

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Ekstrem™



Varier®

The Norwegian EPD Foundation

Owner of the declaration:

Varier Furniture AS

Product:

Ekstrem™

Declared unit:

1 kg

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR

NPCR 026:2018 Part B for furniture

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-4876-4132-EN

Registration number:

NEPD-4876-4132-EN

Issue date: 31.08.2023

Valid to: 31.08.2028

EPD Software:

LCA.no EPD generator ID: 69280

General information

Product

Ekstrem™

Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway
The Norwegian EPD Foundation
Phone: +47 23 08 80 00
web: post@epd-norge.no

Declaration number: NEPD-4876-4132-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 026:2018 Part B for furniture

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.

Declared unit:

1 kg Ekstrem™

Declared unit (cradle to gate) with option:

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

Functional unit:

A multi-seating, playful geometrics chair to sit comfortable on in different positions, while being a design object for the house.

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

Verification of EPD tool:

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

Third party verifier:

Elisabet Amat, GREENIZE projects

(no signature required)

Owner of the declaration:

Varier Furniture AS
Contact person: Michal Klecz
Phone: +47 70 24 43 50
e-mail: info@varierfurniture.com

Manufacturer:

Varier Furniture AS

Place of production:

Varier Furniture AS
Drammensveien 130
0277 Oslo, Norway

Management system:

Organisation no:

NO 989 804 804

Issue date: 31.08.2023

Valid to: 31.08.2028

Year of study:

2022

Comparability:

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

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: Michal Klecz

Reviewer of company-specific input data and EPD: Bo Quist

Approved:



Håkon Hauan, CEO EPD-Norge

Product

Product description:

Ekstrem™ is not merely a chair, but rather a stand-alone object. It represents one of Norway's first postmodern designs. Its unexpected geometrics allow you to sit forward with feet on the ground, sideways with legs placed on the armrests or completely backwards with the front of the torso against the chair's back. A sitting experience that can only be described as out of the ordinary.

Ekstrem™ consists of a steel frame covered in soft foam and woollen knit upholstery. It is available in six colorways in Knit, a bespoke woollen upholstery textile by Devold. Knitted from one continuous thread, it provides an elasticity which is essential when fitted to the chair's organic shape. The knitted fabric is soft and breathable and features a classic quadratic pattern.

Product specification

Designed by Terje Ekstrøm in 1984. More information on Ekstrem here:
www.varierfurniture.com/collection/ekstrem

Materials	kg	%	Recycled share in material (kg)	Recycled share in material (%)
Metal - Steel	8,67	68,40	0,00	0,00
Plastic - Acrylonitrile butadiene styrene (ABS)	0,00	0,03	0,00	0,00
Plastic - Polyurethane (PUR)	2,25	17,76	0,00	0,00
Textile - Cotton	1,75	13,81	0,00	0,00
Total	12,67		0,00	

Packaging	kg	%	Recycled share in material (kg)	Recycled share in material (%)
Packaging - Cardboard	7,25	98,64	2,61	36,00
Packaging - Plastic	0,10	1,36	0,00	0,00
Total incl. packaging	20,02		2,61	

Technical data:

Chair Measurement:

W 72 x D 70 x H 79 cm

Seat height: 43 cm

Market:

Global, mainly Europe.

Reference service life, product

Longevity is incorporated into Varier's core values. Upholstery and cushions can be replaced over time and Varier products can be passed on to the next generation. Varier offers an extended warranty of 7 years on wooden parts and 5 years on mechanisms. Lifetime is usually longer than 15 years.

Reference service life, building

LCA: Calculation rules

Declared unit:

1 kg Ekstrem™

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.

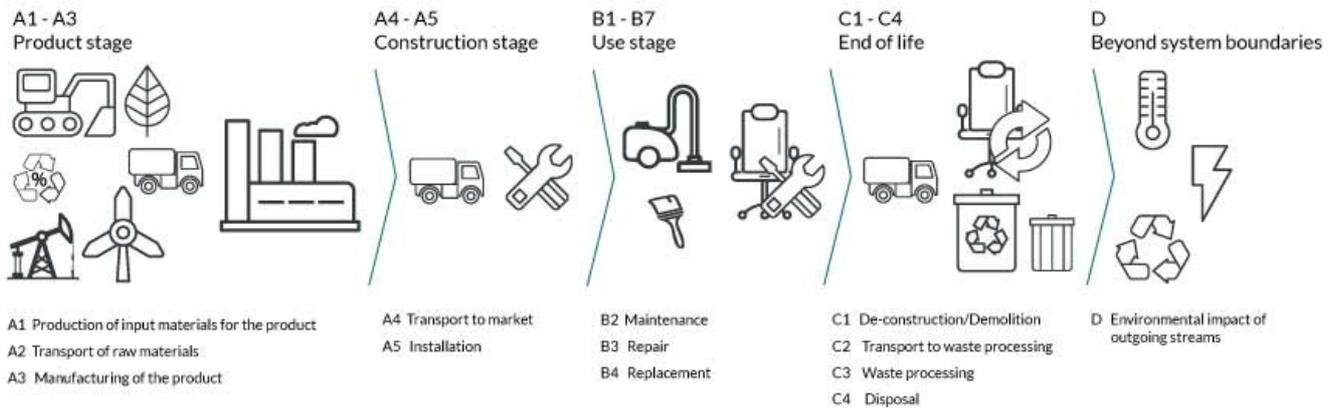
Materials	Source	Data quality	Year
Metal - Steel	ecoinvent 3.6	Database	2019
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Plastic - Acrylonitrile butadiene styrene (ABS)	ecoinvent 3.6	Database	2019
Plastic - Polyurethane (PUR)	ecoinvent 3.6	Database	2019
Textile - Cotton	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:

A1 (raw materials) to A4 (transport) - products are transported to consumers and assembled by consumers



Additional technical information:

LCA: Scenarios and additional technical information

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

After manufacturing the chairs are transported to our customers, and the customers assembles the chairs themselves. The chair is sold to homes all around the globe and used for generations. Varier currently has no standard refurbishment procedures.

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 %	1250	0,043	l/tkm	53,75
Assembly (A5)					
Unit	Value				
Waste, packaging, corrugated board box, to average treatment (kg)	kg	3,75			
Waste, packaging, plastic film (LDPE), to average treatment - A5 (kg)	kg	0,10			
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 %	55	0,043	l/tkm	2,37
Waste processing (C3)					
Unit	Value				
Waste treatment per kg Plastics, Mixture, municipal incineration with fly ash extraction (kg)	kg	0,00			
Waste treatment per kg Polyurethane (PU), incineration (kg)	kg	2,25			
Waste treatment per kg Scrap steel, incineration with fly ash extraction (kg)	kg	8,67			
Waste treatment per kg Textile, incineration with fly ash extraction (kg)	kg	1,75			
Waste, materials to recycling (kg)	kg	2,94			
Disposal (C4)					
Unit	Value				
Landfilling of ashes and residues from incineration of Scrap steel (kg)	kg	5,73			
Landfilling of ashes from incineration of Plastics, Mixture, municipal incineration with fly ash extraction, process per kg ashes and residues - C4 (kg)	kg	0,00			
Landfilling of ashes from incineration of Polyurethane (PU), process per kg ashes and residues - C4 (kg)	kg	0,09			
Landfilling of ashes from incineration of Textile, soiled, process per kg ashes and residues (kg)	kg	0,09			
Benefits and loads beyond the system boundaries (D)					
Unit	Value				
Substitution of electricity, in Norway (MJ)	MJ	4,75			
Substitution of primary steel with net scrap (kg)	kg	2,94			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	71,93			

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	7,08E+01	2,59E+00	6,43E+00	0	0	
GWP-fossil	kg CO ₂ -eq	8,26E+01	2,59E+00	6,86E-02	0	0	
GWP-biogenic	kg CO ₂ -eq	-1,35E+01	1,07E-03	6,37E+00	0	0	
GWP-luluc	kg CO ₂ -eq	1,63E+00	9,21E-04	2,07E-05	0	0	
ODP	kg CFC11 -eq	5,35E-06	5,86E-07	1,33E-08	0	0	
AP	mol H+ -eq	5,98E-01	7,44E-03	2,97E-04	0	0	
EP-FreshWater	kg P -eq	1,33E-02	2,07E-05	5,14E-07	0	0	
EP-Marine	kg N -eq	4,38E-01	1,47E-03	1,04E-04	0	0	
EP-Terrestrial	mol N -eq	1,38E+00	1,65E-02	1,06E-03	0	0	
POCP	kg NMVOC -eq	2,95E-01	6,30E-03	3,07E-04	0	0	
ADP-minerals&metals ¹	kg Sb -eq	1,88E-03	7,15E-05	1,52E-06	0	0	
ADP-fossil ¹	MJ	1,03E+03	3,91E+01	8,81E-01	0	0	
WDP ¹	m ³	2,73E+03	3,78E+01	1,19E+00	0	0	

Indicator	Unit	B4	C1	C2	C3	C4	D
GWP-total	kg CO ₂ -eq	0	0	1,14E-01	1,15E+01	6,89E-02	-3,67E+00
GWP-fossil	kg CO ₂ -eq	0	0	1,14E-01	6,12E+00	6,88E-02	-3,65E+00
GWP-biogenic	kg CO ₂ -eq	0	0	4,71E-05	5,36E+00	6,12E-05	-2,65E-03
GWP-luluc	kg CO ₂ -eq	0	0	4,05E-05	4,80E-05	2,00E-05	-1,58E-02
ODP	kg CFC11 -eq	0	0	2,58E-08	3,49E-08	2,03E-08	-3,04E-02
AP	mol H+ -eq	0	0	3,27E-04	5,74E-03	4,69E-04	-1,95E-02
EP-FreshWater	kg P -eq	0	0	9,10E-07	3,34E-06	7,05E-07	-2,36E-04
EP-Marine	kg N -eq	0	0	6,47E-05	3,15E-03	1,66E-04	-4,45E-03
EP-Terrestrial	mol N -eq	0	0	7,24E-04	3,03E-02	1,84E-03	-4,62E-02
POCP	kg NMVOC -eq	0	0	2,77E-04	7,27E-03	5,29E-04	-1,96E-02
ADP-minerals&metals ¹	kg Sb -eq	0	0	3,14E-06	1,39E-06	1,13E-06	-6,00E-05
ADP-fossil ¹	MJ	0	0	1,72E+00	2,96E+00	1,50E+00	-3,32E+01
WDP ¹	m ³	0	0	1,66E+00	8,11E+00	3,37E+00	9,35E+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	5,86E-06	1,58E-07	4,41E-09	0	0	
 IRP ²	kgBq U235 -eq	2,51E+00	1,71E-01	3,78E-03	0	0	
 ETP-fw ¹	CTUe	4,33E+03	2,90E+01	1,16E+00	0	0	
 HTP-c ¹	CTUh	2,78E-07	0,00E+00	3,50E-11	0	0	
 HTP-nc ¹	CTUh	2,04E-06	3,17E-08	1,45E-09	0	0	
 SQP ¹	dimensionless	1,19E+03	2,74E+01	6,26E-01	0	0	

Indicator	Unit	B4	C1	C2	C3	C4	D
 PM	Disease incidence	0	0	6,97E-09	3,36E-08	8,47E-09	-4,77E-07
 IRP ²	kgBq U235 -eq	0	0	7,52E-03	5,05E-03	6,06E-03	-2,65E-02
 ETP-fw ¹	CTUe	0	0	1,28E+00	1,90E+01	9,47E-01	-2,13E+02
 HTP-c ¹	CTUh	0	0	0,00E+00	8,42E-10	3,40E-11	-1,62E-08
 HTP-nc ¹	CTUh	0	0	1,39E-09	2,13E-08	9,79E-10	3,07E-07
 SQP ¹	dimensionless	0	0	1,20E+00	3,79E-01	3,30E+00	-4,19E+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	1,31E+02	5,60E-01	1,48E-02	0	0	
	PERM	MJ	9,10E+01	0,00E+00	-3,08E+01	0	0	
	PERT	MJ	2,22E+02	5,60E-01	-3,07E+01	0	0	
	PENRE	MJ	9,58E+02	3,91E+01	8,81E-01	0	0	
	PENRM	MJ	7,34E+01	0,00E+00	-4,25E+00	0	0	
	PENRT	MJ	1,03E+03	3,91E+01	-3,37E+00	0	0	
	SM	kg	2,71E+00	0,00E+00	0,00E+00	0	0	
	RSF	MJ	6,10E-01	2,00E-02	4,85E-04	0	0	
	NRSF	MJ	7,76E-01	7,16E-02	1,97E-03	0	0	
	FW	m ³	1,17E+01	4,18E-03	4,18E-04	0	0	

Indicator		Unit	B4	C1	C2	C3	C4	D
	PERE	MJ	0	0	2,46E-02	8,96E-02	2,98E-02	-3,90E+01
	PERM	MJ	0	0	0,00E+00	-3,15E+01	0,00E+00	0,00E+00
	PERT	MJ	0	0	2,46E-02	-3,14E+01	2,98E-02	-3,90E+01
	PENRE	MJ	0	0	1,72E+00	2,99E+00	1,50E+00	-3,32E+01
	PENRM	MJ	0	0	0,00E+00	-6,92E+01	0,00E+00	0,00E+00
	PENRT	MJ	0	0	1,72E+00	-6,62E+01	1,50E+00	-3,32E+01
	SM	kg	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0	0	8,82E-04	2,06E-03	7,85E-04	1,10E-01
	NRSF	MJ	0	0	3,15E-03	0,00E+00	4,15E-02	1,22E+00
	FW	m ³	0	0	1,84E-04	9,68E-03	1,36E-03	-5,12E-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	3,85E-01	2,02E-03	0,00E+00	0	0	
	NHWD	kg	1,64E+01	1,90E+00	3,85E+00	0	0	
	RWD	kg	2,50E-03	2,66E-04	0,00E+00	0	0	

Indicator		Unit	B4	C1	C2	C3	C4	D
	HWD	kg	0	0	8,88E-05	0,00E+00	5,76E+00	-1,71E-02
	NHWD	kg	0	0	8,37E-02	0,00E+00	9,90E-02	-1,46E+00
	RWD	kg	0	0	1,17E-05	0,00E+00	9,23E-06	-2,23E-05

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	0	
	MFR	kg	2,99E+00	0,00E+00	3,54E+00	0	0	
	MER	kg	5,65E-06	0,00E+00	2,62E-01	0	0	
	EEE	MJ	3,82E-01	0,00E+00	2,14E-01	0	0	
	EET	MJ	5,78E+00	0,00E+00	3,25E+00	0	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	2,94E+00	0,00E+00	0,00E+00
	MER	kg	0	0	0,00E+00	1,27E+01	0,00E+00	0,00E+00
	EEE	MJ	0	0	0,00E+00	4,63E+00	0,00E+00	0,00E+00
	EET	MJ	0	0	0,00E+00	7,00E+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	7,64E-01
Biogenic carbon content in accompanying packaging	kg C	3,36E+00

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, Poland (kWh)	ecoinvent 3.6	1060,47	g CO ₂ -eq/kWh

Dangerous substances

The product contains no substances on the REACH Candidate list or the Norwegian priority list at or above 100 ppm, 0,01 % by weight.

Indoor environment

Additional Environmental Information

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	8,59E+01	2,59E+00	0,00E+00	0	0	
Indicator	Unit	B4	C1	C2	C3	C4	D
GWPIOBC	kg CO ₂ -eq	0	0	1,14E-01	8,94E+00	7,45E-02	-5,27E+00

GWPIOBC: 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.

Key Environmental Indicators

Indicator	Unit	A1-A3	A4	A1-C4	A1-D
GWPtotal	kg CO ₂ -eq	70,77	2,59	91,46	87,79
Total energy consumption	MJ	1090,58	39,77	1137,66	1066,76
Amount of recycled materials	%	13,04			

Bibliography

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 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.
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 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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