epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Sola Universal chair with metal legs



Martela

The Norwegian EPD Foundation

Owner of the declaration:
Martela Oyj

Product:
Sola Universal chair with metal legs

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:

Registration number:

Issue date:

Valid to:

EPD software:
LCAno EPD generator ID: 143898

General information

Product

Sola Universal chair with metal legs

Owner of the declaration:

Martela Oyj
Contact person: Anne-Maria Peitsalo
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Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway
The Norwegian EPD Foundation
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Manufacturer:

Martela Oyj

Declaration number:

Place of production:

Martela Oyj
Miestentie 1
02150 Espoo, Finland

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, ISO 9001, ISO 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:

0114891-2

Declared unit:

1 pcs Sola Universal chair with metal legs

Issue date:

Declared unit (cradle to gate) with option:

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

Valid to:

Year of study:

2022

Functional unit:

The Sola chair series include several chairs with numerous base options designed by Antti Kotilainen. It is easy to find a suitable alternative for different areas of use, such as meeting rooms, lounges and for office use.

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: Tiina Bordi

Reviewer of company-specific input data and EPD: Anne-Maria Peitsalo

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.

Approved:

Håkon Hauan, CEO EPD-Norge

Third party verifier:

Elisabet Amat, GREENIZE projects

(no signature required)

Product

Product description:

Sola Universal chair with four-leg base is available without upholstery and with several upholstery and material options. Thanks to the row connection and stackability, chairs are also ideal for learning environments.

Product specification

Sola Universal chair with four leg base and without armrests.
Base: white, black, chrome or Inspiring Colours
Seat options: oak or ash

Materials	kg	%	Recycled share in material (kg)	Recycled share in material (%)
Metal - Steel	3,13	53,87	0,63	20,00
Plastic - Polypropylene (PP)	0,10	1,72	0,00	0,00
Wood - Plywood	2,58	44,41	0,00	0,00
Total	5,81		0,63	

Packaging	kg	%	Recycled share in material (kg)	Recycled share in material (%)
Packaging - Cardboard	1,00	90,91	0,36	36,00
Packaging - Plastic	0,10	9,09	0,00	0,00
Total incl. packaging	6,91		0,99	

Technical data:

Möbelfakta certified product

More product information available here:
https://www.martela.com/furniture/seating/universal-chairs/sola-universal-chair-with-four-leg-base

Market:

Europe

Reference service life, product

At least 10 years verified by type testing in accredited test laboratory, 5 years warranty

Reference service life, building

LCA: Calculation rules

Declared unit:

1 pcs Sola Universal chair with metal legs

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	SSAB	EPD (EN15804A1) + company dataset (EN15804A2)	2020
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Plastic - Polypropylene (PP)	ecoinvent 3.6	Database	2019
Wood - Plywood	modified 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:

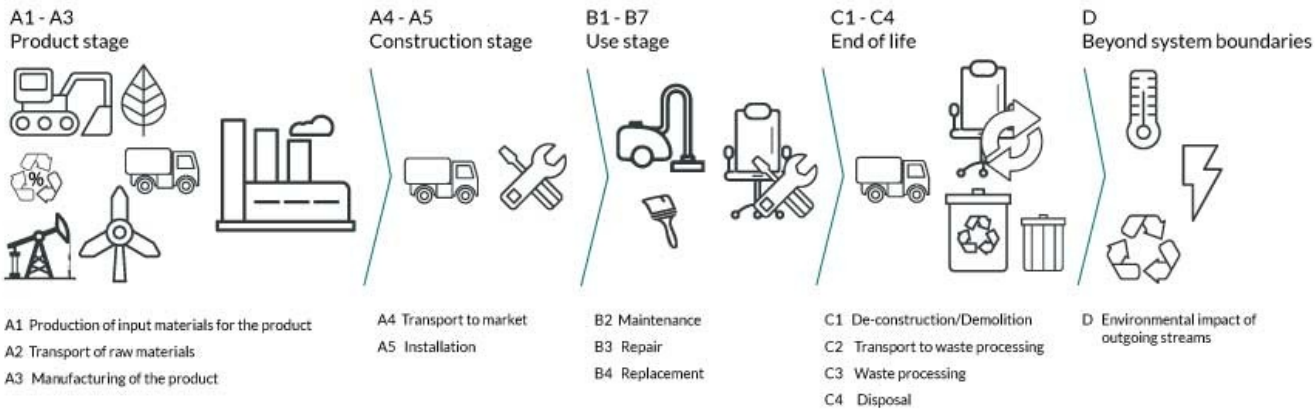
Product Stage / A1 Raw materials:
Martela has long partnerships with its suppliers and subcontractors, who buy raw materials to their products and components from their suppliers, respectively. Main suppliers are locating in Europe.

Wood material is coming from sustainably cultivated forest (FSC, PEFC, etc). Recycled materials are taken to use based on availability and when they fulfill the technical requirements set for the end products.

Materials are including the product package to our customers. Packages that are coming from suppliers are re-used in customer delivery phase (like pallets) or handled as waste in Manufacturing phase A3. Customer delivery package is disposed in Installation phase A5.

Product Stage / A2 Transport:
Transportation is calculated from suppliers location to our own factory in Nummela.

Product Stage / A3 Manufacturing:
Martela Nummela Production unit makes final assembly of the products based on customer orders.
Nummela factory are using renewable electricity and heating energy. From factory waste 98% is recycled.



Additional technical information:

LCA: Scenarios and additional technical information

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

Construction installation stage / A4 Transport:
Transportation from Martela logistics center in Nummela to our customers are calculated base on average transportation distances: in Finland 300 km and in Scandinavia 1100 km. In export deliveries Ferry is in use (between Helsinki - Tallinn and Turku - Stockholm).

Construction installation stage / A5 Assembly:
Martela products are partly assembled at customer premises (like tables). This assembling is done with hand tools and use of energy is minimal in this stage. This product is assembled in the production phase.

Customer end package is disposed in this stage automatically by the tool set-up, but with local installations, our installation personnel take all waste back to our premises and packages are re-used (like pallets) or recycled locally or in Nummela factory (included in A3 waste).

User stage / B1-B7:
Martela products do not require special maintenance. Cleaning with for example wet wiping is advice according.

Based on technical durability testing according EN standard in accredited testing laboratory Martela verifies use life of at least 10 years and grants normal warranty for 5 years.

End-of-life stage / C1-C4:
LCA-tool is calculating stage C waste processing and disposal material by material for recycling and resource for energy production in Norway. Material amounts are calculated based on the material used to make the product. Average transportation distance 85 km has added for waste management.

Beyond the system boundaries / Re-use - Recovery - Recycling -potential / D:
LCA-tool is calculating stage D potential based on material recycling and resource for energy production from materials if product end of lifecycle would be in Norway. Material amounts are calculated based on the material used to make the product

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Ship, Ferry, Sea (km)	50,0 %	300	0,034	l/tkm	10,20
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	800	0,043	l/tkm	34,40

Assembly (A5)	Unit	Value			
Waste, packaging, corrugated board box, to average treatment (kg)	kg	1,00			
Waste, packaging, plastic film (LDPE), to average treatment - A5 (kg)	kg	0,10			

Maintenance (B2)	Unit	Value			
Water, tap water (m3)	m3/DU	0,01			

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 %	85	0,043	l/tkm	3,66

Waste processing (C3)	Unit	Value			
Waste treatment per kg Polypropylene (PP), incineration with fly ash extraction - C3 (kg)	kg	0,10			
Waste treatment per kg Scrap steel, incineration with fly ash extraction (kg)	kg	3,13			
Waste treatment per kg Wood, incineration with fly ash extraction (kg)	kg	2,58			
Waste, materials to recycling (kg)	kg	1,06			

Disposal (C4)	Unit	Value			
Landfilling of ashes and residues from incineration of Scrap steel (kg)	kg	2,07			
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 Wood, process per kg ashes and residues (kg)	kg	0,03			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity, in Norway (MJ)	MJ	1,96			
Substitution of primary steel with net scrap (kg)	kg	0,85			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	29,61			

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	5,21E+00	9,50E-01	1,72E+00	3,45E-03	0
	GWP-fossil	kg CO_2 -eq	1,11E+01	9,49E-01	2,41E-02	3,43E-03	0
	GWP-biogenic	kg CO_2 -eq	-5,91E+00	3,63E-04	1,70E+00	2,16E-05	0
	GWP-luluc	kg CO_2 -eq	2,20E-02	3,89E-04	5,96E-06	5,58E-06	0
	ODP	kg CFC11 -eq	4,51E-07	2,10E-07	3,89E-09	3,04E-10	0
	AP	mol H+ -eq	3,75E-02	8,44E-03	8,64E-05	2,00E-05	0
	EP-FreshWater	kg P -eq	2,24E-04	6,79E-06	1,49E-07	2,74E-07	0
	EP-Marine	kg N -eq	9,37E-03	1,99E-03	3,43E-05	3,17E-06	0
	EP-Terrestial	mol N -eq	1,08E-01	2,22E-02	3,09E-04	3,69E-05	0
	POCP	kg NMVOC -eq	3,02E-02	6,34E-03	9,04E-05	1,16E-05	0
	ADP-minerals&metals[1]	kg Sb-eq	5,42E-05	2,22E-05	4,36E-07	9,59E-08	0
	ADP-fossil[1]	MJ	1,51E+02	1,39E+01	2,59E-01	5,86E-02	0
	WDP[1]	m^3	9,14E+02	1,16E+01	4,02E-01	1,05E+00	0

Indicator		**Unit**	B4	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	0	0	8,06E-02	4,60E+00	2,36E-02	-1,11E+00
	GWP-fossil	kg CO_2 -eq	0	0	8,05E-02	3,01E-01	2,36E-02	-1,11E+00
	GWP-biogenic	kg CO_2 -eq	0	0	3,33E-05	4,30E+00	1,76E-05	-8,70E-04
	GWP-luluc	kg CO_2 -eq	0	0	2,87E-05	9,39E-06	7,08E-06	-6,33E-03
	ODP	kg CFC11 -eq	0	0	1,82E-08	4,24E-09	7,25E-09	-1,25E-02
	AP	mol H+ -eq	0	0	2,31E-04	5,44E-04	1,66E-04	-6,06E-03
	EP-FreshWater	kg P -eq	0	0	6,43E-07	1,04E-06	2,36E-07	-7,28E-05
	EP-Marine	kg N -eq	0	0	4,58E-05	2,49E-04	5,91E-05	-1,42E-03
	EP-Terrestial	mol N -eq	0	0	5,12E-04	2,66E-03	6,55E-04	-1,48E-02
	POCP	kg NMVOC -eq	0	0	1,96E-04	6,79E-04	1,88E-04	-6,06E-03
	ADP-minerals&metals[1]	kg Sb-eq	0	0	2,22E-06	2,36E-07	4,05E-07	-1,78E-05
	ADP-fossil[1]	MJ	0	0	1,22E+00	4,19E-01	5,37E-01	-1,03E+01
	WDP[1]	m^3	0	0	1,18E+00	1,18E+00	1,08E+00	1,79E+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	9,71E-07	5,16E-08	1,31E-09	1,68E-10	0
	IRP[2]	kgBq U235 -eq	6,38E-01	6,06E-02	1,12E-03	4,05E-04	0
	ETP-fw[1]	CTUe	2,23E+02	9,89E+00	3,33E-01	6,34E-02	0
	HTP-c[1]	CTUh	1,24E-08	0,00E+00	1,00E-11	9,00E-12	0
	HTP-nc[1]	CTUh	1,03E-07	1,10E-08	4,08E-10	2,11E-10	0
	SQP[1]	dimensionless	6,02E+02	8,32E+00	2,09E-01	1,64E-02	0

Indicator		Unit	B4	C1	C2	C3	C4	D
	PM	Disease incidence	0	0	4,93E-09	9,77E-09	3,03E-09	-1,63E-07
	IRP[2]	kgBq U235 -eq	0	0	5,32E-03	9,58E-04	2,15E-03	-1,23E-02
	ETP-fw[1]	CTUe	0	0	9,03E-01	1,75E+00	3,20E-01	-6,55E+01
	HTP-c[1]	CTUh	0	0	0,00E+00	2,43E-10	1,10E-11	-4,74E-09
	HTP-nc[1]	CTUh	0	0	9,86E-10	5,39E-09	3,08E-10	8,49E-08
	SQP[1]	dimensionless	0	0	8,52E-01	7,72E-02	1,17E+00	-1,70E+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	1,03E+02	1,79E-01	4,55E-03	7,96E-03	0
	PERM	MJ	4,43E+01	0,00E+00	-8,20E+00	0,00E+00	0
	PERT	MJ	1,48E+02	1,79E-01	-8,20E+00	7,96E-03	0
	PENRE	MJ	1,45E+02	1,39E+01	2,59E-01	5,86E-02	0
	PENRM	MJ	7,53E+00	0,00E+00	-4,25E+00	0,00E+00	0
	PENRT	MJ	1,52E+02	1,39E+01	-3,99E+00	5,86E-02	0
	SM	kg	9,86E-01	0,00E+00	0,00E+00	0,00E+00	0
	RSF	MJ	2,62E-01	6,26E-03	1,45E-04	6,38E-04	0
	NRSF	MJ	1,41E-01	2,10E-02	5,66E-04	6,29E-04	0
	FW	m^3	1,37E-01	1,34E-03	1,24E-04	1,01E-02	0

Indicator		**Unit**	B4	C1	C2	C3	C4	D
	PERE	MJ	0	0	1,74E-02	1,63E-02	1,01E-02	-1,58E+01
	PERM	MJ	0	0	0,00E+00	-3,61E+01	0,00E+00	0,00E+00
	PERT	MJ	0	0	1,74E-02	-3,61E+01	1,01E-02	-1,58E+01
	PENRE	MJ	0	0	1,22E+00	4,19E-01	5,37E-01	-1,03E+01
	PENRM	MJ	0	0	0,00E+00	-3,28E+00	0,00E+00	0,00E+00
	PENRT	MJ	0	0	1,22E+00	-2,86E+00	5,37E-01	-1,03E+01
	SM	kg	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0	0	6,24E-04	3,52E-04	2,66E-04	3,11E-02
	NRSF	MJ	0	0	2,23E-03	0,00E+00	2,13E-02	8,40E-02
	FW	m^3	0	0	1,30E-04	7,28E-04	4,84E-04	-2,02E-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	5,47E-02	6,90E-04	0,00E+00	1,11E-05	0
	NHWD	kg	9,44E-01	5,63E-01	1,10E+00	7,11E-04	0
	RWD	kg	1,77E-03	9,51E-05	0,00E+00	3,43E-07	0

Indicator		Unit	B4	C1	C2	C3	C4	D
	HWD	kg	0	0	6,28E-05	0,00E+00	2,08E+00	-4,97E-03
	NHWD	kg	0	0	5,92E-02	0,00E+00	2,10E-02	-4,40E-01
	RWD	kg	0	0	8,29E-06	0,00E+00	3,28E-06	-1,03E-05

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	3,65E-01	0,00E+00	9,81E-01	0,00E+00	0
	MER	kg	9,99E-07	0,00E+00	6,99E-02	0,00E+00	0
	EEE	MJ	1,98E-01	0,00E+00	5,72E-02	0,00E+00	0
	EET	MJ	3,00E+00	0,00E+00	8,65E-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	1,06E+00	0,00E+00	0,00E+00
	MER	kg	0	0	0,00E+00	5,81E+00	0,00E+00	0,00E+00
	EEE	MJ	0	0	0,00E+00	2,04E+00	0,00E+00	0,00E+00
	EET	MJ	0	0	0,00E+00	3,09E+01	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	1,17E+00
Biogenic carbon content in accompanying packaging	kg C	4,63E-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	Data source	Amount	Unit
Electricity, Finland (kWh)	ecoinvent 3.6	255,20	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	5,21	0,95	12,59	11,48
Total energy consumption	MJ	248,61	14,11	265,30	239,29
Amount of recycled materials	%	14,27			

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	1,13E+01	9,50E-01	2,41E-02	3,45E-03	0

Indicator	Unit	B4	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	0	0	8,06E-02	3,01E-01	2,37E-02	-1,58E+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 (%)
Sola Universal chair with sled base and armrests	6,80	7,85	162,97	15,25
Sola Bar stool with upholstery and sled base	7,40	17,93	371,09	19,06
Sola Universal chair with upholstery and four leg base	6,63	20,98	331,18	17,55
Sola Universal chair with four leg base and castors, 98% recycled polyester upholstery	12,30	51,51	886,50	6,22
Sola Universal chair with four leg base and castors, 100% wool upholstery	12,30	83,88	1060,08	3,54

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