

Product

Product description:

The Ella universal chair with four leg base has a light and timeless appearance. The chair is available both without upholstery or with various upholstery and material options, and with raised seating height and long armrests. The chair is stackable and row-connectable, so Ella is excellently suited for various spaces, such as cafés, for example. In the plastic version, the raw material used for the plastic in the seats and backrests of the chairs is 100% recycled.

Product specification

Ella universal chair with four leg base

Seat and backrest: Laminate (white or black) or Veneer (oak, walnut, ash or stained ash)

Metal base: black, white, red, green, brown, greige, chrome or Inspiring Colours

Materials	kg	%	Recycled share in material (kg)	Recycled share in material (%)
Metal - Steel	2,69	61,55	0,53	19,73
Plastic - Polypropylene (PP)	0,16	3,67	0,00	0,00
Wood - Plywood	1,52	34,78	0,00	0,00
Total	4,36		0,53	

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	5,46		0,89	

Technical data:

Möbelfakta certified product

More product data available here:

<https://www.martela.com/furniture/seating/universal-chairs/ella-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 Ella Universal chairs

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
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) and fabrics can be chosen from our standard collection with Öko tex or EU ecolabel certificates. 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.

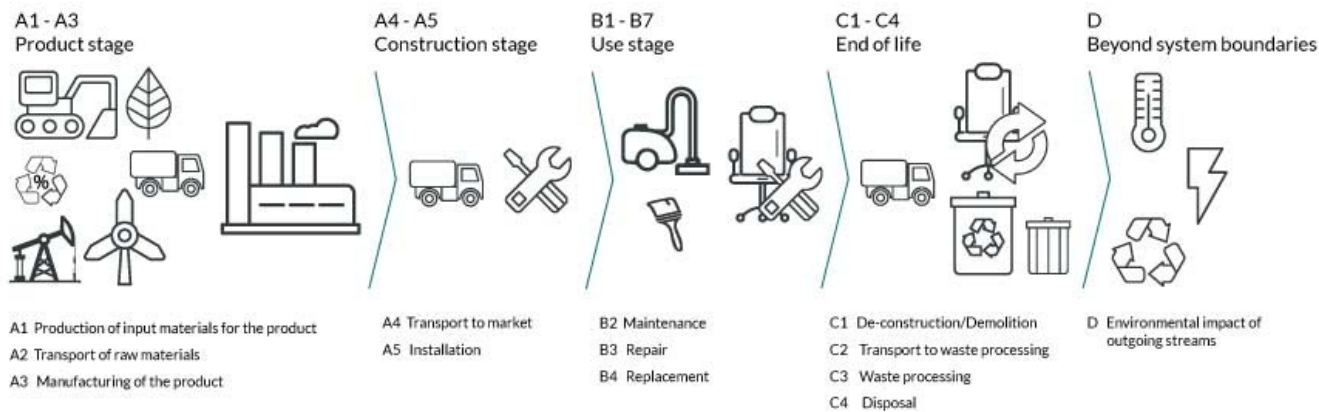
Product Stage / A2 Transport:

Transportation is calculated from suppliers location to our own factories in Nummela and Poland and between our factories when delivering components to final assembly phase in our logistics center in Nummela.

Product Stage / A3 Manufacturing:

Martela has two own factories for manufacturing these products. Poland factory is producing sewing and upholstery parts to chairs and screens. Production unit in Nummela make final assembly of the products based on customer orders.

Nummela factory is using renewable electricity and heating energy. From factory waste 98% is recycled. Poland factory is in rental premises and cannot choose its used energy, so in calculation we are using Poland average factors.



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 based on average transportation distances: in Scandinavia 1100 km incl. by ferry 300 km (between Turku - Stockholm).

Construction installation stage / A5 Assembly:

Martela products are partly assembled at customer premises. This assembling is done with hand tools and use of energy is minimal in this stage. Customer package is disposed in this stage automatically by the tool set-up, but our own installation teams take all waste back to our premises and packages are re-used (like pallets) or recycled as materials (included in A3 waste).

User stage / B1-B7:

Martela products do not require special maintenance. Cleaning with for example vacuuming and wet wiping is advice accordingly.

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. Product use life can be extended from that by re-furbishing upholstery parts.

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 of 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	0,16			
Waste treatment per kg Scrap steel, incineration with fly ash extraction (kg)	kg	2,69			
Waste treatment per kg Wood, incineration with fly ash extraction (kg)	kg	1,52			
Waste, materials to recycling (kg)	kg	0,91			
Disposal (C4)		Unit	Value		
Landfilling of ashes and residues from incineration of Scrap steel (kg)	kg	6,59			
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	0,02			
Benefits and loads beyond the system boundaries (D)		Unit	Value		
Substitution of electricity, in Norway (MJ)	MJ	1,32			
Substitution of primary steel with net scrap (kg)	kg	0,72			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	19,91			

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	5,90E+00	8,14E-01	1,72E+00	3,45E-03	0	
	GWP-fossil	kg CO ₂ -eq	1,00E+01	8,13E-01	2,41E-02	3,43E-03	0	
	GWP-biogenic	kg CO ₂ -eq	-4,15E+00	3,11E-04	1,70E+00	2,16E-05	0	
	GWP-luluc	kg CO ₂ -eq	1,75E-02	3,33E-04	5,96E-06	5,58E-06	0	
	ODP	kg CFC11 -eq	4,70E-07	1,80E-07	3,89E-09	3,04E-10	0	
	AP	mol H+ -eq	3,28E-02	7,23E-03	8,64E-05	2,00E-05	0	
	EP-FreshWater	kg P -eq	1,91E-04	5,81E-06	1,49E-07	2,74E-07	0	
	EP-Marine	kg N -eq	8,07E-03	1,71E-03	3,43E-05	3,17E-06	0	
	EP-Terrestrial	mol N -eq	9,14E-02	1,90E-02	3,09E-04	3,69E-05	0	
	POCP	kg NMVOC -eq	2,59E-02	5,43E-03	9,04E-05	1,16E-05	0	
	ADP-minerals&metals ¹	kg Sb-eq	5,83E-05	1,90E-05	4,36E-07	9,59E-08	0	
	ADP-fossil ¹	MJ	1,40E+02	1,19E+01	2,59E-01	5,86E-02	0	
	WDP ¹	m ³	7,67E+02	9,90E+00	4,02E-01	1,05E+00	0	

Indicator		Unit	B4	C1	C2	C3	C4	D
	GWP-total	kg CO ₂ -eq	0	0	6,91E-02	2,97E+00	7,16E-02	-9,16E-01
	GWP-fossil	kg CO ₂ -eq	0	0	6,90E-02	4,39E-01	7,16E-02	-9,11E-01
	GWP-biogenic	kg CO ₂ -eq	0	0	2,86E-05	2,53E+00	5,42E-05	-6,77E-04
	GWP-luluc	kg CO ₂ -eq	0	0	2,46E-05	7,00E-06	2,20E-05	-4,33E-03
	ODP	kg CFC11 -eq	0	0	1,56E-08	3,07E-09	2,27E-08	-8,41E-03
	AP	mol H+ -eq	0	0	1,98E-04	3,81E-04	5,15E-04	-4,91E-03
	EP-FreshWater	kg P -eq	0	0	5,51E-07	7,66E-07	7,05E-07	-5,92E-05
	EP-Marine	kg N -eq	0	0	3,92E-05	1,73E-04	1,84E-04	-1,13E-03
	EP-Terrestrial	mol N -eq	0	0	4,39E-04	1,85E-03	2,04E-03	-1,17E-02
	POCP	kg NMVOC -eq	0	0	1,68E-04	4,77E-04	5,87E-04	-4,91E-03
	ADP-minerals&metals ¹	kg Sb-eq	0	0	1,91E-06	1,75E-07	1,27E-06	-1,49E-05
	ADP-fossil ¹	MJ	0	0	1,04E+00	3,04E-01	1,67E+00	-8,35E+00
	WDP ¹	m ³	0	0	1,01E+00	8,79E-01	3,11E+00	2,07E+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	6,99E-07	4,42E-08	1,31E-09	1,68E-10	0
 IRP ²	kgBq U235 -eq	5,67E-01	5,19E-02	1,12E-03	4,05E-04	0
 ETP-fw ¹	CTUe	2,06E+02	8,47E+00	3,33E-01	6,34E-02	0
 HTP-c ¹	CTUh	8,75E-09	0,00E+00	1,00E-11	9,00E-12	0
 HTP-nc ¹	CTUh	9,34E-08	9,44E-09	4,08E-10	2,11E-10	0
 SQP ¹	dimensionless	3,89E+02	7,13E+00	2,09E-01	1,64E-02	0







Indicator	Unit	B4	C1	C2	C3	C4	D
 PM	Disease incidence	0	0	4,23E-09	7,36E-09	9,49E-09	-1,24E-07
 IRP ²	kgBq U235 -eq	0	0	4,56E-03	7,12E-04	6,68E-03	-7,69E-03
 ETP-fw ¹	CTUe	0	0	7,73E-01	1,40E+00	9,59E-01	-5,33E+01
 HTP-c ¹	CTUh	0	0	0,00E+00	1,89E-10	3,40E-11	-3,99E-09
 HTP-nc ¹	CTUh	0	0	8,45E-10	3,59E-09	8,73E-10	7,46E-08
 SQP ¹	dimensionless	0	0	7,30E-01	5,77E-02	3,63E+00	-1,15E+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	6,56E+01	1,54E-01	4,55E-03	7,96E-03	0	
	PERM	MJ	2,94E+01	0,00E+00	-8,20E+00	0,00E+00	0	
	PERT	MJ	9,50E+01	1,54E-01	-8,20E+00	7,96E-03	0	
	PENRE	MJ	1,32E+02	1,19E+01	2,59E-01	5,86E-02	0	
	PENRM	MJ	9,49E+00	0,00E+00	-4,25E+00	0,00E+00	0	
	PENRT	MJ	1,41E+02	1,19E+01	-3,99E+00	5,86E-02	0	
	SM	kg	8,90E-01	0,00E+00	0,00E+00	0,00E+00	0	
	RSF	MJ	2,62E-01	5,36E-03	1,45E-04	6,38E-04	0	
	NRSF	MJ	2,19E-01	1,80E-02	5,66E-04	6,29E-04	0	
	FW	m ³	1,14E-01	1,15E-03	1,24E-04	1,01E-02	0	

Indicator		Unit	B4	C1	C2	C3	C4	D
	PERE	MJ	0	0	1,49E-02	1,22E-02	3,02E-02	-1,07E+01
	PERM	MJ	0	0	0,00E+00	-2,12E+01	0,00E+00	0,00E+00
	PERT	MJ	0	0	1,49E-02	-2,12E+01	3,01E-02	-1,07E+01
	PENRE	MJ	0	0	1,04E+00	3,04E-01	1,67E+00	-8,35E+00
	PENRM	MJ	0	0	0,00E+00	-5,24E+00	0,00E+00	0,00E+00
	PENRT	MJ	0	0	1,04E+00	-4,94E+00	1,67E+00	-8,35E+00
	SM	kg	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0	0	5,34E-04	2,60E-04	8,01E-04	2,70E-02
	NRSF	MJ	0	0	1,91E-03	0,00E+00	4,34E-02	2,32E-01
	FW	m ³	0	0	1,12E-04	5,18E-04	1,51E-03	-1,40E-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	4,68E-02	5,91E-04	0,00E+00	1,11E-05	0	
	NHWD	kg	1,12E+00	4,82E-01	1,10E+00	7,11E-04	0	
	RWD	kg	1,54E-03	8,15E-05	0,00E+00	3,43E-07	0	
Indicator		Unit	B4	C1	C2	C3	C4	D
	HWD	kg	0	0	5,38E-05	0,00E+00	6,57E+00	-4,21E-03
	NHWD	kg	0	0	5,07E-02	0,00E+00	4,35E-02	-3,64E-01
	RWD	kg	0	0	7,11E-06	0,00E+00	1,03E-05	-6,45E-06

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

*Reading example: 9,0 E-03 = $9,0 \cdot 10^{-3}$ = 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	3,11E-01	0,00E+00	9,81E-01	0,00E+00	0	
	MER	kg	2,28E-01	0,00E+00	6,99E-02	0,00E+00	0	
	EEE	MJ	1,69E-01	0,00E+00	5,72E-02	0,00E+00	0	
	EET	MJ	2,56E+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	9,11E-01	0,00E+00	0,00E+00
	MER	kg	0	0	0,00E+00	4,36E+00	0,00E+00	0,00E+00
	EEE	MJ	0	0	0,00E+00	1,39E+00	0,00E+00	0,00E+00
	EET	MJ	0	0	0,00E+00	2,10E+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 = $9,0 \cdot 10^{-3}$ = 0,009"

*INA Indicator Not Assessed

Biogenic Carbon Content		
Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	6,90E-01
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 CO ₂ -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	5,90	0,81	11,55	10,63
Total energy consumption	MJ	197,87	12,09	213,42	194,60
Amount of recycled materials	%	16,28			

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	1,02E+01	8,14E-01	2,41E-02	3,45E-03	0

Indicator	Unit	B4	C1	C2	C3	C4	D
GWPIOBC	kg CO ₂ -eq	0	0	6,91E-02	4,39E-01	7,17E-02	-1,31E+00

GWPI-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 (%)
Ella with wooden legs and wooden seat and back	4,59	-4,83	188,69	6,34
Ella with sled base and with seat and back made of recycled plastic	5,13	11,35	185,01	37,62
Ella bar stool with wooden back and upholstered seat (98% recycled PE)	6,68	15,40	311,15	19,44
Ella with 4-leg base and castors, upholstered seat and back (98% recycled PE)	11,75	34,81	540,74	20,67
Ella with 5-star base and height adjustment, upholstered (98% recycled PE)	12,33	38,10	678,18	29,55

