

**ZEITRAUM**

# OKITO

Design by Läufer & Keichel, 2018



# Furniture Footprint

## OKITO

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OKITO – aesthetic material connection in minimalist form. The heart of this minimalist chair is the solid wood seat. With its CNC-milled form, the solid wood seat anchors the chair frame and backrest. The brackets are simply bolted to the underside and are not visible from above. The connection of the backrest is achieved without visible fixings, creating a strikingly simple silhouette – a key feature to the OKITO family.

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: OKITO. 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. 5,6 kg			
<b>Certification</b>	CATAS Test EN 1728:2012 + AC:2013 Level 1 – general			

### Environmental details (wooden seat)

Recycled content/ renewable raw materials	ca. 27,5 % recycled material (steel, share: 57 %, ø 50 % recycled content) ca. 41,3 % renewable materials			
Recyclability	ca. 42 % wood (waste wood category 2) ca. 57 % steel ca. 1 % plastic			
Repairability	Moderately repairable. We will be happy to assist with spare parts and service where necessary and possible.			

### Manufacturing details

Furniture element	Production site	Production partner since	Visited by ZEITRAUM	Code of Conduct signed
Metal frame	Turkey	2018	Yes	Yes
Seat	North Rhine- Westphalia, Germany	2008	Yes	Yes

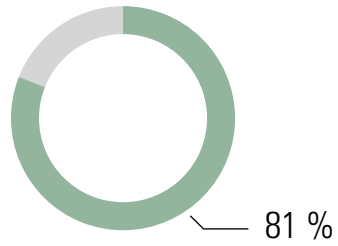
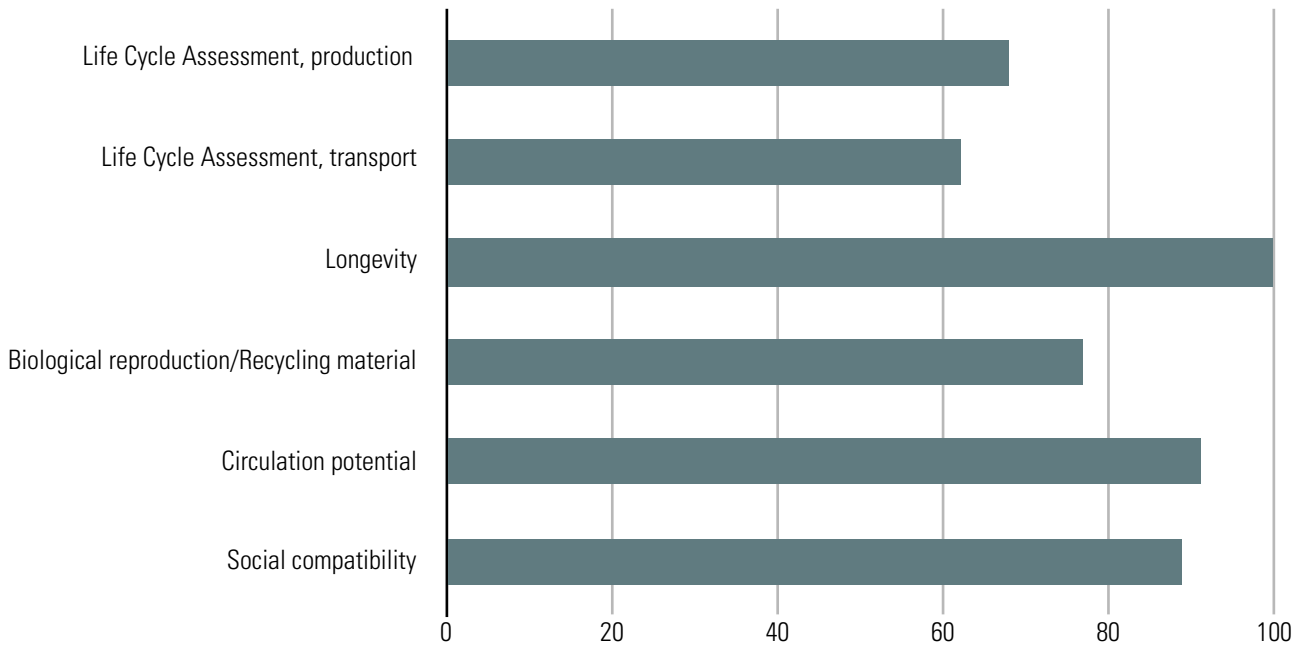
### Packaging

Flatpack	On request
Two pieces of furniture can be packed in one box	

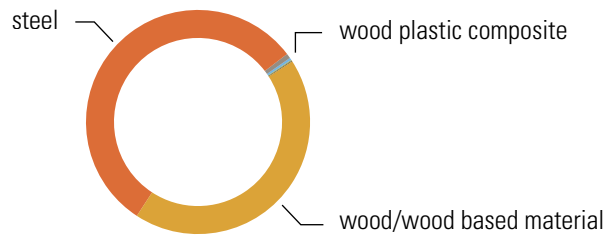
### Warehouse

Country	Federal state
Germany	North Rhine-Westphalia

OKITO, wooden seat; oak



- wood/wood based material
- steel
- wood plastic composite
- PA
- natural oil
- PVAC adhesive



■ 2x Two chairs packable in one box

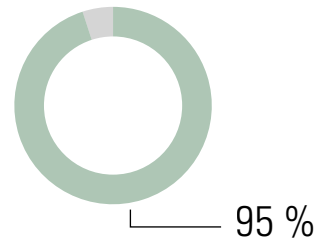
▬ Flat pack (possible)

<b>OKITO, wooden seat; oak</b>	Material/Product rating						
	Oak	Steel	Wood plastic Composite	Plastic, PA	Natural oil, Osmo	PVAC	Weighted rating, %
Life Cycle Assessment, production	10	4,3	7	3	5	10	67,8863 %
Life Cycle Assessment, transport	9	4	7,66	6,5	9	6,5	62,06954 %
Longevity	10	10	8	8	10	9	99,762 %
Biological reproduction/ Recycling material	10	6	5	0	6	0	76,959 %
Circulation potential	8	10	7	10	10	4	91,043 %
Social compatibility	10	8	10	9	10	9	88,852 %
Average rating, $\bar{\sigma}$	9,5	7,05	7,443	6,083	8,333	6,416	Total weight
Share in kg	2,5	3,2	0,04	0,02	0,008	0,007	5,775
Share in %	43,29 %	55,41 %	0,69 %	0,34 %	0,13 %	0,12 %	
Weighted rating	4,112	3,906	0,051	0,02	0,01	0,007	
<b>Product rating in %</b>	<b>81,06</b>						

<b>Packaging</b> (two chairs packable in one box)	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, $\bar{\sigma}$	8,666	Total weight
Share in kg	3,4	3,4
Share in %	100 %	
Weighted rating	8,666	
<b>Product rating in %</b>	<b>86,66</b>	



## 1 Oak



**Tab. 1 A:** Material data sheet, oak, general<sup>12</sup>

Material group	Natural material; wood; hardwood
Botanical name	<i>Quercus robur L./Q. patrea Liebl. (Fagaceae)</i>
Name	European Oak (GB, US); Eiche (D), Sommereiche (D); Chêne (F)
Material Norm. Ref.	DIN EN 13556: QCXE
Origin	Germany, (Central Europe)
Occurrence	Europe to Asia Minor; North America; most common European occurrence in France
Use	Solid and veneer, mainly sliced veneer; furniture and interior fittings; paneling and parquet; structural timber, etc.

<sup>1</sup> WAGENFUEHR, R. (2007) - Wood Atlas. (6) Leipzig: Hanser Wirtschaft, Fachbuchverlag Leipzig, pp. 255-277

<sup>2</sup> LOHMANN, U. (2010) - Wood encyclopedia. The standard work for wood and forestry. (4) Hamburg: Nikol-Verlag, pp. 284-285

**Tab. 1 B:** Material data sheet, oak, specific<sup>3</sup>**General description**

Certifications/Information	FSC and PEFC on request	
<b>Life cycle assessment data hardwood, average (GER)</b>		<b>10</b>
<b>Resource input per kg</b>	<b>A1-A3</b>	
Total non-renewable primary energy (PENRT)	2,18 MJ	10
Use of freshwater resources (FW)	0,00048 m <sup>3</sup>	10
<b>Environmental impact per m<sup>3</sup></b>		
Global Warming Potential (GWP)	-1,74 Kg CO <sub>2</sub> -eqv.	10
<b>Environmental impact Transport, per 1000 kgkm (690 kg/m<sup>3</sup>)</b>		<b>9</b>
<b>Production site: Germany/ZEITRAUM</b>		
<b>Truck - ca. 300 km</b>	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.	
<b>Main raw material origin: Germany, Central Europe/Production site</b>		
<b>Truck - ca. 1500 km</b>	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)	134,535 Kg CO <sub>2</sub> -eqv.	
<b>Sustainability Assessment</b>		
Longevity	Very durable/repairable (> 20 years)	10
Biological reproduction/ recycled material	100 %	10
Circulation potential	70 % - 99 % (technological/recycling)	8
Socially compatible	Yes	10
<b>Total average rating</b>		<b>9,5</b>
<b>Processing</b>		
Mechanical	Good; can be cut and peeled, suitable for turning and carving; pre-drill thin wood for nailing	
Drying	Moderately good; slow; tendency to tear and warp; predrying outdoors favorable; good durability	

<sup>3</sup> BMI 2021: Oekobaudat. Database <[https://www.oekobaudat.de/no\\_cache/en/database/search.html](https://www.oekobaudat.de/no_cache/en/database/search.html)> Accessed, on 10/27/2021

Adhesion	Good; alkalis can cause stains	
Surface finishing	Good; can be stained and varnished, if necessary use pore filler when varnishing; tinting of wood color by smoking	
<b>Natural durability DIN EN 350-2</b>	durable; sapwood low; heartwood durable; also in water; durability class 2	

### Physical properties

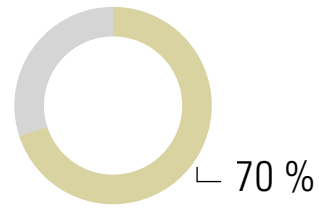
Kiln density (0 % wood moisture content)	390... 650... 930 kg/m <sup>3</sup>	
Bulk density (12 - 15 % wood moisture)	430... 690... 960 kg/m <sup>3</sup>	
Pore ratio	ca. 57 %	
Shrinkage rate at 1 % moisture reduction	radial - 0,20 %; tangential - 0,32 %; volume - 0,45 %	

### Mechanical properties

Compressive strength ( $\sigma_{dB}$ )	Q. robur: 54... 61... 67 N/mm <sup>2</sup> Q. petraea: 48... 65... 70 N/mm <sup>2</sup>	
Flexural strength ( $\sigma_{bB}$ )	Q. robur: 74... 88... 105 N/mm <sup>2</sup> Q. petraea: 78... 110... 117 N/mm <sup>2</sup>	
Tensile strength ( $\sigma_{zB}   $ )	50... 90... 180 N/mm <sup>2</sup>	
Tensile strength ( $\sigma_{zB} \perp$ )	2,6... 4,0... 9,6 N/mm <sup>2</sup>	
Shear strength ( $\tau_{aB}$ )	6,0... 11,0... 13,0 N/mm <sup>2</sup>	
Hardness (HB   )	50... 66 N/mm <sup>2</sup>	
Hardness (HB $\perp$ )	25... 34 N/mm <sup>2</sup>	
E-modulus ( $E_b   $ )	Q. robur: 10000... 11700... 13200 N/mm <sup>2</sup> Q. petraea: 9200... 13000... 13500 N/mm <sup>2</sup>	



## 2 Steel, powder coated frames



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

Material group	Natural material; metals; transition metals
Parts origin	Italy
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>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, powder coated frames, specific<sup>56</sup>

**General description**

Certifications/Information	ISO 14001, ISO 9001	
Emission class (formaldehyde)	Formaldehyde free	
Surface	smooth, hard	
Color	black	
<b>Life cycle assessment data Steel profile, powder-coated (GER)</b>		<b>4,33</b>
<b>Resource input per kg</b>	<b>A1-A3</b>	
Total non-renewable primary energy (PENRT)	12,49 MJ	2
Use of freshwater resources (FW)	0,0026 m <sup>3</sup>	4
<b>Environmental impact per kg</b>	<b>A1-A3</b>	
Global Warming Potential (GWP)	1,09 Kg CO <sub>2</sub> -eqv.	7
<b>Environmental impact Transport, per 1000 kgkm (7850 kg/m<sup>3</sup>)</b>		<b>4</b>
<b>Production site: Italy/ZEITRAUM</b>		
<b>Truck ø - ca. 1500 km</b>	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.	
<b>Main raw material origin: China/production location</b>		<b>0</b>
<b>Truck - ca. 2000 km</b>	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 CO <sub>2</sub> -eqv.	
<b>Container ship - ca. 10000 km</b>	A4	
Total non-renewable primary energy (PENRT)	1094 MJ	
Use of freshwater resources (FW)	0,005636 m <sup>3</sup>	
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](https://www.oekobaudat.de/no_cache/en/database/search.html)> Accessed, on 10/27/2021

<sup>6</sup> MATERIALARCHIV (2019) - Materialarchiv <<http://www.materialarchiv.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
<b>Total average rating</b>		<b>7,05</b>

### Processing

Mechanical	More difficult to machine due to hardness, drilling, turning, milling, cutting; forming (bending, compression, tension forming)	
Joints	Riveting; screwing and welding	
Surface finishing	Engraving, polishing, embossing, grinding, lasering	
Other	High plastic deformability under impact loading; materials with low carbon content are easier to deform	

### Durability

Heat resistant, corrosion and heat resistant

### Physical properties

Density	7,85 g/cm <sup>3</sup>	
Electrical conductivity	9,93*10 <sup>6</sup> S/m	
Thermal Abrasiveness	80,2 W/(m*K)	

### Mechanical properties mild steel

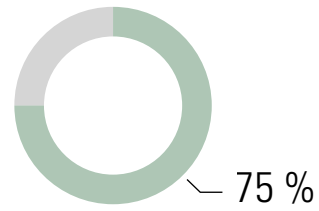
Yield strength (βs)	185 - 360 N/mm <sup>2</sup>	
Tensile strength (βz)	310 - 680 N/mm <sup>2</sup>	
Elongation at break	18 - 26 %	
E-modulus (E)	210*10 <sup>3</sup> N/mm <sup>2</sup>	
Shear modulus (G)	85*10 <sup>3</sup> N/mm <sup>2</sup>	
Poisson's ratio	0,28	

### Notes

The life cycle assessment of iron improves the more often the material has been recycled or the proportion of recycled material increases



### 3 AgriPlast, bioplastic, wood-plastic composite



**Fig. 3:** www.biowert.com

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

Material group	Natural-Synthetic Material; Plastic; Wood-Plastic Composite Material
Name	Wood-plastic composites; wood-polymer composites (GB, US); Holz-Kunststoff-Verbundwerkstoffe (D)
Short name	WPC (Wood-Plastic-Composites)
Manufactured in	Germany (GER)
Version	It is a plastic-cellulose mixture  Available in the usual types for plastic: granules, injection molded parts, etc  Cellulose content: 30-70 %
Use	Can be used in almost all areas as a plastic alternative

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

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

**General description Agriplast NFLDPE 5050**

Emission class	Formaldehyde-free	
Fire resistance	<b>Fire protection:</b> n.a.	
Color	Brown, mottled; dyed available	
Texture	smooth, mottled, plastic-like to wood-like	
<b>Basic materials/auxiliary materials</b>		
Cellulose	50 % (Predominantly from grasses)	
Polypropylene	50 %	
<b>Life cycle assessment data WPC, decking boards (GER)</b>		<b>7</b>
<b>Resource input per kg</b>	<b>A1-A3</b>	
Total non-renewable primary energy (PENRT)	29,1468 MJ	10
Use of freshwater resources (FW)	4,8809 m <sup>3</sup>	0
<b>Environmental impact per kg</b>	<b>A1-A3</b>	
Global Warming Potential (GWP)	0,0138 Kg CO <sub>2</sub> -eqv.	10
<b>Environmental impact Transport, per 1000 kgkm (1.074 g/cm<sup>3</sup>)</b>		<b>7,66</b>
<b>Production site: Germany/ZEITRAUM</b>		
<b>Truck - ca. 200 km</b>	A4	10
Total non-renewable primary energy (PENRT)	241,6 MJ	
Use of freshwater resources (FW)	0,012776 m <sup>3</sup>	
Global Warming Potential (GWP)	17,938 Kg CO <sub>2</sub> -eqv.	
<b>Main raw material origin (grasses): Germany/production site</b>		<b>10</b>
<b>Truck - &lt; 100 km</b>	A4	
Total non-renewable primary energy (PENRT)	120,8 MJ	
Use of freshwater resources (FW)	0,006388 m <sup>3</sup>	
Global Warming Potential (GWP)	8,97 Kg CO <sub>2</sub> -eqv.	
<b>Main raw material origin (PP): n.a./production site</b>		<b>3</b>
<b>n.a. - ø &gt; 7000 km</b>	A4	
Total non-renewable primary energy (PENRT)	8456 MJ	

<sup>8</sup> BMI 2021: Oekobaudat. Database <[https://www.oekobaudat.de/no\\_cache/en/database/search.html](https://www.oekobaudat.de/no_cache/en/database/search.html)> Accessed, on 10/27/2021

<sup>9</sup> KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

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	50 %	5
Circulation potential	70 - 99 % technological/downcycling	7
Socially compatible	Yes	10
<b>Total average rating</b>		<b>7,44</b>

### Processing

Mechanically	Very good; with conventional plastic processing machines; drilling, sawing; milling; etc.	
Adhesion	Good; with adhesives for low-energy plastics	
Surface finishing	Brushing; Sanding; Painting; Oiling; Embossing	
<b>Resistance</b>	Low-maintenance; water-resistant; resistant to fungi and insects; weather-resistant with plastic content > 30 %	

### Physical properties

Bulk density according to DIN EN ISO 1183	1,074 g/cm <sup>3</sup>	
Vicat softening temperature according to DIN EN ISO 306 Vicat B/50	110 °C	

### Mechanical properties

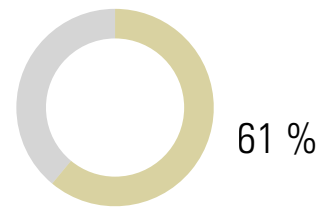
Flexural strength ( $\sigma_{bB}$ )	22,3 N/mm <sup>2</sup>	
Tensile strength ( $\sigma_{zB}   $ )	15,1 N/mm <sup>2</sup>	
E-modulus ( $E_b   $ )	1003 N/mm <sup>2</sup>	
Elongation according to DIN EN ISO 527	2,9 %	

### Notes

Recyclable and residue-free disposal when incinerated;  
AgriPlast NFPP 5050 HM consists of 50 % cellulosic fibers derived from grasses and 50 % polypropylene



## 4 Polyamide



**Tab. 4 A:** Material data sheet, polyamide, general<sup>10</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>10</sup> KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

**Tab. 4 B:** Material data sheet, polyamide, specific<sup>11,12</sup>**General description**

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
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Use of freshwater resources (FW)	0,04378 m <sup>3</sup>	10
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**Environmental impact per kg** A1-A3

Global Warming Potential (GWP)	16,91 Kg CO <sub>2</sub> -eqv.	0
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**Environmental impact Transport, per 1000 kgkm (1140 kg/m<sup>3</sup>)** 6,5**Production site: Germany/ZEITRAUM****Truck - ca. 500 km** A4 10

Total non-renewable primary energy (PENRT)	604 MJ	
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Use of freshwater resources (FW)	0,03194 m <sup>3</sup>	
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Global Warming Potential (GWP)	44,845 Kg CO <sub>2</sub> -eqv.	
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**Main raw material origin: n.a./production site****n.a. - ø > 7000 km** A4 3

Total non-renewable primary energy (PENRT)	8456 MJ	
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Use of freshwater resources (FW)	0,44716 m <sup>3</sup>	
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Global Warming Potential (GWP)	627,83 Kg CO <sub>2</sub> -eqv.	
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**Sustainability Assessment**

Longevity	Very durable (> 20 years)	8
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Biological reproduction/ recycled material	0 %	0
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Circulation potential	100 % (technological)	10
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Socially compatible	Yes	9
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**Total average rating** 6,08**Processing**

<sup>11</sup> BMI 2021: Oekobaudat. Database <[https://www.oekobaudat.de/no\\_cache/en/database/search.html](https://www.oekobaudat.de/no_cache/en/database/search.html)> Accessed, on 10/27/2021

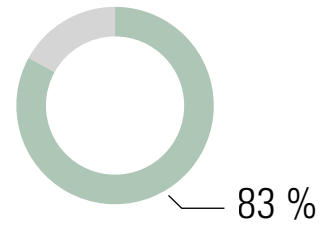
<sup>12</sup> MATERIALARCHIV (2019) - Materialarchiv <<http://www.materialarchiv.ch/app-tablet/#search>> Accessed, on 03/01/2019

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	
<b>Resistance</b>	Easy care; water resistant; resistant to fungi and insects	
<b>Properties</b>		
Elongation at break	50,0 %	
Density	1140 kg/m <sup>3</sup>	
Moisture absorption	2,5 - 3,5 %	
Dielectric strength	25 kV/mm	
Notched impact strength (Charpy)	3,0 kJ/m <sup>2</sup>	
<b>Thermal properties</b>		
Vicat softening temperature according to DIN EN ISO 306 Vicat B/50	250 °C	
Continuous operating temperature	-30 bis 95 °C	





## 5 Osmo, hard wax oil



**Tab. 5 A:** Material data sheet, Osmo, hard wax oil, general<sup>1314</sup>

Material group	Coating materials; Oils
Name	Hard wax oil (GB, US); Hartwachsöl (D)
Manufacturer	Osmo Holz und Color GmbH & Co. KG
Manufactured in	Germany (GER)
Version	Osmo Hard Wax Oil 3032 satin, 3062 matt
Use	Furniture construction; for interior use; also suitable for parquet, cork and terracotta

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

<sup>14</sup> Osmo (2019) - Osmo Hard Wax Oil 3032 satin, 3062 matte <<https://www.osmo.de>> Accessed, on 03/02/2019

**Tab. 5 B:** Material data sheet, Osmo, hard wax oil, specific<sup>1516</sup>

<b>General description</b>		
Certifications/Information	ISO 9001, ISO 14001, ISO 18001	
Emission class (formaldehyde)	Formaldehyde-free	
VOC's	< 500 g/l (volatile components emit during curing)	
Delivery forms	Liquid	
Color	yellowish (transparent/yellowish in cured form)	
Texture	Glossy to matt (cured)	
<b>Contents</b>		
50 - 60 % solids	Natural oils and waxes (sunflower oil, soybean oil, safflower oil, carnauba and candellila wax) Paraffins	
Additives	Siccatives (desiccants) and water-repellent additives	
Solvent	Desaromatized white spirit (gasoline-free - according to the purity requirements of the European Pharmacopoeia)	
<b>Life cycle assessment data hard wax oil (GER)</b>		<b>5</b>
<b>Resource input per kg</b>	<b>A1-A3</b>	
Total non-renewable primary energy (PENRT)	n.a.	
Use of freshwater resources (FW)	n.a.	
<b>Environmental impact per kg</b>	<b>A1-A3</b>	
Global Warming Potential (GWP)	n.a.	
<b>Environmental impact Transport, per 1000 kgkm</b>		<b>9</b>
<b>Production site: Germany/ZEITRAUM</b>		
<b>Truck - ca. 200 km</b>	<b>A4</b>	<b>10</b>
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.	
<b>Main raw material origin: n.a./production site</b>		
<b>n.a. - ø 3000 km</b>	<b>A4</b>	<b>8</b>
Total non-renewable primary energy (PENRT)	3624 MJ	
Use of freshwater resources (FW)	0,19164 m <sup>3</sup>	

<sup>15</sup> BMI 2021: Oekobaudat. Database <[https://www.oekobaudat.de/no\\_cache/en/database/search.html](https://www.oekobaudat.de/no_cache/en/database/search.html)> Accessed, on 10/27/2021

<sup>16</sup> MATERIALARCHIV (2019) - Materialarchiv <<http://www.materialarchiv.ch/app-tablet/#search>> Accessed, on 03/01/2019

Global Warming Potential (GWP)	296,07 Kg CO <sub>2</sub> -eqv.	
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### **Sustainability Assessment**

Longevity	Very durable/repairable (> 20 years, with good care)	10
Biological reproduction/ recycled material	51 - 60 %	6
Circulation potential	100 % (biodegradable)	10
Socially compatible	Yes	10
<b>Total average rating</b>		<b>8,33</b>

### **Processing**

Application	With brush, spatula or spray gun	
Storage	Can be stored up to 5 years with tight closure	

### **Properties**

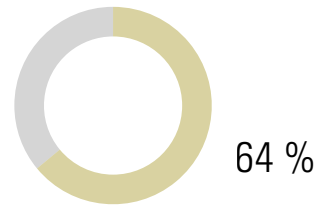
Density	0,89 g/cm <sup>3</sup>	
Viscosity	Thixotropic, creamy	
Consistency	Medium viscosity	
Moisture resistance	Good	

### **Notes**

Osmo Polyx®-Oil is based on natural vegetable oils and waxes; Osmo Polyx®-Oil contains neither biocides nor preservatives. It is harmless to humans, animals and plants when dry and complies with DIN 53160 (sweat- and saliva-proof) and EURO-NORM EN 71 (suitable for children's toys)



## 6 PVAc dispersion adhesive, D3



**Tab. 6 A:** Material data sheet, PVAc dispersion adhesive, D3, general<sup>1718</sup>

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>17</sup> KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

<sup>18</sup> KEIBERIT (2019) - KLEIBERIT 303, D3, PVAc Adhesive <[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)> Accessed, on 02/03/2019

**Tab. 6 B:** Material data sheet, PVAc dispersion adhesive, D3, specific<sup>1920</sup>**General description**

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 Dispersion-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
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Use of freshwater resources (FW)	0,00758 m <sup>3</sup>	10
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**Environmental impact per kg** A1-A3

Global Warming Potential (GWP)	0,955 Kg CO <sub>2</sub> -eqv.	10
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**Environmental impact Transport, per 1000 kgkm** 6,5**Production site: Germany/ZEITRAUM**

<b>Truck - ca. 200 km</b>	A4	10
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Total non-renewable primary energy (PENRT)	172,12 MJ	
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Use of freshwater resources (FW)	0,012106 m <sup>3</sup>	
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Global Warming Potential (GWP)	12,822 Kg CO <sub>2</sub> -eqv.	
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**Main raw material origin: n.a./production site**

<b>n.a. - ø &gt; 7000 km</b>	A4	3
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Total non-renewable primary energy (PENRT)	8456 MJ	
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Use of freshwater resources (FW)	0,44716 m <sup>3</sup>	
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Global Warming Potential (GWP)	627,83 Kg CO <sub>2</sub> -eqv.	
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**Sustainability Assessment**

Longevity	Very durable/moderately repairable (> 20 years)	9
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Biological reproduction/ recycled material	0 %	0
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Circulation potential	Only thermally recyclable	4
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Socially compatible	Yes	9
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<sup>19</sup> BMI 2021: Oekobaudat. Database <[https://www.oekobaudat.de/no\\_cache/en/database/search.html](https://www.oekobaudat.de/no_cache/en/database/search.html)> Accessed, on 10/27/2021

<sup>20</sup> MATERIALARCHIV (2019) - Materialarchiv <<http://www.materialarchiv.ch/app-tablet/#search>> Accessed, on 03/01/2019

**Total average rating****6,41****Processing**

Adhesion	With brush, spatula or glue roller	
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**Properties**

Density	1,1 g/cm <sup>3</sup>	
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PH level	3	
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Consistency	Medium viscosity	
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Moisture resistance	D3	
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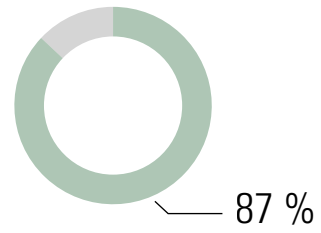
Heat resistance	Up to 120 °C	
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**Notes**

PVAc adhesive is available solvent-free and solvent-based	
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## 7 Cardboard, chairs



**Tab. 7 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. 7 B:** Cardboard chairs, specific<sup>21,22</sup>**General description**

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	
<b>Life cycle assessment data „Kraftpapier“ (GER)</b>		<b>10</b>
<b>Resource input per kg</b>	<b>A1-A3</b>	
Total non-renewable primary energy (PENRT)	5,888 MJ	
Use of freshwater resources (FW)	0,004899 m <sup>3</sup>	
<b>Environmental impact per kg</b>	<b>A1-A3</b>	
Global Warming Potential (GWP)	-0,8973 Kg CO <sub>2</sub> -eqv.	
<b>Environmental impact Transport, per 1000 kgkm</b>		<b>9</b>
<b>Production site: Germany/ZEITRAUM</b>		
<b>Truck - ca. 200 km</b>	A4	<b>10</b>
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.	
<b>Main raw material origin: Germany, Central Europe/Production site</b>		
<b>Truck - ca. 1500 km</b>	A4	<b>8</b>
Total non-renewable primary energy (PENRT)	1812 MJ	
Use of freshwater resources (FW)	0,09582 m <sup>3</sup>	
Global Warming Potential (GWP)	134,535 Kg CO <sub>2</sub> -eqv.	
<b>Sustainability Assessment</b>		
Longevity	Moderately durable/repairable (< 10 years)	<b>4</b>
Biological reproduction/ recycled material	85 %	<b>9</b>

<sup>21</sup> BMI 2021: Oekobaudat. Database <[https://www.oekobaudat.de/no\\_cache/en/database/search.html](https://www.oekobaudat.de/no_cache/en/database/search.html)> Accessed, on 10/27/2021

<sup>22</sup> MATERIALARCHIV (2019) - Materialarchiv <<http://www.materialarchiv.ch/app-tablet/#search>> Accessed, on 03/01/2019



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

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

**[www.zeitraum-moebel.com](http://www.zeitraum-moebel.com)**

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