epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Grade chair

LAMMHULTS

The Norwegian EPD Foundation

Owner of the declaration:
Lammhults Möbel AB

Product:
Grade chair

Declared unit:
1 pcs

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 026:2022 Part B for Furniture

Program operator:
The Norwegian EPD Foundation

Declaration number:

NEPD-7767-7137-EN

Registration number:

NEPD-7767-7137-EN

Issue date: 10.10.2024

Valid to: 10.10.2029

EPD software:
LCAno EPD generator ID: 531571

General information

Product

Grade chair

Owner of the declaration:

Lammhults Möbel AB
Contact person: Helena Kumlin
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Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Manufacturer:

Lammhults Möbel AB

Declaration number:

NEPD-7767-7137-EN

Place of production:

Lammhults Möbel AB
Växjövägen 41
SE-363 45 Lammhult, Sweden

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 026:2022 Part B for Furniture

Management system:

ISO 14001, 9001, 45001

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.

Organisation no:

556058-2602

Declared unit:

1 pcs Grade chair

Issue date:

10.10.2024

Declared unit (cradle to gate) with option:

A1-A3,A4,A5,B2,B3,B4,C1,C2,C3,C4,D

Valid to:

10.10.2029

Year of study:

2023

Functional unit:

Grade chair 4 legs, seat shell in polypropylene

Comparability:

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

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD: Lovisa Aiff

Reviewer of company-specific input data and EPD: Helena Kumlin

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Elisabet Amat, GREENIZE projects

(no signature required)

Approved:

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Grade, designed by Johannes Foersom & Peter Hiort-Lorenzen, brings a new level of design sophistication to the plastic stacking shell chair category with its subtly reliefed, recyclable, polypropylene shell and choice of materials and color schemes. Five levels or "grades" of relief are molded into the back of Grade, providing a visual rhythm to the chair's form.

Product specification

Grade is available as a chair and an armchair with a stackable and linkable four-leg base, or with a height adjustable, five-star swivel base with casters. Seat shell of recycled polypropylene. Also available with upholstered seat or fully upholstered seat shell.

CHAIR / ARMCHAIR
Frame of Ø 14 resp. Ø 16 powder coated or chromium plated steel tubing. Armrests of recycled polypropylene.

5-FEET SWIVEL CHAIR/ARMCHAIR
Pillar and foot of cast recycled aluminium. Armrests of Ø 16 mm powder coated or chromium-plated steel tubing.

Materials	kg	%	Recycled share in material (kg)	Recycled share in material (%)
Plastic - Polypropylene (PP)	0,01	0,17	0,00	0,00
Plastic - Polypropylene with glass fibre	2,61	55,60	0,00	0,00
Powder coating	0,06	1,28	0,00	0,00
Thermoplastic elastomers (TPE)	0,03	0,68	0,00	0,00
Metal - Steel	1,98	42,27	0,00	0,00
Total	4,69	100,00	0,00	

Packaging	kg	%	Recycled share in material (kg)	Recycled share in material (%)
Packaging - Cardboard	0,24	28,30	0,00	0,00
Packaging - Plastic	0,04	4,80	0,00	0,00
Packaging - Plastic straps	0,01	0,82	0,00	0,00
Recycled cardboard	0,57	66,08	0,57	100,00
Total incl. packaging	5,55	100,00	0,57	

Technical data:

Width 51cm
Height 78cm
Depth 54cm
Seat height 45cm

Grade meets the requirements of EN 16139:2013 level 1 and Möbelfakta.

Market:

Available world wide

Reference service life, product

15 years (warranty 5 years)

Reference service life, building

LCA: Calculation rules

Declared unit:

1 pcs Grade chair

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. They represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on registered EPDs according to EN 15804, Ostfold Research databases, ecoinvent and other LCA databases. The data quality of the raw materials in A1 is presented in the table below.

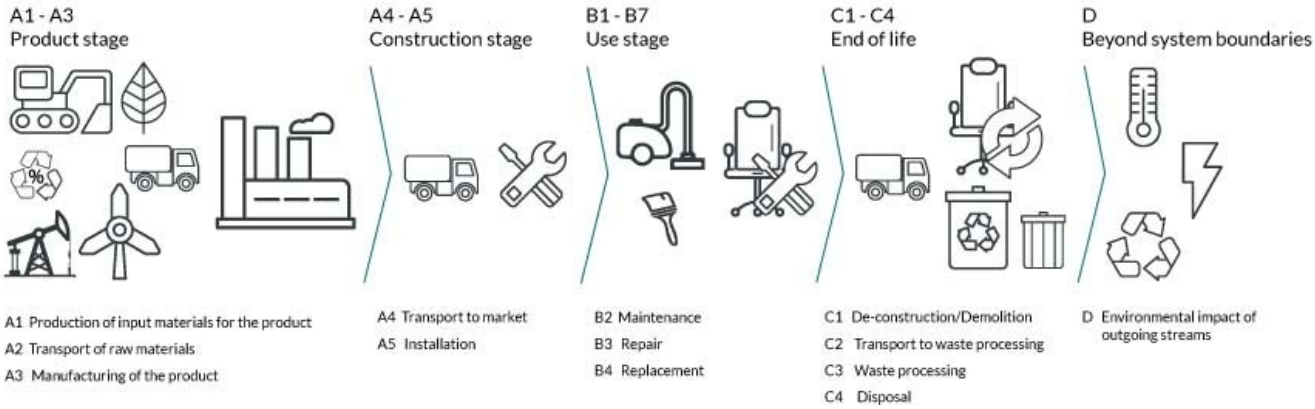
Materials	Source	Data quality	Year
Metal - Steel	ecoinvent 3.6	Database	2019
Packaging - Cardboard	Modified ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Packaging - Plastic straps	ecoinvent 3.6	Database	2019
Plastic - Polypropylene (PP)	ecoinvent 3.6	Database	2019
Plastic - Polypropylene with glass fibre	ecoinvent 3.6	Database	2019
Powder coating	Ecoinvent 3.6	Database	2019
Recycled cardboard	Modified ecoinvent 3.6	Database	2019
Thermoplastic elastomers (TPE)	Ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	X	X	X	MND	MND	MND	X	X	X	X	X

System boundary:

The analysis is a cradle-to-cradle, A1-D, where some B-stages that were assumed to be neglectable are not included. The A1-A4 stages includes the extraction and production of raw materials, transportation to the production site, the production process itself, and an estimated transport distance to the market. A5 includes the generated waste from the packaging of the product after the assembly at the customer. The only B-stage that is assumed to be relevant is B2, which includes assumptions on how the customer takes care of the product according to Lammhults' care instructions. The C- and D-stages includes the use of materials and energy for deconstruction, the transport to waste management, the waste processes, disposal of materials that cannot be processed, and the potential of reuse, recovery, and recycling of the product.



Additional technical information:

https://www.lammhults.se/products/chairs-armchairs/grade-chair

Lammhults Care & Maintenance: https://issuu.com/lammhults/docs/lammhultscaremaintenance2205

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Some assumptions have been made regarding the products lifetime after leaving the factory gates. The product is assumed to be transported to the capitol of each country sold/delivered to. An average distance (A4) to the customer has been calculated through this data. In the A5 phase, the packaging of the product becomes waste, and the impacts are added automatically according to assumptions made in the EPD tool on waste handling on-site. In the use stage, the assumption is that the customer takes care of the product by cleaning the product with water and window cleaner. For the end-of-life stage of the product, it has been assumed that there is a 50 km distance from the customer to a waste terminal. The rest of the values are automatically filled in by the tool. For the D-stage, automatic values are filled in, according to generic data.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	548	0,043	l/tkm	23,56

Assembly (A5)	Unit	Value			
Waste, packaging, cardboard, 100 % recycled, to average treatment (kg)	kg	0,57			
Waste, packaging, corrugated board box, 0 % recycled, to average treatment (kg)	kg	0,24			
Waste, packaging, plastic film (LDPE), to average treatment - A5 (kg)	kg	0,04			
Waste, packaging, PET straps, to average treatment - A5 (kg)	kg	0,01			

Maintenance (B2)	Unit	Value			
Household detergent, 5% soap solution (kg)	kg/DU	0,00			
Wastewater, average treatment (m3)	m3	0,00			
Water, tap water (m3)	m3/DU	0,00			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	50	0,043	l/tkm	2,15

Waste processing (C3)	Unit	Value			
Waste, materials to recycling (kg)	kg	0,67			
Waste treatment per kg Scrap steel, incineration with fly ash extraction (kg)	kg	1,98			
Waste treatment per kg Non-hazardous waste, incineration with fly ash extraction - C3 (kg)	kg	2,67			
Waste treatment per kg Polypropylene (PP), incineration with fly ash extraction - C3 (kg)	kg	0,01			
Waste treatment per kg Polyethylene, PE, incineration with fly ash extraction - C3 (kg)	kg	0,03			

Disposal (C4)	Unit	Value			
Landfilling of ashes and residues from incineration of Scrap steel (kg)	kg	1,31			
Landfilling of ashes from incineration of Non-hazardous waste, process per kg ashes and residues - C4 (kg)	kg	0,63			
Landfilling of ashes from incineration of Polypropylene, PP, process per kg ashes and residues - C4 (kg)	kg	0,00			
Landfilling of ashes from incineration of Polyethylene, PE, process per kg ashes and residues - C4 (kg)	kg	0,00			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of primary steel with net scrap (kg)	kg	0,67			
Substitution of electricity, in Norway (MJ)	MJ	1,66			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	25,14			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact							
Indicator		Unit	A1-A3	A4	A5	B2	B3
	GWP-total	kg CO_2 -eq	1,65E+01	4,97E-01	1,39E+00	6,33E-04	0
	GWP-fossil	kg CO_2 -eq	1,73E+01	4,97E-01	1,69E-02	4,54E-04	0
	GWP-biogenic	kg CO_2 -eq	-7,94E-01	2,06E-04	1,37E+00	2,31E-05	0
	GWP-luluc	kg CO_2 -eq	5,47E-02	1,77E-04	4,61E-06	1,56E-04	0
	ODP	kg CFC11 -eq	1,30E-06	1,13E-07	2,98E-09	4,90E-11	0
	AP	mol H+ -eq	9,40E-02	1,43E-03	6,65E-05	3,31E-06	0
	EP-FreshWater	kg P -eq	8,67E-04	3,97E-06	1,15E-07	8,26E-07	0
	EP-Marine	kg N -eq	2,05E-02	2,83E-04	2,47E-05	1,65E-06	0
	EP-Terrestial	mol N -eq	2,23E-01	3,16E-03	2,38E-04	8,09E-06	0
	POCP	kg NMVOC -eq	7,72E-02	1,21E-03	6,92E-05	1,91E-06	0
	ADP-minerals&metals[1]	kg Sb-eq	4,73E-04	1,37E-05	3,38E-07	1,64E-08	0
	ADP-fossil[1]	MJ	3,53E+02	7,51E+00	1,98E-01	7,06E-03	0
	WDP[1]	m^3	5,64E+03	7,27E+00	2,87E-01	1,07E-01	0

Indicator		Unit	B4	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	0	0	4,54E-02	6,38E+00	1,59E-02	-8,92E-01
	GWP-fossil	kg CO_2 -eq	0	0	4,53E-02	6,38E+00	1,59E-02	-8,86E-01
	GWP-biogenic	kg CO_2 -eq	0	0	1,88E-05	1,97E-04	1,07E-05	-7,09E-04
	GWP-luluc	kg CO_2 -eq	0	0	1,61E-05	1,08E-04	4,90E-06	-5,35E-03
	ODP	kg CFC11 -eq	0	0	1,03E-08	4,24E-08	5,08E-09	-1,06E-02
	AP	mol H+ -eq	0	0	1,30E-04	9,75E-04	1,15E-04	-4,88E-03
	EP-FreshWater	kg P -eq	0	0	3,62E-07	4,46E-06	1,56E-07	-5,85E-05
	EP-Marine	kg N -eq	0	0	2,58E-05	3,66E-04	4,11E-05	-1,15E-03
	EP-Terrestial	mol N -eq	0	0	2,88E-04	3,66E-03	4,54E-04	-1,20E-02
	POCP	kg NMVOC -eq	0	0	1,10E-04	9,15E-04	1,31E-04	-4,88E-03
	ADP-minerals&metals[1]	kg Sb-eq	0	0	1,25E-06	1,72E-06	2,83E-07	-1,42E-05
	ADP-fossil[1]	MJ	0	0	6,85E-01	1,18E+00	3,75E-01	-8,31E+00
	WDP[1]	m^3	0	0	6,63E-01	-1,79E+01	6,89E-01	1,24E+01

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Remarks to environmental impacts

Additional environmental impact indicators

Indicator		Unit	A1-A3	A4	A5	B2	B3
	PM	Disease incidence	1,64E-06	3,04E-08	9,95E-10	3,60E-11	0
	IRP[2]	kgBq U235 -eq	2,28E+00	3,28E-02	8,52E-04	4,49E-05	0
	ETP-fw[1]	CTUe	6,45E+02	5,57E+00	2,59E-01	1,66E-02	0
	HTP-c[1]	CTUh	5,62E-08	0,00E+00	7,00E-12	1,00E-12	0
	HTP-nc[1]	CTUh	4,68E-07	6,08E-09	3,20E-10	2,70E-11	0
	SQP[1]	dimensionless	3,95E+02	5,25E+00	1,50E-01	7,94E-03	0

Indicator		Unit	B4	C1	C2	C3	C4	D
	PM	Disease incidence	0	0	2,78E-09	8,51E-09	2,12E-09	-1,34E-07
	IRP[2]	kgBq U235 -eq	0	0	3,00E-03	4,48E-03	1,50E-03	-1,07E-02
	ETP-fw[1]	CTUe	0	0	5,08E-01	1,72E+01	2,33E-01	-5,26E+01
	HTP-c[1]	CTUh	0	0	0,00E+00	6,08E-10	9,00E-12	-3,77E-09
	HTP-nc[1]	CTUh	0	0	5,55E-10	1,14E-08	2,56E-10	6,65E-08
	SQP[1]	dimensionless	0	0	4,79E-01	2,39E-01	7,77E-01	-1,44E+01

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. 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.

Resource use							
Indicator		**Unit**	A1-A3	A4	A5	B2	B3
	PERE	MJ	1,38E+02	1,08E-01	3,40E-03	2,28E-03	0
	PERM	MJ	7,16E+00	0,00E+00	-7,16E+00	0,00E+00	0
	PERT	MJ	1,45E+02	1,08E-01	-7,15E+00	2,28E-03	0
	PENRE	MJ	2,97E+02	7,51E+00	1,98E-01	7,27E-03	0
	PENRM	MJ	7,16E+01	0,00E+00	-1,90E+00	0,00E+00	0
	PENRT	MJ	3,68E+02	7,51E+00	-1,70E+00	7,27E-03	0
	SM	kg	5,65E-01	0,00E+00	0,00E+00	0,00E+00	0
	RSF	MJ	6,90E-01	3,85E-03	1,10E-04	6,56E-05	0
	NRSF	MJ	9,58E-01	1,38E-02	4,38E-04	6,55E-05	0
	FW	m^3	2,32E-01	8,03E-04	9,45E-05	1,02E-03	0

Indicator		**Unit**	B4	C1	C2	C3	C4	D
	PERE	MJ	0	0	9,81E-03	1,09E-01	6,71E-03	-1,34E+01
	PERM	MJ	0	0	0,00E+00	-6,84E+01	0,00E+00	0,00E+00
	PERT	MJ	0	0	9,81E-03	-6,83E+01	6,71E-03	-1,34E+01
	PENRE	MJ	0	0	6,85E-01	1,45E+00	3,75E-01	-8,31E+00
	PENRM	MJ	0	0	0,00E+00	-1,62E+00	0,00E+00	0,00E+00
	PENRT	MJ	0	0	6,85E-01	-1,70E-01	3,75E-01	-8,31E+00
	SM	kg	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0	0	3,51E-04	2,72E-03	1,78E-04	2,45E-02
	NRSF	MJ	0	0	1,25E-03	0,00E+00	7,60E-03	1,49E-02
	FW	m^3	0	0	7,33E-05	2,00E-03	3,39E-04	-1,71E-02

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; 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; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1-A3	A4	A5	B2	B3
	HWD	kg	3,98E-01	3,87E-04	0,00E+00	1,72E-05	0
	NHWD	kg	4,11E+00	3,65E-01	8,55E-01	1,18E-04	0
	RWD	kg	1,34E-03	5,12E-05	0,00E+00	3,91E-08	0

Indicator		Unit	B4	C1	C2	C3	C4	D
	HWD	kg	0	0	3,53E-05	0,00E+00	1,85E+00	-3,94E-03
	NHWD	kg	0	0	3,33E-02	2,67E+00	9,78E-02	-3,52E-01
	RWD	kg	0	0	4,67E-06	0,00E+00	3,06E-06	-8,87E-06

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

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1-A3	A4	A5	B2	B3
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0
	MFR	kg	3,10E-01	0,00E+00	7,75E-01	0,00E+00	0
	MER	kg	4,58E-01	0,00E+00	3,50E-06	0,00E+00	0
	EEE	MJ	2,26E-01	0,00E+00	4,62E-02	0,00E+00	0
	EET	MJ	3,41E+00	0,00E+00	6,98E-01	0,00E+00	0

Indicator		Unit	B4	C1	C2	C3	C4	D
	CRU	kg	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	0	0	0,00E+00	6,73E-01	0,00E+00	0,00E+00
	MER	kg	0	0	0,00E+00	4,69E+00	0,00E+00	0,00E+00
	EEE	MJ	0	0	0,00E+00	1,31E-01	0,00E+00	0,00E+00
	EET	MJ	0	0	0,00E+00	1,98E+00	0,00E+00	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	3,74E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional requirements

Greenhouse gas emissions 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).

Electricity mix	Source	Amount	Unit
Electricity, Sweden (kWh)	ecoinvent 3.6	54,94	g CO2-eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

Additional Environmental Information

Key Environmental Indicators

Key environmental indicators	Unit	A1-A3	A4	A1-C4	A1-D
GWPtotal	kg CO_2 -eq	16,54	0,50	24,87	23,98
Total energy consumption	MJ	436,54	7,64	447,04	425,39
Amount of recycled materials	%	5,17			

Additional environmental impact indicators required in NPCR Part A for construction products

Indicator	Unit	A1-A3	A4	A5	B2	B3
GWPIOBC	kg CO_2 -eq	2,53E+01	4,97E-01	1,69E-02	6,32E-04	0

Indicator	Unit	B4	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	0	0	4,54E-02	3,50E+00	2,13E-02	-1,26E+00

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Variants and Options

Key environmental indicators (A1-A3) for variants of this EPD

Variants	Weight (kg)	GWPtotal (kg CO_2 -eq)	Total energy consumption (MJ)	Amount of recycled materials (%)
Grade chair 5-feet swivel base	10,78	23,65	698,59	50,07
Grade chair 5-feet swivel base upholstered seat in wool	11,73	40,03	853,70	46,02
Grade chair 5-feet swivel base fully upholstered in wool	11,91	57,12	946,98	45,35
Grade chair upholstered seat in wool	6,82	34,17	617,70	9,40
Grade chair fully upholstered in wool	6,91	51,27	706,26	8,55
Grade chair fully upholstered in recycled polyester	6,82	25,64	603,10	14,90

Key environmental indicators (A1-A3) for options for this EPD

Options	Weight (kg)	GWPtotal (kg CO_2 -eq)	Total energy consumption (MJ)	Amount of recycled materials (%)
Grade armrests for 5-feet swivel base	0,77	3,68	70,19	0,78
Grade armrests for 4-legged chair	1,62	2,76	115,21	38,02

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 Environmental product declaration - Core rules for the product category of construction products.
ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.
Iversen et al., (2021) eEPD v2021.09 Background information for EPD generator tool system verification, LCA.no Report number: 07.21
Ruud et al., (2023) EPD generator for NPCR026 Part B for Furniture - Background information for EPD generator application and LCA data, LCA.no report number 01.23
NPCR Part A: Construction products and services. Ver. 2.0. March 2021, EPD-Norge.
NPCR 026 Part B for Furniture. Ver. 2.0 March 2022, EPD-Norge.

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