

# VNA CHAIR

Design by Florian Hauswirth, 2018



# Furniture Footprint VNA CHAIR

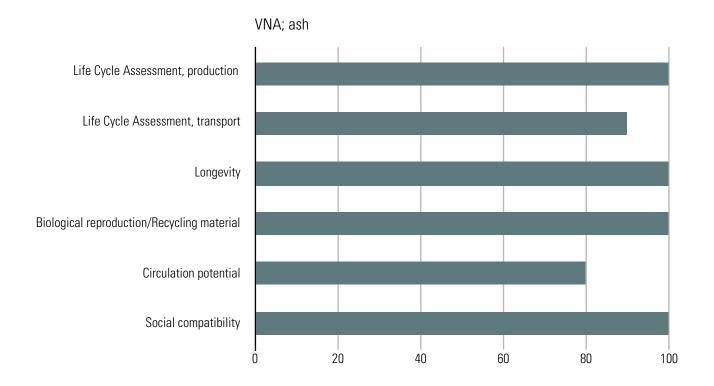
Design by Florian Hauswirth, 2018

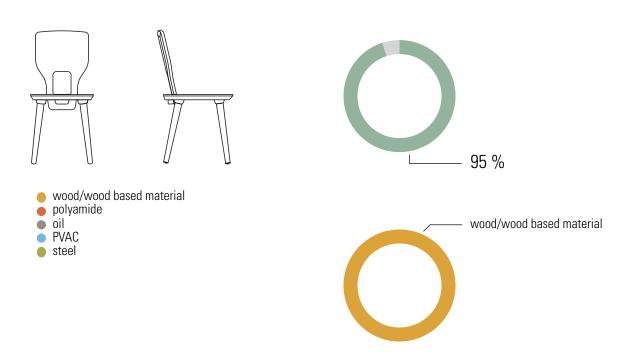
VNA CHAIR is a Stabelle, a chair made from planks inspired by traditional craftsmanship in the Alpine region. The name comes from a small mountain village in the Engadine, where designer Florian Hauswirth and ZEITRAUM met at the start of the project. In the mountain regions, everyday objects used to be made by local craftsmen or skilful farmers from locally available materials. Tables and chairs were made simply and solidly from planks and posts, sometimes decorated with ornaments.

ZEITRAUM furniture meets the highest quality and environmental standards and is primarily made of solid wood. All the materials we use come from responsible manufacturing and are for the most part sourced directly from Germany. The following describes the product: VNA CHAIR. Due to the proportion of renewable raw materials, among other things, ZEITRAUM products can contribute to a good rating in certification programmes for sustainable buildings, such as LEED. For more information, please do not hesitate to contact us at any time.

#### **Product details**

Product category	Chairs				
Weight	ca. 6,52 kg				
Certification	CATAS Test EN 1728:2	2012 + AC:2013 Level 1 – gene	eral		
Environmental deta	ils (wooden seat)				
Recycled content/ renewable raw materials	ca. 0,05 % recycled material (steel, share: 0,1 %, ø 50 % recycled content) ca. 99 % renewable materials				
Recyclability	ca. 0,1 % steel ca. 0,1 % polyamide ca. 99,8 % wood (waste wood category 2)				
Repairability	Due to the modular construction and the use of solid wood, the furniture can be repaired and refurbished almost indefinitely. We will be happy to assist with spare parts and service where necessary and possible.				
Manufacturing deta	ils				
Furniture element	Production site	Production partner since	Visited by ZEITRAUM	Code of Conduct signed	
Frame	Bavaria, Germany	2012	Yes	Yes	
Seat	Bavaria, Germany	2012	Yes	Yes	
Packaging					
Flatpack	No				
Two pieces of furnitur	e can be packed in one box				
Warehouse					
Country		Federal state	Federal state		
Germany		Bavaria			

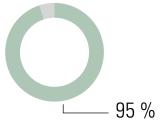




VNA; ash	Material/Product rating					
	Ash	РА	Natural oil, Osmo	PVAC	Steel	Weighted rating, %
Life Cycle Assessment, production	10	3	5	10	5,33	99,7893 %
Life Cycle Assessment, transport	9	6,5	9	6,5	4	89,8755 %
Longevity	10	8	10	9	10	99,939 %
Biological reproduction/ Recycling material	10	0	6	0	6	99,7 %
Circulation potential	8	10	10	4	10	80,012 %
Social compatibility	10	9	10	9	8	99,931 %
Average rating, ø	9,5	6,083	8,333	6,416	7,221	Total weight
Share in kg	6,5	0,008	0,007	0,005	0,007	6,527
Share in %	99,58 %	0,12 %	0,1 %	0,07 %	0,1 %	
Weighted rating	9,46	0,007	0,008	0,004	0,007	
Product rating in %	94,86					

Packaging	Material/Product rating		
	Cardboard	Weighted rating, %	
Life Cycle Assessment, production	10	100 %	
Life Cycle Assessment, transport	9	90 %	
Longevity	4	40 %	
Biological reproduction/Recycling material	9	90 %	
Circulation potential	10	100 %	
Social compatibility	10	100 %	
Average rating, ø	8,666	Total weight	
Share in kg	3	3	
Share in %	100 %		
Weighted rating	8,666		
Product rating in %	86,66		

## 1 Ash



**Tab. 1 A**: Material data sheet, ash, general  $^{12}$ 

Material group	Natural material; wood; hardwood
Botanical name	Fraxinus excelsior (Oleaceae)
Name	Common Ash (GB); Gemeine Esche (D); Frêne commun (F)
Material Norm. Ref.	DIN EN 13556: ACPL
Origin	Germany, (Central Europe)
Occurrence	Europe to central Russia, Near East Prefers fresh to moist soils, but also grows well on rocky terrain and dry limestone soils, as well as on plains and in mountainous areas
Use	Veneer; especially cut and peeled wood; furniture making; paneling; parquet and construction wood for medium demands, special construction for sports equipment, boat building, etc.

<sup>&</sup>lt;sup>1</sup> WAGENFUEHR, R. (2007) - Wood Atlas. (6) Leipzig: Hanser Wirtschaft, Fachbuchverlag Leipzig, pp. 279-285

 $<sup>^2</sup>$  LOHMANN, U. (2010) - Wood encyclopedia. The standard work for wood and forestry. (4) Hamburg: Nikol-Verlag, pp. 321-322

Tab. 1 B: Material data sheet, ash, specific<sup>3</sup>

Certifications/Information	FSC and PEFC on request	
Life cycle assessment data hardw	ood, average (GER)	10
Resource input per kg	A1-A3	
Total non-renewable primary energy (PENRT)	2,18 MJ	10
Use of freshwater resources (FW)	0,00048 m <sup>3</sup>	10
Environmental impact per m³	A1-A3	
Global Warming Potential (GWP)	-1,74 Kg CO <sub>2</sub> -eqv.	10
Environmental impact Transport, p	er 1000 kgkm (720 kg/m³)	9
Production site: Germany/ZEITRAL	JM	
Truck - ca. 300 km	A4	10
Total non-renewable primary energy (PENRT)	362,4 MJ	
Use of freshwater resources (FW)	0,019164 m <sup>3</sup>	
Global Warming Potential (GWP)	26,907 Kg CO <sub>2</sub> -eqv.	
Main raw material origin: German	y, Central Europe/Production site	
Truck - ca. 1500 km	A4	8
Total non-renewable primary energy (PENRT)	1812 MJ	
Use of freshwater resources (FW)	0,09582 m³	
Global Warming Potential (GWP)	134,535 Kg CO <sub>2</sub> -eqv.	
Sustainability Assessment		
Longevity	Very durable/repairable (> 20 years)	10
Biological reproduction/ recycled material	100 %	10
Circulation potential	70 % - 99 % (technological/recycling)	8
Socially compatible	Yes	10
Total average rating		9,5
Processing		
Mechanical	Good; woods with higher bulk density tend to tear out when planed; can be cut and peeled	
	can be cut and period	
Drying	Good; technical drying is preferable	

<sup>&</sup>lt;sup>3</sup> BMI 2021: Oekobaudat. Database <a href="https://www.oekobaudat.de/no\_cache/en/database/search.html">https://www.oekobaudat.de/no\_cache/en/database/search.html</a> Accessed, on 10/27/2021

Surface finishing	Good; can be stained and varnished
Natural durability DIN EN 350-2	Low, especially outdoors; not weather-resistant; however, fairly resistant to alkalis and acids; durability class 5
Physical properties	
Kiln density (0 % wood moisture content)	410 650 820 kg/m³
Bulk density (12 - 15 % wood moisture)	450 720 860 kg/m³
Pore ratio	ca. 57 %
Shrinkage rate at 1 % moisture reduction	radial - 0,13 %; tangetial - 0,72 %; volume - 0,43-0,45 %
Mechanical properties	
Compressive strength ( $\sigma_{ exttt{dB}}$ )	23 52 80 N/mm²
Flexural strength ( $\sigma_{bB}$ )	58 105 210 N/mm²
Tensile strength ( $\sigma_{zB}$   )	70 165 293 N/mm²
Tensile strength ( $\sigma_{zB} \perp$ )	7 11,2 N/mm²
Shear strength ( <b>T</b> aB)	9 12 14,6 N/mm²
Hardness (HB   )	36 65 100 N/mm²
Hardness (HB ⊥)	37 41 N/mm²
E-modulus (E <sub>b</sub>   )	4400 13400 18100 N/mm²

# 2 Steel



**Tab. 2 A**: Material data sheet, steel, general<sup>4</sup>

Material group	Natural material; metals; transition metals
Parts origin	n.a.
Occurrence	Worldwide; South America, Western Australia, China and Eastern Europe, Canada
Use	According to application: building structural and tool steel, structural steel for machinery, vehicle and shipbuilding or mechanical engineering; line pipe, pressure vessel, etc.; handicraft and design; furniture making

<sup>&</sup>lt;sup>4</sup> KALWEIT, A., a.o. (2012) - Handbook of Technical Product Design, Materials and Manufacturing - Decision Bases for Designers and Engineers (2) Berlin: Springer-Verlag Berlin Heidelberg GmbH

**Tab. 2 B**: Material data sheet, steel, specific<sup>56</sup>

-		
Certifications/Information	n.a.	
Emission class (formaldehyde)	Formaldehyde free	
Surface	smooth, hard	
Color	Grey	
Life cycle assessment data Steel p	profile, (GER)	5,33
Resource input per kg	A1-A3	
Total non-renewable primary energy (PENRT)	10,99 MJ	4
Use of freshwater resources (FW)	0,002314 m <sup>3</sup>	4
Environmental impact per kg	A1-A3	
Global Warming Potential (GWP)	0,9944 Kg CO <sub>2</sub> -eqv.	8
Environmental impact Transport, p	er 1000 kgkm (7850 kg/m³)	4
Production site: Europe/ZEITRAUN	1	
Truck ø - ca. 1500 km	A4	8
Total non-renewable primary energy (PENRT)	1812 MJ	
Use of freshwater resources (FW)	0,09582 m <sup>3</sup>	
Global Warming Potential (GWP)	134 Kg CO <sub>2</sub> -eqv.	
Main raw material origin: China/p	roduction location	0
Truck - ca. 2000 km	A4	
Total non-renewable primary energy (PENRT)	2416 MJ	
Use of freshwater resources (FW)	0,12776 m <sup>3</sup>	
Global Warming Potential (GWP)	179,38 Kg CO₂-eqv.	
Container ship - ca. 10000 km	A4	
Total non-renewable primary energy (PENRT)	1094 MJ	
Use of freshwater resources (FW)	0,005636 m³	
Global Warming Potential (GWP)	90,11 Kg CO <sub>2</sub> -eqv.	
Sustainability Assessment		

 $<sup>^{5}\,</sup>BMI\,2021:\,Oekobaudat.\,Database\,< https://www.oekobaudat.de/no\_cache/en/database/search.html>\,Accessed,\,on\,10/27/2021$ 

 $<sup>^{6}\,</sup>MATERIALARCHIV\,(2019)-Material archiv\,< http://www.material archiv.ch/app-tablet/\#search>\,Accessed,\,on\,03/01/2019$ 

Longevity	Very durable/repairable (> 20 years)	10
Biological reproduction/ recycled material	50 - 60 %	6
Circulation potential	100 % (technological)	10
Socially compatible	Yes	8
Total average rating		7,22
Notes	The life cycle assessment of iron improves the more often the material has been recycled or the proportion of recycled material increases	

# 3 Polyamide



**Tab. 3 A**: Material data sheet, polyamide, general<sup>7</sup>

Material group	Synthetic material; plastic
Name	Polyamide (GB, US); Polyamid (D)
Short name	PA
Manufactured in	Germany (GER)
Use	Machine and equipment construction; vehicle construction; electrical engineering; furniture construction

 $<sup>^{7}</sup>$  KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

**Tab. 3 B**: Material data sheet, polyamide, specific<sup>89</sup>

•		
Certifications/Information	n.a.	
Delivery forms	Granules, fibers, pipes, films, molded parts	
Color	Available in all colors	
Life cycle assessment data Nylon	casting (PA 6.6) (GER)	3
Resource input per kg	A1-A3	
Total non-renewable primary energy (PENRT)	251,7 MJ	0
Use of freshwater resources (FW)	0,04378 m <sup>3</sup>	10
Environmental impact per kg	A1-A3	
Global Warming Potential (GWP)	16,91 Kg CO <sub>2</sub> -eqv.	0
Environmental impact Transport, p	per 1000 kgkm (1140 kg/m³)	6,5
Production site: Germany/ZEITRAL	JM	
Truck - ca. 500 km	A4	10
Total non-renewable primary energy (PENRT)	604 MJ	
Use of freshwater resources (FW)	0,03194 m³	
Global Warming Potential (GWP)	44,845 Kg CO <sub>2</sub> -eqv.	
Main raw material origin: n.a./pro	duction site	
n.a ø > 7000 km	A4	3
Total non-renewable primary energy (PENRT)	8456 MJ	
Use of freshwater resources (FW)	0,44716 m <sup>3</sup>	
Global Warming Potential (GWP)	627,83 Kg CO <sub>2</sub> -eqv.	
Sustainability Assessment		
Longevity	Very durable (> 20 years)	8
Biological reproduction/ recycled material	0 %	0
Circulation potential	100 % (technological)	10
Socially compatible	Yes	9
Total average rating		6,08
Processing		

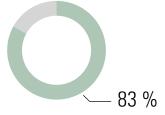
<sup>&</sup>lt;sup>8</sup> BMI 2021: Oekobaudat. Database <a href="https://www.oekobaudat.de/no\_cache/en/database/search.html">https://www.oekobaudat.de/no\_cache/en/database/search.html</a> Accessed, on 10/27/2021

<sup>&</sup>lt;sup>9</sup> MATERIALARCHIV (2019) - Materialarchiv <a href="http://www.materialarchiv.ch/app-tablet/#search">http://www.materialarchiv.ch/app-tablet/#search</a> Accessed, on 03/01/2019

Mechanically	Very good; with conventional plastic processing machines; drilling, sawing; milling; etc.	
Adhesion	Good; with adhesives for low-energy plastics	
Surface processing	Brushing; Sanding; Painting; Oiling; Embossing	
Resistance	Easy care; water resistant; resistant to fungi and insects	
Properties		
Elongation at break	50,0 %	
Density	1140 kg/m³	
Moisture absorption	2,5 - 3,5 %	
Dielectric strength	25 kV/mm	
Notched impact strength (Charpy)	3,0 kJ/m²	
Thermal properties		
Vicat softening temperature according to DIN EN ISO 306 Vicat B/50	250 °C	
Continuous operating temperature	-30 bis 95 °C	



# 4 Osmo, wood wax finish transparent



**Tab. 4 A**: Material data sheet, Osmo, wood wax finish transparent, general<sup>10</sup>

Material group	Coating materials; Oils
Name	Wood wax finish transparent (GB, US); Dekorwachs transparent (D)
Manufacturer	Osmo Holz und Color GmbH & Co. KG
Manufactured in	Germany (GER)
Version	Osmo Wood Wax Finish Transparent 3111 (white)
Use	Highly recommended for furniture and children's toys, flooring, walls, ceilings, doors, mouldings, beams and edge-glued panels. Wood Wax Finish results in a water and dirt-resistant surface. It is wipe-proof and stain-resistant

<sup>&</sup>lt;sup>10</sup> Osmo (2022) - Osmo Wood Wax Finish Transparent 3111 <a href="https://www.osmo.de">https://www.osmo.de</a> Accessed, on 05/31/2022

Tab. 4 B: Material data sheet, Osmo, wood wax finish transparent, specific1112

Certifications/Information	ISO 9001, ISO 14001, ISO 18001	
Emission class (formaldehyde)	Formaldehyde-free	
VOC's	< 400 g/l (volatile components emit during curing)	
Delivery forms	Liquid	
Color	Available in 25 color variations	
Texture	Glossy to matt (cured)	

#### **Contents**

50 - 60 % solids

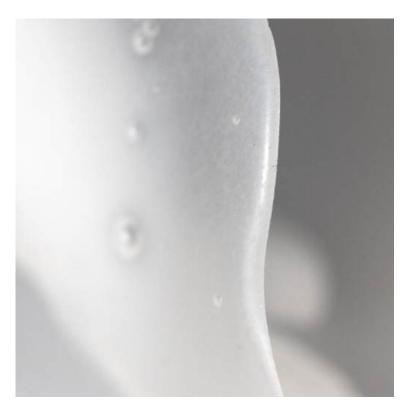
Based on natural vegetable oils (sunflower oil, soybean oil, safflower oil) and waxes, kerosenes, egg mustard and organic pigments, titanium dioxide (white pigment), siccatives (drier) and water-repellent additives. De-aromatized white spirit (ben-zole free). EU limit value for the product (cat. 1.e): 400 g/l VOC (2010). This product contains max. 400 g/l VOC

Life cycle assessment data Osmo,	wood wax finish (GER)	5
Resource input per kg	A1-A3	
Total non-renewable primary energy (PENRT)	n.a.	
Use of freshwater resources (FW)	n.a.	
Environmental impact per kg	A1-A3	
Global Warming Potential (GWP)	n.a.	
Environmental impact Transport, p	er 1000 kgkm	9
Production site: Germany/ZEITRAL	JM	
Truck - ca. 200 km	A4	10
Total non-renewable primary energy (PENRT)	172,12 MJ	
Use of freshwater resources (FW)	0,012106 m <sup>3</sup>	
Global Warming Potential (GWP)	12,822 Kg CO <sub>2</sub> -eqv.	
Main raw material origin: n.a./pro	duction site	
n.a ø 3000 km	A4	8
Total non-renewable primary energy (PENRT)	3624 MJ	
Use of freshwater resources (FW)	0,19164 m <sup>3</sup>	
Global Warming Potential (GWP)	296,07 Kg CO <sub>2</sub> -eqv.	
Sustainability Assessment	1	
Longevity	Very durable/repairable (> 20 years, with good care)	10

 $<sup>^{11}\</sup> BMI\ 2021:\ Oekobaudat.\ Database < https://www.oekobaudat.de/no\_cache/en/database/search.html>\ Accessed,\ on\ 10/27/2021$ 

<sup>&</sup>lt;sup>12</sup> MATERIALARCHIV (2019) - Materialarchiv <a href="http://www.materialarchiv.ch/app-tablet/#search">http://www.materialarchiv.ch/app-tablet/#search</a> Accessed, on 03/01/2019

Biological reproduction/	51 - 60 %	6
recycled material		0
Circulation potential	100 % (biodegradable)	10
Socially compatible	Yes	10
Total average rating		8,33
Processing		
Application	With brush, spatula or spray gun	
Storage	Can be stored up to 5 years with tight closure	
Properties		
Density	0,9 - 1,3 g/cm <sup>3</sup>	
Viscosity	Thixotropic, creamy	
Consistency	Medium viscosity	
Moisture resistance	Good	
Notes	Number of coats: for a transparent finish, one coat, for an intenstively coloured surface, apply two coats	



# 5 PVAc dispersion adhesive, D3



Tab. 5 A: Material data sheet, PVAc dispersion adhesive, D3, general 1314

Material group	Synthetic material; adhesives; dispersion adhesives
Name	Dispersion Adhesive (GB, US); Dispersionsklebstoff, PVAc-(Polyvinylacetat) Klebstoffe, Weißleim (D)
Manufacturer	Kleiberit Klebstoffe GmbH
Manufactured in	Germany (GER)
Version	Kleiberit 303, D3-adhesive
Use	Furniture construction; especially for interiors; staircase construction, ship interior finishing; surface bonding of HWS; door and window production

<sup>13</sup> KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

<sup>&</sup>lt;sup>14</sup> KEIBERIT (2019) - KLEIBERIT 303, D3, PVAC Adhesive <a href="https://interior-construction.kleiberit.com/fileadmin/Content/Documents/DE/Infoblaetter/303\_D3\_Leim\_D.pdf">https://interior-construction.kleiberit.com/fileadmin/Content/Documents/DE/Infoblaetter/303\_D3\_Leim\_D.pdf</a> Accessed, on 02/03/2019

Tab. 5 B: Material data sheet, PVAc dispersion adhesive, D3, specific 1516

Certifications/Information	ISO 9001, ISO 14001, ISO 50001	
Emission class (formaldehyde)	Formaldehyde-free	
Delivery forms	Liquid	
Color	Whitish (transparent in cured form)	
Texture	Glossy	
Life cycle assessment data Disper	rsion-based solvent-free adhesives, coatings and sealants (GER)	10
Resource input per kg	A1-A3	
Total non-renewable primary energy (PENRT)	26,7 MJ	10
Use of freshwater resources (FW)	0,00758 m <sup>3</sup>	10
Environmental impact per kg	A1-A3	
Global Warming Potential (GWP)	0,955 Kg CO <sub>2</sub> -eqv.	10
Environmental impact Transport, p	per 1000 kgkm	6,5
Production site: Germany/ZEITRAL	UM	
Truck - ca. 200 km	A4	10
Total non-renewable primary energy (PENRT)	172,12 MJ	
Use of freshwater resources (FW)	0,012106 m <sup>3</sup>	
Global Warming Potential (GWP)	12,822 Kg CO <sub>2</sub> -eqv.	
Main raw material origin: n.a./pro	duction site	
n.a ø > 7000 km	A4	3
Total non-renewable primary energy (PENRT)	8456 MJ	
Use of freshwater resources (FW)	0,44716 m <sup>3</sup>	
Global Warming Potential (GWP)	627,83 Kg CO <sub>2</sub> -eqv.	
Sustainability Assessment		
Longevity	Very durable/moderately repairable (> 20 years)	9
Biological reproduction/ recycled material	0 %	0
Circulation potential	Only thermally recyclable	4
Socially compatible	Yes	9

 $<sup>^{15}\,</sup>BMI\,\,2021:\,Oekobaudat.\,Database\,< https://www.oekobaudat.de/no\_cache/en/database/search.html>\,Accessed,\,on\,\,10/27/2021\,.$ 

<sup>&</sup>lt;sup>16</sup> MATERIALARCHIV (2019) - Materialarchiv <a href="http://www.materialarchiv.ch/app-tablet/#search">http://www.materialarchiv.ch/app-tablet/#search</a> Accessed, on 03/01/2019

Total average rating		6,41
Processing		
Adhesion	With brush, spatula or glue roller	
Properties		
Density	1,1 g/cm <sup>3</sup>	
PH level	3	
Consistency	Medium viscosity	
Moisture resistance	D3	
Heat resistance	Up to 120 °C	
Notes	PVAc adhesive is available solvent-free and solvent-based	



# 6 Cardboard, chairs



Tab. 6 A: Cardboard, chairs, general

Material group	Packaging
Name	Cardboard (GB, US); Karton (D)
Manufacturer	Schuhmacher Packaging GmbH
Manufactured in	Germany (GER)
Use	Packaging material for the production of cardboard boxes

Tab. 6 B: Cardboard chairs, specific<sup>1718</sup>

Certifications/Information	ISO 9001, ISO 50001, DIN ISO 22000, DIN EN ISO 14001, EMAS, ISO 28000;2007, FSC	
Color	Brown	
Texture	matt	
Contents		
85 %	Recycled paper	
15 %	Primary raw material	
Life cycle assessment data "Kraft	papier" (GER)	10
Resource input per kg	A1-A3	
Total non-renewable primary energy (PENRT)	5,888 MJ	
Use of freshwater resources (FW)	0,004899 m³	
Environmental impact per kg	A1-A3	
Global Warming Potential (GWP)	-0,8973 Kg CO <sub>2</sub> -eqv.	
Environmental impact Transport, p	er 1000 kgkm	9
Production site: Germany/ZEITRAL	JM	
Truck - ca. 200 km	A4	10
Total non-renewable primary energy (PENRT)	172,12 MJ	
Use of freshwater resources (FW)	0,012106 m <sup>3</sup>	
Global Warming Potential (GWP)	12,822 Kg CO <sub>2</sub> -eqv.	
Main raw material origin: German	y, Central Europe/Production site	
Truck - ca. 1500 km	A4	8
Total non-renewable primary energy (PENRT)	1812 MJ	
Use of freshwater resources (FW)	0,09582 m³	
Global Warming Potential (GWP)	134,535 Kg CO <sub>2</sub> -eqv.	
Sustainability Assessment		
Longevity	Moderately durable/repairable (< 10 years)	4
Biological reproduction/ recycled material	85 %	9

<sup>17</sup> BMI 2021: Oekobaudat. Database <a href="https://www.oekobaudat.de/no\_cache/en/database/search.html">https://www.oekobaudat.de/no\_cache/en/database/search.html</a> Accessed, on 10/27/2021

<sup>&</sup>lt;sup>18</sup> MATERIALARCHIV (2019) - Materialarchiv <a href="http://www.materialarchiv.ch/app-tablet/#search">http://www.materialarchiv.ch/app-tablet/#search</a> Accessed, on 03/01/2019

Circulation potential	100 % (technological)	10
Socially compatible	Yes	10
Total average rating		8,66
Disposal note	Waste paper	

# Information on all materials used by ZEITRAUM can be found in our material library at:

www.zeitraum-moebel.com

**Important note**: Our Furniture Footprint product data sheets have no scientific claim and are to be understood as a guide for our customers and us. All data are marked with corresponding source information. The contents of our Furniture Footprint product database have been compiled with the utmost care. However, we do not guarantee the accuracy, completeness and timeliness of the content, so we do not assume any liability for incorrect, outdated or incomplete information.