,1	51,6	54,2	56,8	59,4	62,0	64,6	67,3	68,8	72,5	75,1	77,7
2600	7,7	10,4	13,1	15,7	18,5	21,1	23,8	26,5	29,2	31,9	34,6	37,3	40,0	42,7	45,4	48,1	50,8	53,5	56,2	58,8	61,5	64,2	66,9	69,6	72,3	75,0	77,7	80,4
2700	7,9	10,7	13,5	16,3	19,1	21,8	24,6	27,4	30,2	32,9	35,8	38,6	41,3	44,2	46,9	49,7	52,5	55,3	58,1	60,8	63,6	66,4	69,2	72,0	74,7	77,5	80,3	83,1
2800	8,2	11,1	13,9	16,8	19,7	22,6	25,5	28,3	31,2	34,1	37,0	39,8	42,7	45,6	48,5	51,3	54,2	57,1	60,0	62,8	65,7	68,6	71,4	74,3	77,2	80,1	82,9	85,8
2900	8,6	11,6	14,6	17,6	20,6	23,6	26,6	29,6	32,6	35,6	38,6	41,6	44,6	47,6	50,6	53,7	56,7	59,7	62,7	65,7	68,7	71,7	74,7	77,8	80,8	83,8	86,8	89,8