ZEITRAUM

NONOTO BAR

Design by Läufer & Keichel, 2017

zeitraum-moebel.de

Furniture Footprint

NONOTO BAR

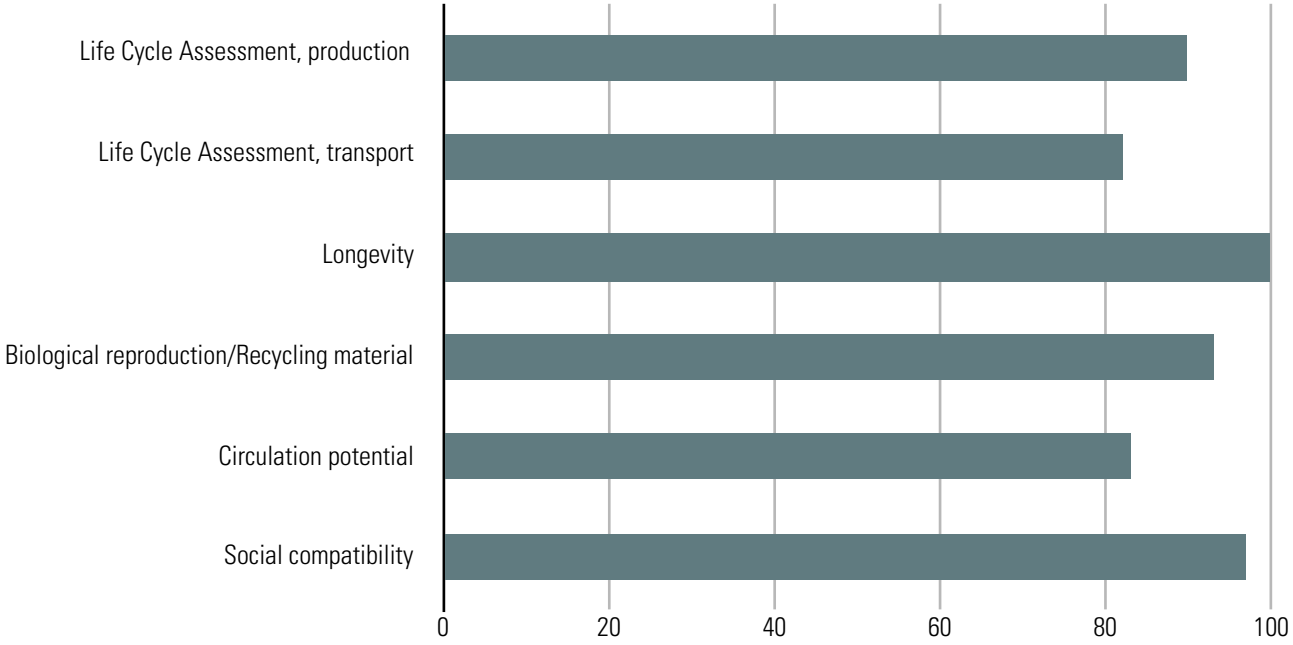
Design by Läufer & Keichel, 2017

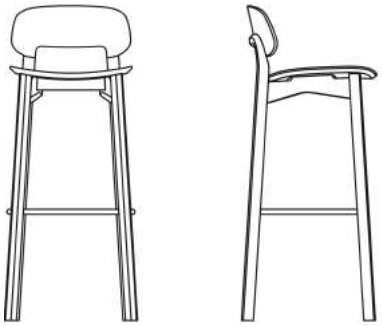
NONOTO BAR – the modulated bar chair. The NONOTO chair family is complemented with a new barstool: NONOTO BAR. The unique junction between frame and backrest lends the stool a sculptural character. A ring serves as footrest while also providing additional stability and adding another finish: both the walnut and the graphite black stain design come with a matt black powder coated footrest. Natural oak version and all other stains feature a rosegold coated footrest.

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: NONOTO BAR. 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.

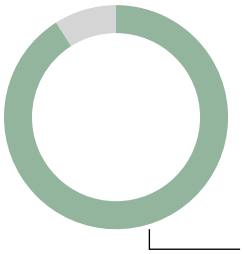
Product details				
Product category	Chairs			
Weight	ca. 5,5 kg			
Certification	CATAS Test EN 1728:2012 Level 2 – extreme			
Environmental details (wooden seat)				
Recycled content/ renewable raw materials	ca. 8,5 % recycled material (steel, share: 17 %, ø 50 % recycled content) ca. 82% renewable materials			
Recyclability	ca. 82,8 % wood (waste wood category 2) ca. 17 % steel			
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.			
Removeable cover				
Leather	No			
Fabric	No			
Manufacturing details				
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
Metal Ring	Veneto, Italy	2016	Yes	Yes
Upholstery	Bavaria, Germany	1999	Yes	Yes
Packaging				
Flatpack	No			
Warehouse				
Country		Federal state		
Germany		Bavaria		

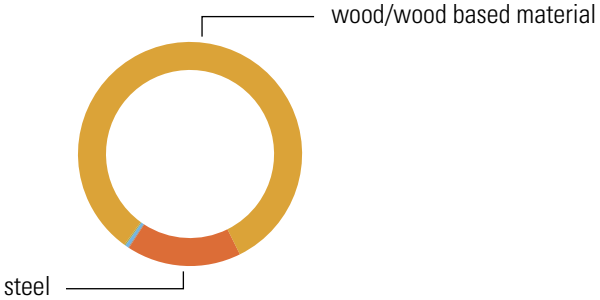
NONOTO BAR, wooden seat; oak





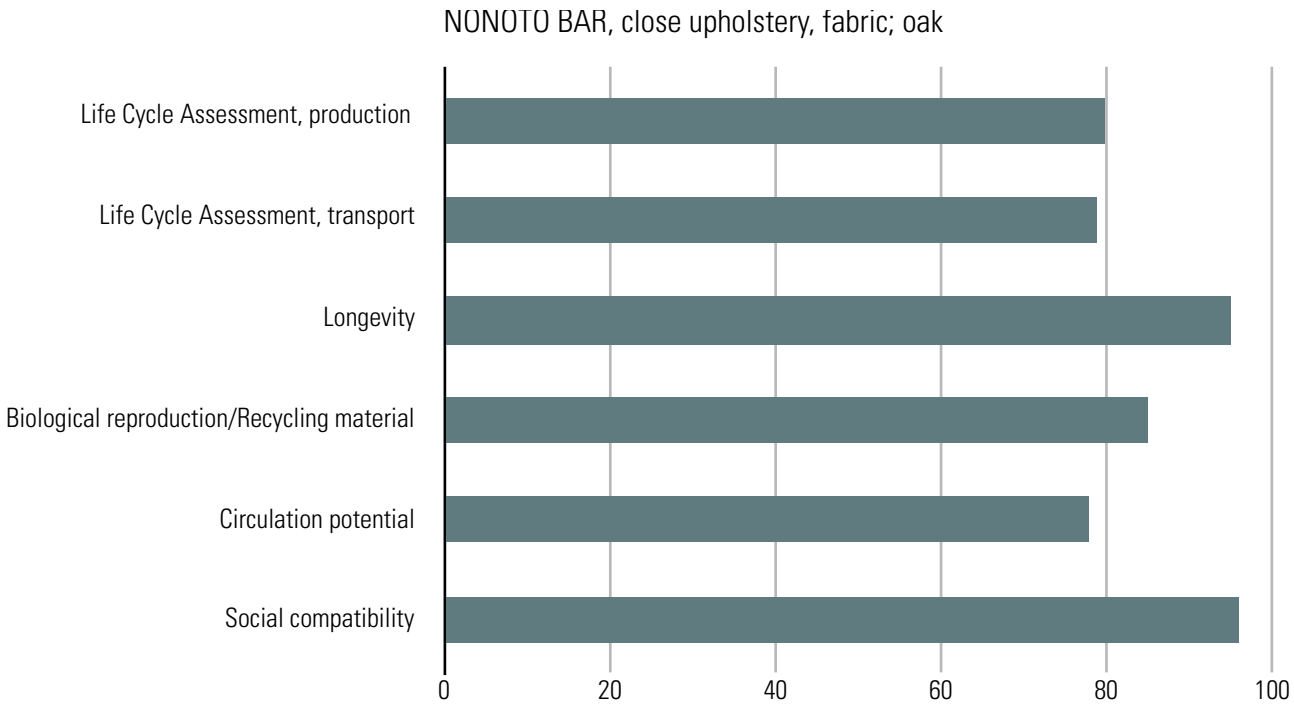
- wood/wood based material
- steel
- PA
- natural oil
- PVAC adhesive

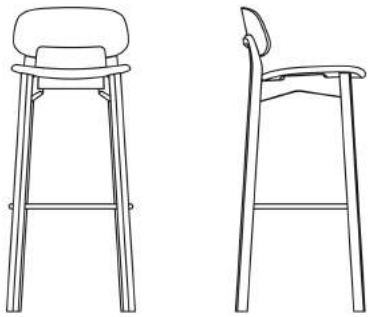




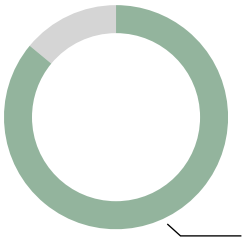
NONOTO BAR, wooden seat; oak	Material/Product rating					
	Oak	Steel	Plastic, PA	Natural oil, Osmo	PVAC	Weighted rating, %
Life Cycle Assessment, production	10	4,3	3	5	10	90,2226 %
Life Cycle Assessment, transport	9	4	6,5	9	6,5	81,6305 %
Longevity	10	10	8	10	9	99,924 %
Biological reproduction/ Recycling material	10	6	0	6	0	92,84 %
Circulation potential	8	10	10	10	4	83,322 %
Social compatibility	10	8	9	10	9	96,633 %
Average rating, ø	9,5	7,05	6,083	8,333	6,416	Total weight
Share in kg	4,8	0,96	0,008	0,028	0,012	5,808
Share in %	82,64 %	16,52 %	0,13 %	0,48 %	0,2 %	
Weighted rating	7,85	1,164	0,007	0,039	0,012	
Product rating in %	**90,72**					

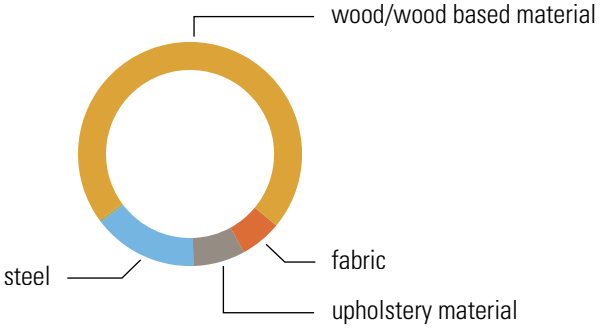
Packaging	Material/Product rating	
	Cardboard	Weighted rating, %
Life Cycle Assessment, production	10	100 %
Life Cycle Assessment, transport	9	90 %
Longevity	4	40 %
Biological reproduction/Recycling material	9	90 %
Circulation potential	10	100 %
Social compatibility	10	100 %
Average rating, ø	8,666	Total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





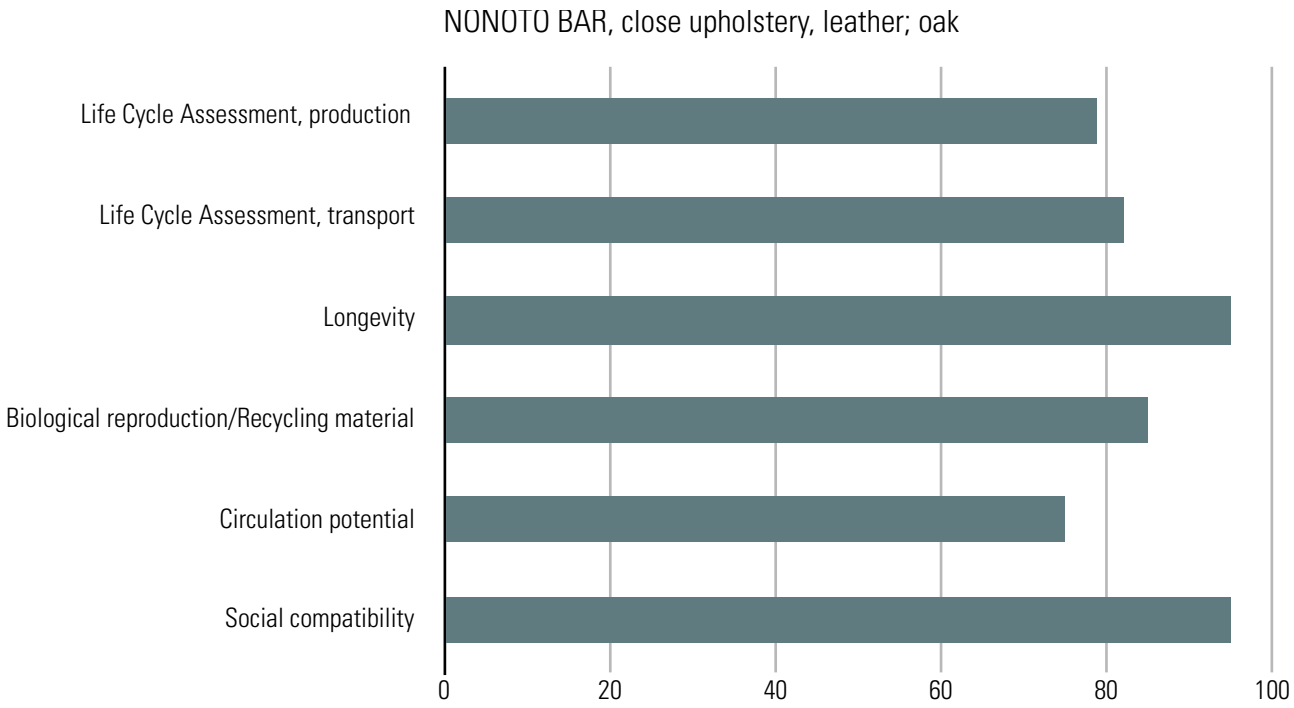
- wood/wood based material
- fabric
- upholstery material
- steel
- other

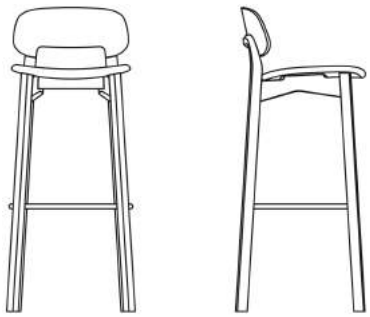


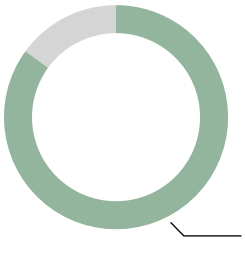


NONOTO BAR, close upholstery, fabric; oak	Material/Product rating										
	Oak	Plywood (moulded)	Fabric, Rohi, Opera	PUR, Upholstery	Poly-ester fiber	Steel	PA	Varnish	Natural oil, Osmo	PVAC	Weighted rating, %
Life Cycle Assessment, production	10	6,33	5,33	3	9	4,33	3	5	5	10	80,42308 %
Life Cycle Assessment, transport	9	9,5	5	6,5	6,5	4	6,5	9	9	6,5	78,68 %
Longevity	10	9	9	5	8	10	8	9	10	9	95,229 %
Biological reproduction/ Recycling material	10	9	10	0	0	6	0	0	6	0	84,846 %
Circulation potential	8	4	8	7	10	10	10	0	10	4	78,065 %
Social compatibility	10	10	10	9	9	8	9	9	10	9	96,143 %
Average rating, ø	9,5	7,971	7,888	5,083	7,083	7,055	6,083	5,333	8,333	6,416	Total weight
Share in kg	3,7	0,8	0,38	0,28	0,195	0,96	0,008	0,002	0,002	0,009	6,336
Share in %	58,39 %	12,62 %	5,99 %	4,41 %	3,07 %	15,15 %	0,12 %	0,03 %	0,03 %	0,14 %	
Weighted rating	5,547	1,005	0,472	0,224	0,217	1,068	0,007	0,001	0,002	0,008	
Product rating in %	**85,51**										

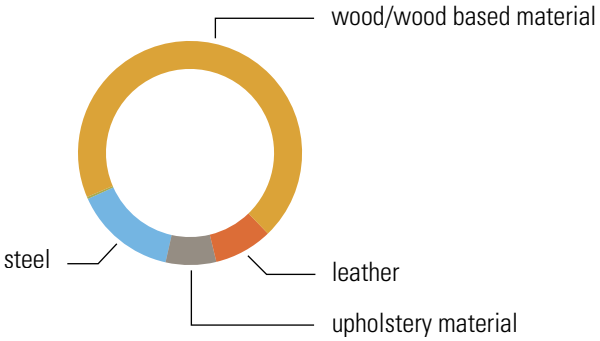
Packaging	Material/Product rating	
	Cardboard	Weighted rating, %
Life Cycle Assessment, production	10	100 %
Life Cycle Assessment, transport	9	90 %
Longevity	4	40 %
Biological reproduction/Recycling material	9	90 %
Circulation potential	10	100 %
Social compatibility	10	100 %
Average rating, ø	8,666	Total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





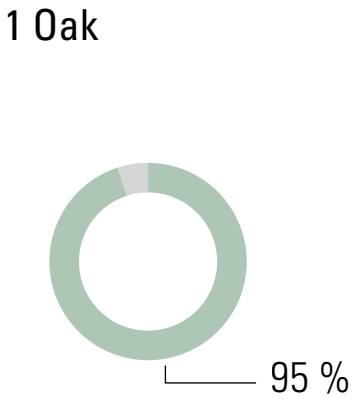


- wood/wood based material
- leather
- upholstery material
- steel
- other



NONOTO BAR, close upholstery, leather; oak	Material/Product rating										
	Oak	moulded Plywood	Leather Jepard	PUR, Upholstery	Poly-ester fiber	Steel	PA	Varnish	Natural oil, Osmo	PVAC	Weighted rating, %
Life Cycle Assessment, production	10	6,33	5	3	9	4,33	3	5	5	10	79,43832 %
Life Cycle Assessment, transport	9	9,5	10	6,5	6,5	4	6,5	9	9	6,5	82,1635 %
Longevity	10	9	9	5	8	10	8	9	10	9	95,098 %
Biological reproduction/ Recycling material	10	9	10	0	0	6	0	0	6	0	85,249 %
Circulation potential	8	4	4	7	10	10	10	0	10	4	74,744 %
Social compatibility	10	10	9	9	9	8	9	9	10	9	95,408 %
Average rating, ø	9,5	7,971	7,833	5,083	7,083	7,055	6,083	5,333	8,333	6,416	Total weight
Share in kg	3,7	0,8	0,55	0,28	0,195	0,96	0,008	0,002	0,002	0,009	6,506
Share in %	56,87 %	12,29 %	8,45 %	4,3 %	2,99 %	14,75 %	0,12 %	0,03 %	0,03 %	0,13 %	
Weighted rating	5,402	0,979	0,661	0,218	0,211	1,04	0,007	0,001	0,002	0,008	
Product rating in %	**85,29**										

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	4,4	4,4
Share in %	100 %	
Weighted rating	8,666	
Product rating in %	**86,66**	



Tab. 1 A: Material data sheet, oak, general[1][2]

Material group	Natural material; wood; hardwood
Botanical name	*Quercus robur L./Q. patrea Liebl. (Fagaceae)*
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.

[1] WAGENFUEHR, R. (2007) - Wood Atlas. (6) Leipzig: Hanser Wirtschaft, Fachbuchverlag Leipzig, pp. 255-277

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

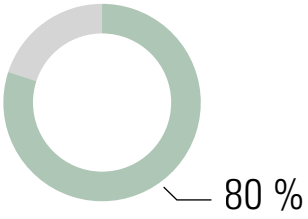
Tab. 1 B: Material data sheet, oak, specific[3]

General description		
Certifications/Information	FSC and PEFC on request	
Life cycle assessment data hardwood, 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^3	10
Environmental impact per m^3	**A1-A3**	
Global Warming Potential (GWP)	-1,74 Kg CO_2-eqv.	10
Environmental impact Transport, per 1000 kgkm (690 kg/m^3)		9
Production site: Germany/ZEITRAUM		
Truck - ca. 300 km	A4	10
Total non-renewable primary energy (PENRT)	362,4 MJ	
Use of freshwater resources (FW)	0,019164 m^3	
Global Warming Potential (GWP)	26,907 Kg CO_2-eqv.	
Main raw material origin: Germany, 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 m^3	
Global Warming Potential (GWP)	134,535 Kg CO_2-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; 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	

[3] BMI 2021: Oekobaudat. Database <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	
Natural durability DIN EN 350-2	durable; sapwood low;heartwood durable; also in water; durability class 2	
Physical properties		
Kiln density (0 % wood moisture content)	390… 650… 930 kg/m³	
Bulk density (12 - 15 % wood moisture)	430… 690… 960 kg/m³	
Pore ratio	ca. 57 %	
Shrinkage rate at 1 % moisture reduction	radial - 0,20 %; tangetial - 0,32 %; volume - 0,45 %	
Mechanical properties		
Compressive strength (σ_{dB})	Q. robur: 54… 61… 67 N/mm² Q. petraea: 48… 65… 70 N/mm²	
Flexural strength (σ_{bB})	Q. robur: 74… 88… 105 N/mm² Q. petraea: 78… 110… 117 N/mm²	
Tensile strength (σ_{zB} ||) Tensile strength (σ_{zB} ⊥)	50… 90… 180 N/mm² 2,6… 4,0… 9,6 N/mm²	
Shear strength (τ_{aB})	6,0… 11,0… 13,0 N/mm²	
Hardness (HB ||)	50… 66 N/mm²	
Hardness (HB ⊥)	25… 34 N/mm²	
E-modulus (E_b ||)	Q. robur: 10000… 11700… 13200 N/mm² Q. petraea: 9200… 13000… 13500 N/mm²	

2 Plywood, veneer panel (moulded wood)



Tab. 2 A: Material data sheet, plywood, veneer panel, general[4]

Material group	Natural-synthetic material; wood-based materials; plywood; veneer panels
Name	Plywood (GB, US); Furnierplatten; Schichtholz; Kunstharzpressholz; Brettsperrholz; etc. (D)
Short name	FU
Manufactured in	Germany
Origin of the wood	Germany (top veneer outside Germany if necessary)
Version	Moulded wood
Use	Mainly for industrial furniture making and interior design; plywood moldings; boat and aircraft building; special parts: bulletproof elements impregnated in resin; model and tool making

[4] 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

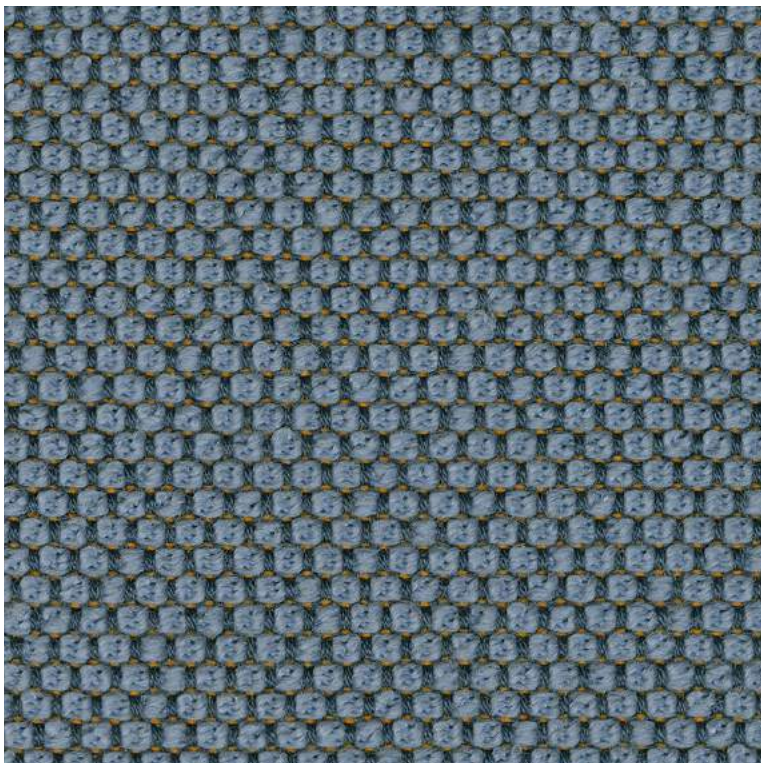
Tab. 2 B: Material data sheet, plywood, veneer panel, specific[5][6]

General description (manufacturer spec.)		
Certifications/Information	FSC, PEFC, E1 (EU), ISO 50001, REACH	
Emission class	E1 (CARB not relevant)	
Fire resistance	**Fire behavior**: The tested product fulfills the requirements of building material class B1 for flame-retardant building materials according to DIN 4102, Part 1 (May 1998) when freely suspended or at a distance greater than 40 mm from the same or other flat building materials	
General description (general)		
Length	1220 - 3050 mm	
Wide	1220 - 3050 mm	
Thickness	4 - 80 mm	
Color	mostly light white yellowish (birch, spruce, pine, maple and poplar), to reddish (beech) rotary cut veneer, birch, beech or poplar; figured, plain	
Texture	plain, figured, smooth (top view), structure of several layers of veneer, smooth (cross section)	
Basic materials/auxiliary materials		
Veneer layers	From at least three layers; 0.8 - 2.5 mm thick veneer layers	
Binder	Synthetic binders; UMF adhesive (melamine-formaldehyde resin), urea-formaldehyde resin (UF adhesive); approx. 5%	
Life cycle assessment data plywood, average (GER)		6,33
Resource input per kg	**A1-A3**	
Total non-renewable primary energy (PENRT)	6,8 MJ	8
Use of freshwater resources (FW)	0,004 m^3	1
Environmental impact per m^3	**A1-A3**	
Global Warming Potential (GWP)	-1,5 Kg CO_2-eqv.	10
Environmental impact Transport, per 1000 kgkm (1200 kg/m^3)		9,5
Production site: Germany/ZEITRAUM		
Truck - ca. 1000 km	A4	9
Total non-renewable primary energy (PENRT)	1208 MJ	
Use of freshwater resources (FW)	0,064 m^3	

[5] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

[6] WEZEL, O. (2019) - Strength properties of wood-based materials according to DIN EN 622 <http://www.tischler-ole-welzel.de/Holzwerkstoffe/Faserplatten%20nach%20DIN%20EN%2013986.pdf> Accessed, on 09/03/2019

Global Warming Potential (GWP)	89,69 Kg CO_2-eqv.	
Main raw material origin: Germany/Production site		
Truck - ca. < 100 km	A4	10
Total non-renewable primary energy (PENRT)	120,8 MJ	
Use of freshwater resources (FW)	0,006388 m^3	
Global Warming Potential (GWP)	8,969 CO_2-eqv.	
Sustainability Assessment		
Longevity	Very durable/moderately repairable (> 20 years)	9
Biological reproduction/ recycled material	90 %	9
Circulation potential	Only thermally recyclable	4
Socially compatible	Yes	10
Total average rating		**7,97**
Processing		
Mechanical	Very good; can be sawed, drilled and milled with common machines	
Adhesion	Very good	
Surface finishing	Good; varnishable; coating possible	
Durability	By changing the synthetic binder or adding further additives, an increase in fire resistance, resistance to fungi and insects and moisture resistance can be achieved (see manufacturer's instructions)	
Physical properties		
Bulk density according to EN 323	400… 1000 kg/m^3	
Basis weight (18 mm)	n.a.	
Material moisture at delivery	8 %	
Mechanical properties		
Compressive strength (σ_{dB})	n.a.	
Flexural strength (σ_{bB})	5… 120 N/mm^2	
Tensile strength (σ_{zB} ||)	n.a.	
Shear strength (τ_{aB})	n.a.	
E-modulus (E_b ||)	500… 14000 N/mm^2	



3 Rohi, Opera

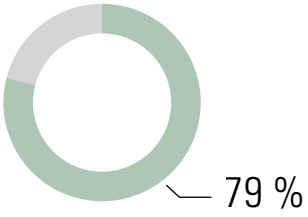


Fig. 3: www.rohi.com

Tab. 3 A: Material data sheet, Opera, general[7]

Material group	Natural synthetic material; textiles; upholstery fabric; virgin wool, polyamide
Name	Opera
Material abbreviation	WV (virgin wool); PA (polyamide)
Manufacturer	Rohi, Germany (GER)
Manufactured in	Germany (GER)
Designer	Rohi
Version	29 different colors
Use	Object areas and private living spaces with very high stresses

[7] ROHI (2021) - Rohi; Products <https://www.rohi.com/en/products/living/> Accessed, on 11/12/2021

Tab. 3 B: Material data sheet, Opera, specific[89]

General description (manufacturer spec.)		
Certifications/Information	RAL-UZ 117 2+3, IWTO Guidelines for Sheep Welfare, FR-free, AB2998 (US Export Norm), ISO 9001, REACH, CP65 (on request)	
Fire resistance	**Fire tests (without additional flame retardant finish)**: CAL TB 117 - 2013 • DIN EN 1021-1/-2 • BS 5852 Part 1: 1979 • UNI 9175 1 IM • ÖNORM B1/Q1 • IMO 2014/90/EU **Fire tests (with optional flame retardant finish)**: BS 5852: 2006 Crib5 • DIN 4102-1 B2 • DIN EN 13501-1 E • FAR 25.853 12 sec. vertical • NF P92-507 M2	
Environmental benefits		
AZO dyes	Not contained	
Heavy metals	Not contained	
Formaldehyde	Not contained	
Brominated flame retardants	Not contained	
Spinning oil used	n.a.	
Appearance		
Pattern	Solid	
Length	n.a.	
Width	140 cm	
Thickness	n.a.	
Color	www.rohi.com; Differences may occur	
Textile surface	n.a.	
Basic materials		
Virgin wool	96 %	
Polyamide (Nylon)	4 %	
LCA data comparator for Opera, Rohi (no data available) - Hero (96 % WV, 4 % PA), Kvadrat		5,33
Resource use per m²	**A1-A3**	
Total non-renewable primary energy (PENRT)	89 MJ	7
Use of freshwater resources (FW)	0,34 m³	4
Environmental impact per m²	**A1-A3**	
Global Warming Potential (GWP)	7,3 Kg CO_2-eqv.	5
Environmental impact Transport, per 1000 kgkm (0.870 kg/m)		5

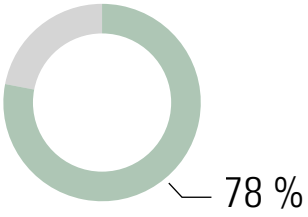
[8] ROHI (2021) - Rohi; Products <https://www.rohi.com/en/products/living/> Accessed, on 11/12/2021

[9] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

Production site: Germany/ZEITRAUM		
Truck - < 100 km	A4	10
Total non-renewable primary energy (PENRT)	120,8 MJ	
Use of freshwater resources (FW)	0,006388 m^3	
Global Warming Potential (GWP)	8,969 Kg CO_2-eqv.	
Main raw material origin: Australia/production site		0
Truck - ca. 2000 km	A4	
Total non-renewable primary energy (PENRT)	2416 MJ	
Use of freshwater resources (FW)	0,12776 m^3	
Global Warming Potential (GWP)	179,38 Kg CO_2-eqv.	
Container ship - ca. 10000 km	A4	
Total non-renewable primary energy (PENRT)	1094 MJ	
Use of freshwater resources (FW)	0,005636 m^3	
Global Warming Potential (GWP)	90,11 Kg CO_2-eqv.	
Sustainability Assessment		
Longevity	Very durable/moderately repairable (> 20 years)	9
Biological reproduction/ recycled material	96 %	10
Circulation potential	70 - 99 % technological/recycling	8
Socially compatible	Yes	10
Total average rating		**7,88**
Resistance to dirt	Not sensitive to dirt	
Physical properties		
Weight	ca. 1010 g/m	
Mechanical properties		
Resilience	90.000 Martindale	
Pilling (ISO1-5)	min. 4 - 5	
Light fastness (ISO 1-5)	min. 5 - 8	
Seam slippage	n.a.	
Care		
Washing	Professional cleaning recommended	
Chlorine	Do not bleach	
Drying drum	Do not dry	

Ironing	Moderate hot ironing	
Dry cleaning	Professional cleaning recommended	

4 Reinhardt Leather, Jepard



Tab. 4 A: Material data sheet, Jepard, general[10]

Material group	Natural materials; animal products; mammalian leather, cowhide (mineral tanning)
Name	Jepard
Manufacturer	Leder Reinhardt GmbH
Manufactured in	Germany (GER)
Cattle origin	Italy
Version	13 different colors
Use	Clothing: jackets, pants, bags, backpacks, belts, etc.; jewelry; hats; caps; shoe soles, straps Furniture making: upholstery materials, seat shells, etc.; saddlery; automotive industry; book covers; art objects; etc.

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

Tab. 4 B: Material data sheet, Jepard, specific[11][12]

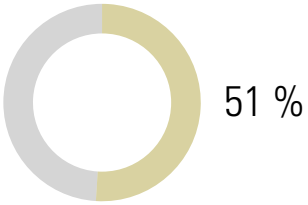
General description (manufacturer spec.)		
Certifications/Information	n.a.	
Fire resistance	**Fire tests**: CA TB 117-2013	
Appearance		
Size	4,2… 5,2 m²	
Thickness	1,1… 1,3 mm	
Color	13 color versions	
Texture	Pappillary layer - smooth, scarred Reticular layer: fibrous (also called flesh side)	
Life cycle assessment data leather		5
Resource use per m²	**A1-A3**	
Total non-renewable primary energy (PENRT)	n.a.	
Use of freshwater resources (FW)	n.a.	
Environmental impact per m²	**A1-A3**	
Global Warming Potential (GWP)	n.a.	
Environmental impact Transport, per 1000 kgkm (approx. 0,9 kg/m²)		10
Production site: Germany/ZEITRAUM		
Truck - ca. 200 km	A4	10
Total non-renewable primary energy (PENRT)	241,6 MJ	
Use of freshwater resources (FW)	0,012776 m³	
Global Warming Potential (GWP)	17,938 Kg CO_2-eqv.	
Main raw material origin: Italy/production site		
Truck - ca. 1000 km	A4	10
Total non-renewable primary energy (PENRT)	1208 MJ	
Use of freshwater resources (FW)	0,06388 m³	
Global Warming Potential (GWP)	89,69 Kg CO_2-eqv.	
Sustainability Assessment		
Longevity	Very durable/moderately repairable (> 20 years)	9
Biological reproduction/ recycled material	> 95 % (chrome tanning)	10

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

[12] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

Circulation potential	40 - 70 % technological/downcycling	4
Socially compatible	Yes	9
Total average rating		**7,83**
Resistance to dirt	Not sensitive to dirt	
Processing		
Mechanically	Mechanical processing of the material with tools designed for this purpose; cutting possible; offcut (upholstered furniture) approx. 30-45 %	
Storage	Relative humidity: 50-70 %; Temperature: 5-15 %	
Adhesion	good; possible with suitable adhesives	
Surface processing	good; can be dyed; smooth leather can and should be greased, oiled or waxed to protect the der from drying out; too much grease can also cause the leather to dry out; leather can be cleaned with lukewarm water; avoid using solvents	
Other	Untreated leather is porous and permeable to water and air; direct sunlight can cause drying and color change	
Natural durability	With regular care, the service life of leather can be increased many times over	
Properties	Very tear-resistant; elastic; water-permeable; breathable	
Physical properties		
Density	400… 900 kg/m³	
Mechanical properties		
Continuous folding behavior (EN ISO 5402)	30.000	
Light fastness (ISO 105-B02)	3	
Wet abrasion (ISO 11640)	20	
Dry abrasion (ISO 11640)	50	
Elongation at break (unwashed underleather)	n.a.	
Notes	The most important leather is cowhide; leather is largely a by-product of the meat industry; some animals are bred only for their leather, e.g. snakes, crocodiles or lizards	

5 PUR flexible foam, (MDI)



Tab. 5 A: Material data sheet, PUR flexible foam, general[13]

Material group	Synthetic Material; Synthetic Upholstery Material
Name	Polyurethane Foam (GB); Polyurethan Weichschaum (D);
Material abbreviation	PUR foam
Manufactured in	Germany (GER)
Use	Automotive industry (upholstery, fittings); furniture upholstery; shoe soles; etc.

[13] KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

Tab. 5 B: Material data sheet, PUR flexible foam, specific[14][15]

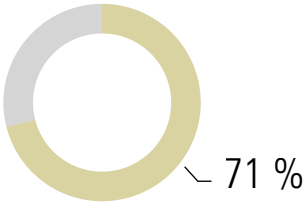
General description (manufacturer spec.)		
Certifications/Information	REACH, OEKOTEX® 100 STANDARD on request	
Fire resistance	DIN 4102 B1, BS 5852 Part 2 Crib 5, DIN EN 10211 EUFAC, DIN EN 10212 EUFAC, CAL117 on request	
Delivery form	Bales, flakes, mats, etc.	
Texture	soft, porous	
Color	Available in all colors	
Life cycle assessment data Comparative material for PUR flexible foam (no data available) - PU slabstock foam insulation panels (GER)		3
Resource input per kg	**A1-A3**	
Total non-renewable primary energy (PENRT)	98,5 MJ	0
Use of freshwater resources (FW)	0,028696 m³	9
Environmental impact per kg	**A1-A3**	
Global Warming Potential (GWP)	4,48 Kg CO_2-eqv.	0
Environmental impact Transport, per 1000 kgkm (approx. 75 kg/m³)		6,5
Production site: Germany/ZEITRAUM		
Truck - ca. 500 km	A4	10
Total non-renewable primary energy (PENRT)	430,3 MJ	
Use of freshwater resources (FW)	0,030265 m³	
Global Warming Potential (GWP)	32,055 Kg CO_2-eqv.	
Main raw material origin: n.a./production site		3
n.a. - ø > 7000 km	A4	
Total non-renewable primary energy (PENRT)	8456 MJ	
Use of freshwater resources (FW)	0,44716 m³	
Global Warming Potential (GWP)	627,83 Kg CO_2-eqv.	
Sustainability Assessment		
Longevity	Durable (10 - 20 years)	5
Biological reproduction/ recycled material	0 %	0

[14] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021.

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

Circulation potential	70 - 99 % technological/downcycling	7
Socially compatible	Yes	9
Total average rating		**5,08**
Resistance to dirt	Not sensitive to dirt	
Notes	MDI: methylene diphenyl isocyanate; chemical compounds from the group of aromatic isocyanates	

6 Polyester fibers



Tab. 6 A: Material data sheet, polyester fibers, general[16]

Material group	Synthetic Material; Synthetic Upholstery Material
Name	Polyester Fibers (GB); Polyesterfaser (D)
Material abbreviation	PES
Manufactured in	Germany (GER)
Use	Furniture upholstery

[16] KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

Tab. 6 B: Material data sheet, polyester fibers, specific[17][18]

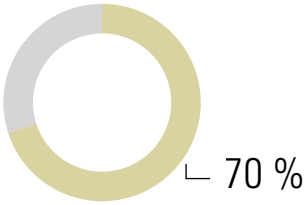
General description		
Certifications/Information	OEKO-TEX® STANDARD 100	
Fire resistance	BS 5852 Part 1, CAL117	
Delivery form	Mats, wadding, etc.	
Texture	soft, fibrous	
Color	Available in all colors	
Life cycle assessment data Comparative material for PE wadding (no data available) - PE nonwoven (GER)		9
Resource input per kg	**A1-A3**	
Total non-renewable primary energy (PENRT)	22 MJ	8
Use of freshwater resources (FW)	0,00252 m^3	10
Environmental impact per kg	**A1-A3**	
Global Warming Potential (GWP)	0,73 Kg CO_2-eqv.	8
Environmental impact Transport, per 1000 kgkm (approx. 0.5 kg/m^2)		6,5
Production site: Germany/ZEITRAUM		
Truck - ca. 500 km	A4	10
Total non-renewable primary energy (PENRT)	430,3 MJ	
Use of freshwater resources (FW)	0,030265 m^3	
Global Warming Potential (GWP)	32,055 Kg CO_2-eqv.	
Main raw material origin: n.a./production site		3
n.a. - ø > 7000 km	A4	
Total non-renewable primary energy (PENRT)	8456 MJ	
Use of freshwater resources (FW)	0,44716 m^3	
Global Warming Potential (GWP)	627,83 Kg CO_2-eqv.	
Sustainability Assessment		
Longevity	Very durable (> 20 years)	8
Biological reproduction/ recycled material	0 %	0
Circulation potential	100 % (technological)	10

[17] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

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

Socially compatible	Yes	9
Total average rating		**7,08**
Resistance to dirt	Not sensitive to dirt	
Properties		
Density	1380 kg/m³	
Acid resistance	Conditionally resistant to organic and mineral acids	
Moisture absorption	0,2 to 0,5 %	
Thermal properties		
Softening temperature Vicat	ca. 230 °C to 240 °C	
Melting point/range	250 °C	

7 Steel



Tab. 7 A: Material data sheet, steel, general[19]

Material group	Natural material; metals; transition metals
Parts origin	Italy and Turkey
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

[19] 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. 7 B: Material data sheet, steel, specific[2021]

General description		
Certifications/Information	ISO 14001, ISO 9001	
Emission class (formaldehyde)	Formaldehyde free	
Surface	smooth, hard	
Color	Grey	
Life cycle assessment data Steel profile, powder-coated (GER)		4,33
Resource input per kg	**A1-A3**	
Total non-renewable primary energy (PENRT)	12,49 MJ	2
Use of freshwater resources (FW)	0,0026 m^3	4
Environmental impact per kg	**A1-A3**	
Global Warming Potential (GWP)	1,09 Kg CO_2-eqv.	7
Environmental impact Transport, per 1000 kgkm (7850 kg/m^3)		4
Production site: Italy, Turkey/ZEITRAUM		
Truck ø - ca. 1500 km	A4	8
Total non-renewable primary energy (PENRT)	1812 MJ	
Use of freshwater resources (FW)	0,09582 m^3	
Global Warming Potential (GWP)	134 Kg CO_2-eqv.	
Main raw material origin: China/production location		0
Truck - ca. 2000 km	A4	
Total non-renewable primary energy (PENRT)	2416 MJ	
Use of freshwater resources (FW)	0,12776 m^3	
Global Warming Potential (GWP)	179,38 Kg CO_2-eqv.	
Container ship - ca. 10000 km	A4	
Total non-renewable primary energy (PENRT)	1094 MJ	
Use of freshwater resources (FW)	0,005636 m^3	
Global Warming Potential (GWP)	90,11 Kg CO_2-eqv.	
Sustainability Assessment		

[20] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

[21] 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
Total average rating		**7,05**
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/cm³	
Electrical conductivity	9,93*10^6 S/m	
Thermal Abrasiveness	80,2 W/(m*K)	
Mechanical properties mild steel		
Yield strength (ßs)	185 - 360 N/mm²	
Tensile strength (ßz)	310 - 680 N/mm²	
Elongation at break	18 - 26 %	
E-modulus (E)	210*10^3 N/mm²	
Shear modulus (G)	85*10^3 N/mm²	
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	

8 Polyamide

61 %

Tab. 8 A: Material data sheet, polyamide, general[22]

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

[22] KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

Tab. 8 B: Material data sheet, polyamide, specific[23][24]

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
Use of freshwater resources (FW)	0,04378 m^3	10
Environmental impact per kg	**A1-A3**	
Global Warming Potential (GWP)	16,91 Kg CO_2-eqv.	0
Environmental impact Transport, per 1000 kgkm (1140 kg/m^3)		6,5
Production site: Germany/ZEITRAUM		
Truck - ca. 500 km	A4	10
Total non-renewable primary energy (PENRT)	604 MJ	
Use of freshwater resources (FW)	0,03194 m^3	
Global Warming Potential (GWP)	44,845 Kg CO_2-eqv.	
Main raw material origin: n.a./production site		
n.a. - ø > 7000 km	A4	3
Total non-renewable primary energy (PENRT)	8456 MJ	
Use of freshwater resources (FW)	0,44716 m^3	
Global Warming Potential (GWP)	627,83 Kg CO_2-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		

[23] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

[24] 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	
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	

9 Varnish (moulded plywood)

53 %

Tab. 9 A: Material data sheet, lacquer, general[25][26]

Material group	Synthetic material; coating materials; varnish
Name	varnish (GB, US); Lack (D)
Manufacturer	Heidelberg Coatings Dr. Rentzsch GmbH
Manufactured in	Germany (GER)
Version	HD-AQUA TOP Farblos
Use	For the varnishing of heavily stressed surfaces in furniture and interior finishing, for hotel and school furnishings, for kitchen and sanitary furniture

[25] KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

[26] ADLER (2019) - ADLER PUR-Antiscratch HQ <https://www.adler-lacke.com/de> Accessed, on 02/03/2019

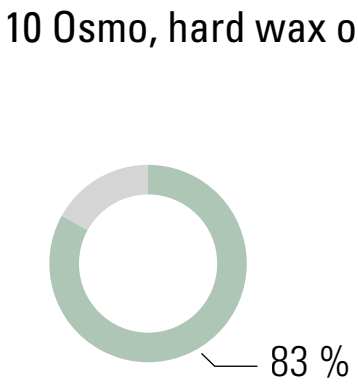
Tab. 9 B: Material data sheet, paint, specific[27][28]

General description		
Certifications/Information	DIN EN 71 - 3, DIN 68861 - 1, DIN EN 13501 - 1, DIN 4102 B1	
Emission class (formaldehyde)	Formaldehyde-free	
VOC's	5,76 %	
Delivery forms	Liquid	
Color	Transparent, colorless	
Texture	Glossy to matt (cured)	
Life cycle assessment data n.a. (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, per 1000 kgkm		9
Production site: Germany/ZEITRAUM		
Truck - ca. 200 km	A4	10
Total nicht erneuerbare Primärenergie (PENRT)	172,12 MJ	
Einsatz von Süßwasserressourcen (FW)	0,012106 m^3	
Global Warming Potential (GWP)	12,822 Kg CO_2-eqv.	
Main raw material origin: n.a./production site		
n.a. - ø 3000 km	A4	8
Total nicht erneuerbare Primärenergie (PENRT)	3624 MJ	
Einsatz von Süßwasserressourcen (FW)	0,19164 m^3	
Global Warming Potential (GWP)	296,07 Kg CO_2-eqv.	
Sustainability Assessment		
Longevity	Very durable/moderately repairable (> 20 years)	9
Biological reproduction/ recycled material	0 %	0
Circulation potential	Hazardous waste	0

[27] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

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

Socially compatible	Yes	9
Total average rating		**5,33**
Processing		
Apply	Spray gun	
Storage	Can be stored up to 5 years with tight closure	
Notes	For hardly combustible or hardly flammable superstructures	



Tab. 10 A: Material data sheet, Osmo, hard wax oil, general[29][30]

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

[29] KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

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

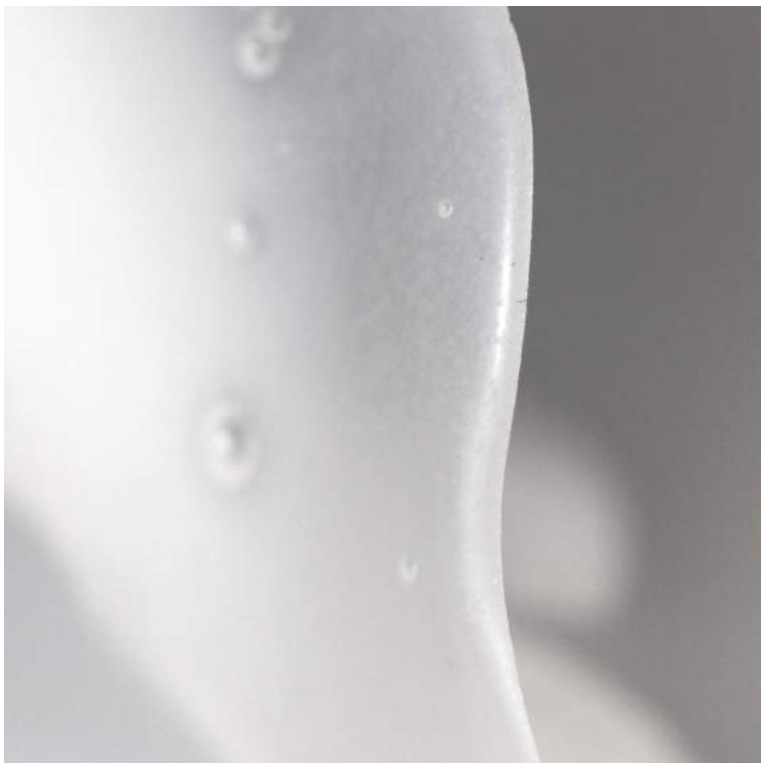
Tab. 10 B: Material data sheet, Osmo, hard wax oil, specific[31][32]

General description		
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)	
Contents		
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)	
Life cycle assessment data hard wax oil (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, per 1000 kgkm		9
Production site: Germany/ZEITRAUM		
Truck - ca. 200 km	A4	10
Total non-renewable primary energy (PENRT)	172,12 MJ	
Use of freshwater resources (FW)	0,012106 m^3	
Global Warming Potential (GWP)	12,822 Kg CO_2-eqv.	
Main raw material origin: n.a./production site		
n.a. - ø 3000 km	A4	8
Total non-renewable primary energy (PENRT)	3624 MJ	
Use of freshwater resources (FW)	0,19164 m^3	

[31] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

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

Global Warming Potential (GWP)	296,07 Kg CO_2-eqv.	
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
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	0,89 g/cm³	
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)	



11 PVAc dispersion adhesive, D3

64 %

Tab. 11 A: Material data sheet, PVAc dispersion adhesive, D3, general[33][34]

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

[33] KALWEIT A. (2012) - Handbook of technical product design - materials and manufacturing. Berlin: Springer Verlag

[34] KEIBERIT (2019) - KLEIBERIT 303, D3, PVAC Adhesive <https://interior-construction.kleiberit.com/fileadmin/Content/Documents/DE/Infoblaetter/303_D3_Leim_D.pdf> Accessed, on 02/03/2019

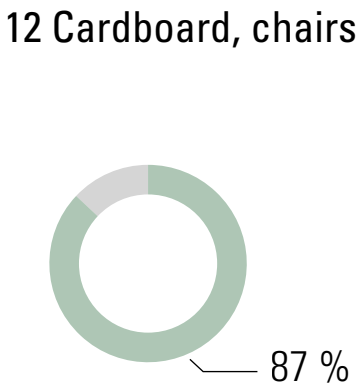
Tab. 11 B: Material data sheet, PVAc dispersion adhesive, D3, specific[35][36]

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
Use of freshwater resources (FW)	0,00758 m^3	10
Environmental impact per kg	**A1-A3**	
Global Warming Potential (GWP)	0,955 Kg CO_2-eqv.	10
Environmental impact Transport, per 1000 kgkm		6,5
Production site: Germany/ZEITRAUM		
Truck - ca. 200 km	A4	10
Total non-renewable primary energy (PENRT)	172,12 MJ	
Use of freshwater resources (FW)	0,012106 m^3	
Global Warming Potential (GWP)	12,822 Kg CO_2-eqv.	
Main raw material origin: n.a./production site		
n.a. - ø > 7000 km	A4	3
Total non-renewable primary energy (PENRT)	8456 MJ	
Use of freshwater resources (FW)	0,44716 m^3	
Global Warming Potential (GWP)	627,83 Kg CO_2-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

[35] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

[36] 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	
Properties		
Density	1,1 g/cm³	
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	



Tab. 12 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. 12 B: Cardboard chairs, specific[37][38]

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	
Life cycle assessment data „Kraftpapier" (GER)		10
Resource input per kg	**A1-A3**	
Total non-renewable primary energy (PENRT)	5,888 MJ	
Use of freshwater resources (FW)	0,004899 m^3	
Environmental impact per kg	**A1-A3**	
Global Warming Potential (GWP)	-0,8973 Kg CO_2-eqv.	
Environmental impact Transport, per 1000 kgkm		9
Production site: Germany/ZEITRAUM		
Truck - ca. 200 km	A4	10
Total non-renewable primary energy (PENRT)	172,12 MJ	
Use of freshwater resources (FW)	0,012106 m^3	
Global Warming Potential (GWP)	12,822 Kg CO_2-eqv.	
Main raw material origin: Germany, 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 m^3	
Global Warming Potential (GWP)	134,535 Kg CO_2-eqv.	
Sustainability Assessment		
Longevity	Moderately durable/repairable (< 10 years)	4
Biological reproduction/ recycled material	85 %	9

[37] BMI 2021: Oekobaudat. Database <https://www.oekobaudat.de/no_cache/en/database/search.html> Accessed, on 10/27/2021

[38] MATERIALARCHIV (2019) - Materialarchiv <http://www.materialarchiv.ch/app-tablet/#search> 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.