

Data Sheets (DS)

Correlation Values	DS 001-1
Technical characteristics of wood	DS 002-1
Technical data solid planks + Trio	DS 003-1
Technical data DUO-x	DS 004-1
Grading Trio	DS 005-1
Grading solid planks	DS 006-1
Grading DUO-x.....	DS 007-1

Fact Sheets (FS)

Wood flooring on underfloor heating	FS 001-1 / FS 002-1
Test report stress resistance	FS 003-1
Level tolerances	FS 004-1
Installation guide for solid planks	FS 005-1 / FS 005-2

Information (INF)

Fumed material (fumo/doppio fumo)	INF 001-1
Comparison oil	INF 002-1

Records (REC)

Record of measuring the moisture content of the screeds	REC 002-1
Record of objections	REC 003-1
Record of the acceptance of the construction work	REC 004-1

MAINTENANCE INSTRUCTIONS (MN)

Maintenance of oiled floors	MN 001-1 / MN 001-2
Maintenance of lacquered floors	MN 002-1

Equilibrium moisture content of wood

Wood Flooring has a comfort level too: Wood flooring will perform best when the interior environment is controlled to stay within a relative range of 45 to 55 percent and a range of 20 to 25 °Celsius. Fortunately, that's about the same comfort range most humans enjoy. The charts below indicate the equilibrium moisture content of wood under various temperature and humidity conditions. The left column indicates temperature in Celsius. The row above indicates percent relative humidity. The values in the chart indicate the equilibrium moisture content (EMC) for any given combination of temperature and humidity. For at 20 °Celsius and 50% relative humidity, the equilibrium moisture content is 9,0%.

The shaded area indicates the generally recommended range for wood flooring, which occurs when temperature is 20-25 °Celsius and 45-55 percent relative humidity.

TEMPERATURE	RELATIVE HUMIDITY													
	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%
10 °C	5,4	6,2	7,0	7,8	8,6	9,4	10,1	11,0	12,0	13,2	14,7	16,2	18,1	21,1
15 °C	5,3	6,1	6,9	7,7	8,4	9,2	10,0	10,9	12,0	13,1	14,7	16,0	18,0	21,0
20 °C	5,0	5,9	6,7	7,5	8,3	9,0	9,9	10,8	11,8	13,0	14,3	16,0	18,0	21,0
25 °C	4,8	5,6	6,4	7,3	8,1	8,9	9,7	10,5	11,5	12,8	14,0	15,8	17,9	20,8
30 °C	4,5	4,3	6,2	7,0	7,9	8,6	9,4	10,3	11,2	12,4	13,9	15,5	17,5	20,0
35 °C	4,2	5,0	5,8	6,6	7,5	8,4	9,1	10,0	11,0	12,1	13,5	15,1	17,1	19,8
40 °C	3,8	4,7	5,5	6,3	7,1	8,0	8,8	9,7	10,7	11,8	13,2	14,9	16,9	19,3
	EMC													

Wood flooring is a natural product

Wood flooring is a natural product, full of elegance, harmony and charisma. With its charm and character the mellow tones will bring warmth to any room.

The attraction to wood should not be allowed to turn into disappointment due to bad planning, unprofessional installation or poor advice.

For the floor installer it is vital, that they know the moisture content of the floor that is to be laid, the climatic conditions that are expected within the room and the subfloor construction, so that they can assess the behaviour of the floor once it is laid. This data should be recorded before installation and handed over to the main contractor and any concerns regarding the suitability in which the flooring is to be laid such as moisture content of the subfloor, addressed prior to any installation taking place.

Technical Characteristics

Wood Species	Differential shrinkage value [%] ⁽¹⁾			Density ⁽²⁾	heat conductivity	
	radial	tangential	average value	average value [g/cm ³]	[W/mK] ⁽¹⁾	[W/mK] ⁽²⁾
Oak	0,18 – 0,22	0,28 – 0,35	0,26	0,69	0,13 – 0,20	0,17
Walnut	0,18 – 0,23	0,25 – 0,30	0,24	0,68	0,13	0,17
Cherry	0,16 – 0,18	0,26 – 0,30	0,23	0,63	-	0,15 – 0,17

sources:

(1) SELL, J. (1987): *Eigenschaften und Kenngrößen von Holzarten*, Baufachverlag AG Zürich

(2) WAGENFÜHR, R. (1996): *Holzatlas*, Fachbuchverlag Leipzig

(3) ÖSTERREICHISCHES NORMUNGSIINSTITUT (2001): *Katalog für wärmeschutztechnische Rechenwerte von Baustoffen und Bauteilen*

Technical Data

Technical data sheet	Solid	TRIO 16	TRIO 20/8
Moisture content	9% (± 2)	9% (±2)	9% (±2)
Top layer	35 % of the thickness	4 mm net thickness	8 mm net thickness
Thickness variation	(±) 0,5mm, mind. 70% of the surface	(±) 0,3 mm	(±) 0,3 mm
Admissible difference in length	not applicable	not applicable	not applicable
Admissible difference in width	(±) 0,3 %	(±) 0,5 mm	(±) 0,5 mm
Squareness	0,2 % along the width	0,2 % along the width	0,2 % along the width
Height difference	(±) 0,2 mm	(±) 0,2 mm	(±) 0,2 mm
Bending lengthwise (along element)			
Bow	0,1 %	0,1 %	0,1 %
Spring	1 %	2 %	2 %
Bending crosswise (across the width of element)	0,7 % of the width	0,7 % of the width	0,7 % of the width

Functional / Surface quality	Solid	TRIO 16	TRIO 20/8
Resistance to roller castors on chairs	EN 425	EN 425	EN 425
Bond strength / Cross cut test	EN ISO 2409	EN ISO 2409	EN ISO 2409
Chemical resistance	EN 13226	EN 13442	EN 13442
Scraping with furniture feet	EN 424	EN 424	EN 424
Slip resistance, inclined plane	DIN 51130	DIN 51130	DIN 51130
Sliding friction	DIN EN 13983	DIN EN 13983	DIN EN 13983

Physical quality	Solid	TRIO 16	TRIO 20/8
Thermal transmittance value	DIN EN 12664:2001 (oak)	DIN EN 12664:2001 (oak)	DIN EN 12664:2001 (oak)
Thermal conductivity	DIN EN 12524:2001 (0,14 (m ² K)/ W)	DIN EN 12524:2001 (0,14 (m ² K)/ W)	DIN EN 12524:2001 (0,14 (m ² K)/ W)
Inflammability	EN 13501-1 (C _{fl} -s1)	EN 13501-1 (C _{fl} -s1)	EN 13501-1 (C _{fl} -s1)
Transmission noise reduction	ISO 140-8 delta Lw	ISO 140-8 delta Lw	ISO 140-8 delta Lw

Additional information	Solid	TRIO 16	TRIO 20/8
Contents of formaldehyde	E1	E1	E1
Biological durability	class 1	class 1	class 1
Underfloor heating	suitable (335-1)	suitable (335-1)	suitable (335-1)

Thermal transmittance values	Oak	Walnut
14 mm solid	0,057 (m ² K)/ W	-
16 mm solid	0,066 (m ² K)/ W	-
20 mm solid	0,082 (m ² K)/ W	0,095 (m ² K)/ W
16 mm Trio	0,067 (m ² K)/ W	0,077 (m ² K)/ W
20 mm Trio	0,083 (m ² K)/ W	0,096 (m ² K)/ W

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Technical Data

Technical data sheet	DUO-x 14	DUO-x 20
Moisture content	9% (± 2)	9% (± 2)
Top layer	4,5 mm nominal	6 mm nominal
Admissible difference in length	not applicable	not applicable
Admissible difference in width	(\pm) 0,5 %	(\pm) 0,5 mm
Squareness	0,2 % along the width	0,2 % along the width
Height difference	(\pm) 0,2 mm	(\pm) 0,2 mm
Bending lengthwise (along element)		
Bow	0,2 %	0,2 %
Spring	2 %	2 %
Bending crosswise (across the width of element)	0,7 % of the width	0,7 % of the width

Functional / Surface quality		
Resistance to roller castors on chairs	EN 425	EN 425
Bond strength / Cross cut test	EN ISO 2409	EN ISO 2409
Chemical resistance	EN 13226	EN 13442
Scraping with furniture feet	EN 424	EN 424
Slip resistance, inclined plane	DIN 51130	DIN 51130
Sliding friction	DIN EN 13983	DIN EN 13983

Physical quality		
Thermal transmittance value	DIN EN 12664:2001 (oak)	DIN EN 12664:2001 (oak)
Thermal conductivity	DIN EN 12524:2001 (0,14 (m ² K)/ W)	DIN EN 12524:2001 (0,14 (m ² K)/ W)
Inflammability	EN 13501-1 (C _{fl} -s1)	EN 13501-1 (C _{fl} -s1)
Transmission noise reduction	ISO 140-8 delta Lw	ISO 140-8 delta Lw

Additional information		
Contents of formaldehyde	E1	E1
Biological durability	EN 350-2 (class 2)	EN 350-2 (class 2)
Underfloor heating	suitable	suitable

Thermal transmittance values	Oak	Walnut
14 mm Duo-x	0,058 (m ² K)/ W	0,068 (m ² K)/ W
20 mm Duo-x	0,083 (m ² K)/ W	0,096 (m ² K)/ W

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Grading Trio

	Noblesse	Natural (doppio fumo)	Country
Healthy sapwood	no	no	up to 1/3 of plank width
Discolored sapwood	no	no	occasional
Sound knots	up to 20 mm, max. 2 per linear meter	up to 40 mm	yes
Open knots	up to 5 mm	up to 10 mm	filled up to 30 mm
Knots unfilled	no	no	up to 5 mm
Filled parts	Fissures from branches, holes < 5 mm	holes up to 10 mm	holes up to 20 mm
Color variations	natural	yes	yes
Water marks	no	no	occasional
Shakes on the surface vertical	no	no	yes, up to 10 cm
Splits on the end joints	no	no	occasional, 2-3 cm
Splintering shakes	no	no	no
Grain	yes	yes	yes
Coars grain	no	yes	yes
Heartwood	no	no	yes
Infestation with insects	no	no	fumo only

5 % of the quantity can be of following grading.

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Grading Solid Planks

	Noblesse	Country
Healthy sapwood	no	up to 1/3 of plank width
Discolored sapwood	no	occasional
Sound knots	up to 20 mm, max. 2 per linear meter	yes
Open knots	up to 5 mm	filled up to 30 mm
Knots unfilled	no	up to 5 mm
Filled parts	Fissures from the branches, holes < 5 mm	holes up to 20 mm
Color variations	natural	yes
Water marks	no	occasional
Shakes on the surface vertical	no	yes, up to 10 cm
Splits on the end joints	no	no
Splintering shakes	no	no
Grain	yes	yes
Coars grain	no	yes
Heartwood	no	yes
Infestation with insects	no	fumo only

5 % of the quantity can be of following grading.

Grading Duo-x

	Prima	Noblesse	Country	Cottage
Healthy sapwood	no	no	up to 1/3 of plank width	up to 1/3 of plank width on both sides possible
Discolored sapwood	no	no	occasional	yes
Sound knots	occasional sound knots < 5 mm	up to 20 mm, max. 2 per linear meter	yes	yes
Open knots	no	up to 5 mm	filled up to 30 mm	yes, filled up
Knots unfilled	no	no	up to 5 mm	up to 5 mm
Filled parts	no	Fissures from branches, holes < 5 mm	holes up to 20 mm	filled up to 35 mm
Color variations	natural, not to rough	natural	yes	yes
Water marks	no	no	occasional	yes
Shakes on the surface vertical	no	no	yes, up to 10 cm	yes, up to 10 cm
Splits on the end joints	no	no	occasional, 2-3 cm	yes, plank width
Splintering shakes	no	no	no	no
Grain	yes	yes	yes	yes
Coars grain	no	no	yes	yes
Heartwood	no	no	yes	yes
Infestation with insects	no	no	fumo only	fumo only

5 % of the quantity can be of following grading.

GUIDELINES FOR THE INSTALLATION OF AN ENGINEERED FLOOR ON UNDERFLOOR HEATING

Research has shown that the quality of the floor surface strongly affects the feeling of comfort.

With wood flooring the feeling of comfort is there from the outset due its favourable warm nature. The advantage is that wooden floors always maintain the ambient temperature and never feel cold in the same way that "hard" surfaces such as tiles or stone would.

When laying wood floors on cement screeds, make sure a time frame of around 4-5 weeks is allowed for curing and natural drying. To remove residual moisture completely, it will be necessary to adhere to the process of turning the heating up and down, as described below.

When planning the underfloor heating, take care that the pipes are not laid too far apart from each other (distance of approx. 150 mm), in order to achieve a consistent surface temperature.

At present two different underfloor heating systems are in use:

- a. Warm water : small pipes are laid in the screeds, min. 4,5 cm under the screed surface. Warm water is sent through these pipes and the resulting heat radiates up through the wooden flooring.
- b. Electrical: Comes in various forms such as rolls of loose cable to lay in screed or on top of the subfloor and in the form of matting but the basic principal remains the same. Electricity is passed through the cabling, heating it up and therefore passing the heat through the wooden flooring. This method can be particularly useful where there is a low ceiling height or restrictions with door clearance.

For both heating systems the following has to be observed:

1. The surface and underside temperature of the wood floor should not exceed 26-27 °C. Also, at these temperatures it will start to feel uncomfortable for the occupants and dust particles will be stirred up at temperatures exceeding 28°C.
2. Underneath the heating system there must be good heat insulation and a heat diffuser above it.

When using underfloor heating careful consideration should be given to exactly which species of wooden flooring should be used. Different species and grain structures will react in different ways when underfloor heating is turned on, therefore species such as beech should be avoided. Generally, timber with plain, even growth rings & straight grain will conduct heat better than timber with heavily figured grain. Additionally, the density of the wood can be a major factor and heat conduction of hardwood is approx 30% higher than that of softwood.

To guarantee a damage-free installation of the floor, it is necessary to follow technical guidelines that refer to the wood floor as well as to the subfloor (heat insulation, moisture insulation). For this reason the floor should be planned and laid by a professional installer.

(Excerpt of a bulletin issued by the Federal Board of Forestry Industry, 1033 Vienna, Marxergasse 2, postal code 6)

Bulletin for the installation of wooden floor on underfloor heating

Timber and timber materials have been used for many years to construct wooden floors and have proven to work well with underfloor heating. The data below is the result of research conducted by the Holzforschung Austria (Timber Research Austria) and sponsored by the Ministry of Construction and Engineering, and the long-term experience of miscellaneous floor constructions over underfloor heating.

1. Moisture barrier

In rooms level with the ground, without basement, or above gateways, damp rooms, alleys or garages a non-transient moisture and vapour barrier should be laid underneath the floor construction. Yet, damages due to moisture pushing through the underground cannot be prevented.

2. Appropriate subfloor

Over underfloor heating you can apply screeds in a wet condition (e.g. cement screeds) or in a dry condition (e.g. chipboards, cement-bound chipboards). As for the dry system, the air layer between the heat pipe and the underside of the screeds leads to a lower heat conductance of the floor construction. The residual moisture content (measured with the CM method) should be no more than 1,8 % for cements screeds and 0,3 % for anhydride screeds.

3. Recommended heating systems

We recommend low temperature heating systems (with warm water underfloor heating flow temperatures of up to 55 ° C). The surface temperature on the readily laid wooden floor should not exceed 29 ° C not even in the outer areas. Optimum values are 26 ° C to 27 ° C.

4. Distance of the heating pipes

To restrict heat peaks and lows on the surface (at a given maximum temperature reduced variations result in a higher average temperature and therefore a better performance of the heat system), the heating pipes should be laid between 10 and 20 cm apart from each other.

5. Relation of the thermal resistance

The thermal resistance values of the individual layers of the floor construction are to be aligned with the requested heat capacity according to the OENORM EN 1264-3. Care should be taken to ensure that there is a reasonable relation between the thermal resistance of the layers above the heating element (cement screeds or anhydride screeds and flooring) and below the heating element (heat insulation). The heat emission downwards should not exceed 20 W/m² or 25 % of the heating capacity. That means that the thermal resistance of the floor construction should not be too high.

The naturally given thermal resistance of timber and timber material restricts the thermal peaks and lows on the floor surface and this way create a consistent surface temperature. A high density of the wood is favourable to the heat conduction of the flooring. The conduction of hard wood is 30 % higher than that of soft wood.

(Vienna, May 2002 Th. Anderl, K.-P. Schober)

6. Heating of flooring screeds

Cement screeds must be flat, sound and sufficiently dry (see item 2). When the screeds are cured (approximately 4 weeks), the underfloor heating should be put into operation step by step (increase the flow temperature by 5 ° C daily). When you reach two thirds of the heating load, the screeds should be heated at a constant temperature. Before installing the flooring the temperature of the screeds should be lowered respectively (by turning off the heating).

7. Appropriate floorings

Basically, the wood floor you have chosen should be in accordance with the OENORM B 3000, 1-11. All wood floor types can be used as floorings (with the exception of cobble stone wood flooring). End grain wood block flooring, 1 strip wood floors or particularly wide lamellas as well as individual elements in laying units of floorings are less suitable. To reduce gaps, gradings with mainly vertical annual rings (for instance prime grading) should be used. Species that expand and contract heavily are not suitable (e.g. copper beech) or should be restricted to use with a dimensionally stable form.

The OENORM B 2218 (country specific standards) is applicable to the installation of wooden floors. When being installed, the moisture content of the floor should be in between 7 and 9 %. As it will go back to 5 - 7 % in the heating period, a low moisture content at the time of installation is recommended. By having a relative air humidity of 50 % visible gaps can be more or less prevented.

According to the OENORM B 2242-7 (country specific standards) the flooring is to be glued down over the entire surface of the screeds, a floating installation is not admissible. Before applying the glue, which should withstand a permanent temperature of 50 ° C, a precoat should be applied. The thickness of the wood floor should not be more than 24 mm.

Only begin to install the flooring after the heating process according to the country specific standards has been completed.

8. General

Gaps that can appear later are less noticeable with wooden floors that are laid in certain patterns (e.g. mosaic or parquet floors) where the directions of the grain vary and with shorter individual lamellas, than they are with wooden floor that is laid in rows and with long individual lamellas (e.g. planks).

To avoid damage to the wood floor and rising heating costs, do not lay carpets on floorings with an underfloor heating system installed.

9. Technical characteristics of some species

The differential degrees of shrinkage (change of dimension per percentage change of wood moisture content) in the table are listed for the different grain directions. When using gradings with mainly vertical annual rings (e.g. prime grading), the expansions and contractions are less distinct, because the change of width is here a result of the lower radial shrinkage.

Test report stress resistance

The lacquer build-up of the company Serenzo corresponds to the classification of strain 1 – 3 with standard coating in view of the requirements of the wooden- floor wear-category of the ihd. Stoppolish treated the classification of strain is 4 – 6. The measured value of an unbrushed floor board from Serenzo is $\mu \geq 0.26$. Values for brushed floor boards are not available.

Requirements of a wood flooring coating (version 01/2001)

Usage classification for wood flooring coating

Usage class	Area of usage	Degree of usage/ Usage description	Examples of area used in
1	residential area	slight / partial usage	bedroom, guestroom
2	residential area	medium / continuous normal usage	living room, dining room, study room
3	residential area	high/ intensive usage	entrance area, children's room, kitchen
4	usage in projects (public/commercial)	high/ intensive usage	hotel room
5	usage in projects	medium / continuous normal usage	boutiques, small shops
6	usage in projects	high/ intensive usage	shopping centres, multiple purpose halls

Requirements of "wooden floor coatings on beech" according to usage classification of Institute of Wood Technology Dresden (ihd)

Properties	Minimum requirement of the usage class					
	1	2	3	4	5	6
Basic properties						
Geometrical dimensions and moisture content acc. to EDIN 13489	Fulfills	Fulfills	Fulfills	Fulfills	Fulfills	Fulfills
Adhesion acc. DIN EN ISO 2409 (cross cut)	GTO-GT2	GTO-GT2	GTO-GT1	GTO-GT1	GTO-GT1	GTO-GT1
Brinell hardness of toplayer of wood acc ihd standards (N/mm ²)	no requirement	no requirement	no requirement	no requirement	no requirement	no requirement
Inclination to dirt acc. ihd standards (levels)	1	1	0	0	0	0
Chemical resistance: Exposure to chemicals acc to DIN 68861 T.1 + Water or enhance with test chemicals acc E DIN EN 13442 (Wood floors)	1C 5 h all test chem. (except acetone) 5 h acetone 10 s	1C 5 h all test chem. (except acetone) 5 h acetone 10 s	1C 16 h all test chem. (except acetone) 5 h acetone 10 s	1C 16 h all test chem. (except acetone) 5 h acetone 10 s	1B 16 h all test chem. (except acetone) 5 h acetone 10 s	1B 16 h all test chem. (except acetone) 5 h acetone 10 s
Abrasion: Abrasion values, acc E DIN EN 13696 (no. of cycles) (sandpaper test)	≥ 50	≥ 80	≥ 120	≥ 120	≥ 180	≥ 200
Hardness/Scratch resistance Diamond scratch hardness acc ihd standards in (N/50 μ m) and Scratch-/Elasticity acc to Hamberger test instr.(N)	≥ 0.20 ≥ 15 N	≥ 0.20 ≥ 15 N	≥ 0.25 ≥ 18 N	≥ 0.25 ≥ 18 N	≥ 0.30 ≥ 20 N	≥ 0.30 ≥ 20 N
Dent resistance/Elasticity:						
Results of knockings acc to ihd standards 425 (level) or elasticity test acc to DIN EN 13696	≥ 2 H	≥ 2 H	≥ 3 H	≥ 3 H	≥ 3 I	≥ 3 I
Results of chair castor rollers, soft rollers acc to DIN EN 425 (25000 cycles)	no requirement	no requirement	no lacquer tears	no lacquer tears	no lacquer tears no roller damage marks	no lacquer tears no roller damage marks
Safety tech. properties						
Slip resistance acc to DIN EN 13893/EDIN 53131 (Leather slider)(-)	$\mu \geq 0.22$	$\mu \geq 0.22$	$\mu \geq 0.22$	$\mu \geq 0.30$ (with cleaning material)	$\mu \geq 0.30$ (with cleaning material)	$\mu \geq 0.30$ (with cleaning material)
Resistance to cigarette butt, acc to DIN 68861 T.6 (class)	no requirement	no requirement	no requirement	no requirement	6 D	6 D
Aging process						
Resistance to climatic changes, acc to ihd standards 424 (cycles)	≥ 15	≥ 15	≥ 15	≥ 20	≥ 20	≥ 20
Light fastness (Yellowing tendency) of coating, acc to DIN EN 438 T.2 (450 h Xenon arc light) (Δb^*)	≤ 2.0	≤ 2.0	≤ 2.0	≤ 2.0	≤ 1.5	≤ 1.5

HEIDELBERG WOOD COATINGS

HEIDELBERGER LACKFABRIK RENTZSCH GmbH & Co. KG
Kurfürsting 100a 69123 Heidelberg
Tel.:06221/7485-0 Fax.:06221/775604



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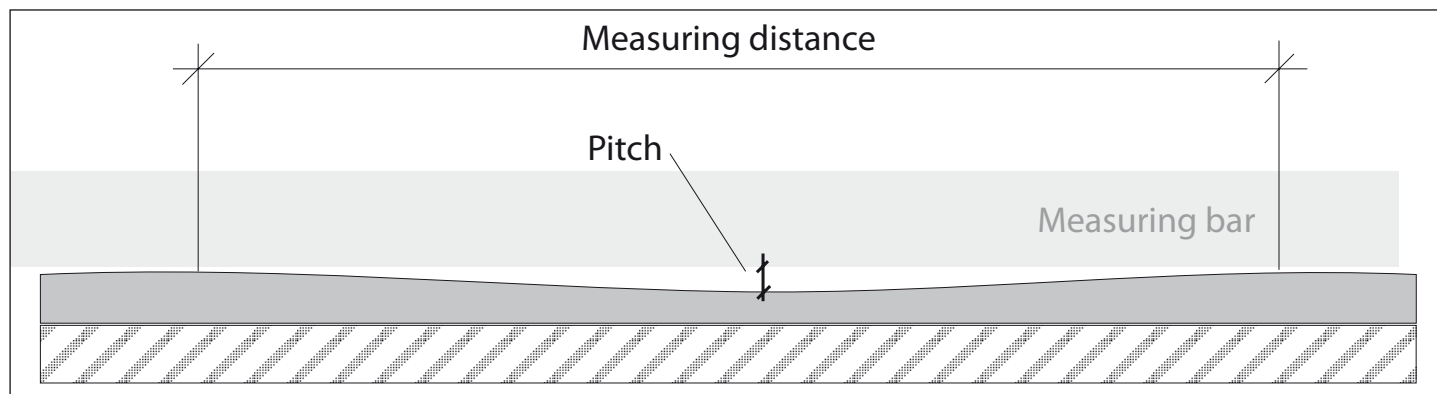
Measuring level tolerances

The evenness of screeds is usually determined with a measuring bar and a wedge.

distance between these two high points is called the measuring distance (sketch below)

To start with, the highest points of the screed surface have to be determined with the help of the bar. The easiest way to do this, is to lay the bar on the ground and move a piece of paper along the surface underneath the bar. Start in the middle and go outside until you reach the point where you can no longer move the paper. This is where the bar sits on its highest point. Next, do the same thing into the other direction to find the second high point. The

Next, a measuring wedge is pushed under the bar at the point where the distance between the surface of the screed and the underside of the bar looks the highest. This height/distance is called the pitch. Make sure, the measuring bar is not laid in a horizontal position and that you do not make your tests where the surface is heavily jagged.



At a measuring distance of for instance 1 m, the pitch can be 4 mm. If there is higher request to the leveling, max. 3 mm are admissible

Leveling tolerances for screeds and floorings

Measuring distance in [m]	pitch in [mm]
up to 0,10	2
up to 1,00	4
up to 4,00	10
up to 10,00	12
up to 15,00	15

Leveling tolerances for screeds and floorings

for special fields or upon request of the builder

Measuring distance in [m]	pitch in [mm]
up to 0,10	1
up to 1,00	3
up to 4,00	9
up to 10,00	12
up to 15,00	15

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Laying Instructions Serenzo Solids I

Fuming is a method to artificially age the colour of the timber, a chemical reaction of the tannic acid of the timber with certain gases, which can also be found in the air. Different concentrations of the tannic acid in the timber can result in colour variations that accentuate the natural beauty of the timber. As this is a natural feature and some colour variation will always be apparent claims regarding the colours can therefore not be accepted.

Please bear in mind that heavy (double) fumed timber may highlight these natural tannic variations to a greater extent and enhance the natural appearance of the timber.

Laying Instruction

These instructions are to be followed when laying the floorboards.

Principles for planning and execution

Thank you very much for selecting Serenzo[®] solid wood floorboards. Before laying the boards, ensure that your room fulfils the following requirements to show your Serenzo[®] solid wood floorboards off to their best advantage visually as well as functionally.

You have to make sure that no moisture can penetrate the wooden floor. In new buildings, it is recommended to play it safe and to ask the architect whether the underfloor has already reached the degree of dryness necessary for laying (according to DIN 18356, <2.0 CM % for cement screeds and < 0.5% for anhydrite screeds. As far as floor heatings are concerned, these values have to be reduced by 0.3 or 0.2 CM % in each case).

The rooms have to be completed including the painting work and heated before the Serenzo[®] floorboards can be laid.

The relative air humidity in the room has to be between 50 % and 60 % and the room temperature has to be approx. 20° during (and after) the laying process. In the cold season (September – April), let the unopened packages become acclimatised in the room for approx. 48 hours before laying the boards. This is not for adjusting the degree of humidity, but is intended to bring your Serenzo[®] solid wood floorboard to the ambient temperature. At any event, the packages may be opened only directly before they are laid. Your Serenzo[®] product was dried in state-of-the-art drying chambers to a final moisture content of 9 % (+/-2 %) and will keep its dimensions and its shape under ideal climatic conditions in the room.

The durability of your Serenzo[®] parquet floors requires a completely dried, perfectly level, suitable underground, non-porous intermediate fillings and sufficiently dry walls. The vendor accepts no liability in the event of a swelling up or of the formation of gaps as a result of an inexpert storage and/or laying and/or unsuitable climatic conditions in the room.

To avoid cavities below the floor, all spaces underneath the floorboards have to be filled. For filling up these cavities suitable materials have to be used. When bulk material is used, make sure that it does not settle between the floorboards when they are laid.

Laying

Fix floor joists

Normally Serenzo[®] solid wood floorboards are screwed on floor joists (OSB or chip-installation plate or already existing floorboards).

You have to make sure that no moisture can penetrate into the wooden floor. We generally recommend to install a vapour barrier (PE foil), especially in non-basement buildings and in new buildings. The foil has to be pulled up to the wall approx. 10 cm and cut off flush using a sharp knife after the skirting board has been fixed. In the area of the floor, the foil has to be installed overlapping by approx. 20 cm and glued on throughout with an adhesive tape.

Use special Serenzo[®] screws! Floor joists have to be fixed horizontally (spread a piece of string) and close-fitting and not more than 40 cm apart on the underground on which they are laid (they are only laid out and not fixed to the ground). The degree of dryness of the wooden substructure has to correspond to the one of the wooden board (approx. 7 – 11 %). If you want to use an old wooden ceiling as floor, keep to the run of the old beams when refurbishing them. Differences in height of the old support construction (old beam floor) result in an unevenness of the floorboards. In order to level them out, you can, for example, glue or nail small chipboard plates (no wedges) under the floor joists. In order to achieve a good footfall sound insulation, insulation strips (e.g. hard rubber strips) have to be laid everywhere under the floor joists and pulled up on the face sides up to the top surface of the floor joists.

Serenzo[®] Floorboards can be screwed on or glued on. In most cases, the floorboard is laid on OSB- or chipboards, as in the following description.

Lay the first row of floorboards with the tongue side towards the wall and fix the distance to the wall (approx. 1.5 cm) using wedges (available at specialised dealers). It is also urgently recommended to keep a distance of at least 1.5 cm to other fixed components, such as adjoining floors, balcony doors, heating pipes, etc. Edge joints that are proportionately larger are necessary for rooms that are bigger.

Screw on the floorboards of the first row directly from above (on the side of the walls, the screws will be concealed by the skirting board later on). Special Serenzo[®] screws prevent a subsequent pulling-out of the floorboards, the special thread with shaping profile saves the labour of pre-drilling.

Every floorboard has to be fixed with at least two screws on the long side and one screw on the face side; as a matter of principle, a screw has to be fitted at least every 40 cm. It is better to use too many screws than not enough!

t.b.c. on next page

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Laying Instructions Serenzo Solids II

Then fix the next floorboard row with the groove on the tongue of the floorboard row that has already been fixed. Help things along by means of light blows of the hammer on a piece of wood placed between the hammer and the floorboard (never hit the boards directly with the hammer).

The floorboards are screwed on diagonally at an angle of 45° through the tongue. The screwing from above is no longer applicable, as a matter of course. First use the remaining section of the row that has been laid previously for all the following rows. However, it may not be shorter than 30 cm.

You have to make sure that two forehead joints lying next to each other are at least 20 cm apart (offset). Pay attention to the saw cut when cutting the floorboards to size; when sawing by hand or using a circular table saw, the fibres split in direction of the bottom; for this reason, you have to turn the visible face of the board upward when sawing. Sawing with hand-held circular saws or electric keyhole saws works vice versa; here the wood fibres split in direction of the top. Here you have to turn the visible face downwards; make sure that the support is clean.

The last floorboard row is laid with a distance to the wall of approx. 15 mm (expansion joint). Lay the last floorboard row on the second last in such a way that it stretches beyond the second last row by the required distance from the wall (at least 15 mm). Use a spare piece as a spacer wedge and draw the outline of the wall on the exposed floorboard row, then separate it lengthwise accordingly. The last row is again screwed on from above, remaining visible. If the last board is very narrow, glue it to the previous row with tongue and groove.

After having removed the spacer wedges, the expansion joints and the screws are concealed with beautifully designed skirting boards. The skirting boards always have to be fixed on the wall, not on the floor. During the construction period, the Serenzo[®] floorboards have to be covered with foil in order to protect it against contamination.

As an alternative, Serenzo[®] solid wood floorboards can also be glued on over the entire surface with Serenzo[®] special glue. Do not use any other glue, because it may not have the necessary properties for the elastic glueing of solid wood floorboards. If other glues are used, the guarantee is void. Glues that are too inelastic may result in the formation of cracks and/or damage to the underground of the floorboards. We recommend you to have boards glued on over the entire surface only by an expert.

On no account may solid wood floorboards be laid floating!

Information Serenzo products »fumo«/»doppio fumo«



Important!

If you encounter a poignant odour, when opening a pack (caused by residues of ammoniac gas), let the open (!) packs air outside for one or 2 days. Make sure, you always protect the solids from moisture and humidity.

If you lay the solids in aired or closed rooms without first airing the packs, the ammoniac residues can tint your furniture, your doors or fixtures, which contain tannin. In addition, it is not guaranteed that the glue will dry adequately.

Serenzo applies special airing techniques to remove the residues before it despatches the product. Wood, however, is a natural product that might release the stored ammoniac only gradually because of varying temperatures or wrong warehousing (air humidity). Please acknowledge, that this does not justify any claims.

Information regarding the »fuming process«

»Fuming« is a special wood treatment technique to get a darker natural looking appearance. The colour tones achieved range from medium to dark brown and can go into black.

The advantage of this technique is that the natural shade of the wood can be maintained. As for the colour, fumed oak is comparable to bog oak.

Types of fuming

Fuming is done with ammoniac that reacts with tannin in the timber. The new colour tone is actually not only dependent on the period of time the timber is being treated but rather on the tannin content.

Serenzo distinguishes between two types of fuming: natural or surface fuming (fumo) and double (deep) fuming (doppio fumo), which are different in that the effect of the fuming process is either less or more intense.

The natural, surface or chamber fuming is a technique where the wood is being exposed to ammoniac in a tightly sealed chamber. Here the wood is being cured on the surface. When sanding the floor later, the upper layer of the wood is removed and as a consequence the timber can become blotchy.

The double fuming process requires a plant for generating a vacuum or low pressure together with high temperatures. The ammoniac gas released can that way go deeper into the timber and this results in a more intense colour.



Warning!

Woca common Natural Soap bleaches Fumo floors relatively hard. Therefore it is not recommended to use them!

As an alternative you may use Refresher, in case the floor is already too saturated, dilute it 1:4.0, otherwise 1:2.0. Furthermore Woca Mastersoap is good alternative because it lubricates less and does not bleach fumed floors.

“UV-Oil ” and “Natural Oil”

UV-Oil

- Oil and lacquer with “Oil look”, hardened by intensive UV-light.

Traditional Natural, Oxidative Oil

- Oil which crystallizes and hardens in contact with air without any additional treatment.

Eigenschaften

- | | |
|--|--|
| <ul style="list-style-type: none"> • UV-Oil, which has penetrated already into the wood and cannot harden by light anymore • To ensure a good surface, the oil has to remain on the wood where a lacquer also would be: on the surface of the wood. • UV-surfaces are very dense and are therefore almost like a urethane coating. • The high gloss enhances the noble character of the wood. • The smooth surface is easy to clean. Partial repair is possible, but not always with a satisfactory result. | <ul style="list-style-type: none"> • The oil penetrates into the wood. The oil reacts with the oxygen in the air and the oil hardens. • As the oil is in the wood, it ensures a direct contact with the wood. • The surface remains open structured. Regulation of the natural moisture is ensured and the floor is antistatic and dirt repellent. • The surface of the wood is natural silky-matt. • A traditional, hardening oil ensures an easily repairable surface. Partial repair is also possible. |
|--|--|

Initial maintenance

- | | |
|--|--|
| <ul style="list-style-type: none"> • UV-Oil is always industrially applied. • Use WOCA Maintenance Paste for the initial Maintenance. WOCA Maintenance Paste protects the joints and edges of the wood. Maintenance Paste is a traditional hardening product and may be used onto UV-oil surfaces. | <ul style="list-style-type: none"> • Use WOCA Maintenance Oil or WOCA Maintenance Paste for polishing of manually or industrially oiled floors. • Always use WOCA Maintenance Oil or WOCA Maintenance Paste for initial maintenance of pre-oiled floors in commercial areas. |
|--|--|

Cleaning

- Remove dust and dirt with a vacuum cleaner or a broom. Use WOCA Natural Soap, 2 bucket system and swep -mop. For commercial areas and badly illuminated areas use WOCA Master soap with a polishing machine. Micro fibres are not suitable as they damage and speed up the wear of the floor.

Renovation

- | | |
|--|---|
| <ul style="list-style-type: none"> • After the basic treatment with WOCA Intensive Wood Cleaner, use WOCA Maintenance Paste for renovation of dried surfaces. | <ul style="list-style-type: none"> • After the basic treatment with WOCA Intensive Wood Cleaner, use WOCA Maintenance Paste or oil for renovation of dried surfaces. |
|--|---|

Repair

If a partial sanding the floor is necessary it is important to make sure that the grinding pattern of the surface is exactly the same in texture and grain as the remaining one.

- | | |
|---|--|
| <ul style="list-style-type: none"> • After cleaning and a possible partial sanding a repeated re-oiling is made with Repair Oil until the required gloss is achieved | <ul style="list-style-type: none"> • After cleaning and a possible partial sanding a repeated re-oiling is made with Repair Oil until the required gloss is achieved. |
|---|--|

All information and pictures taken from:



WoodCare Denmark A/S · Havnevej 17 · DK-9560 Hadsund
Tel. +45 99 58 56 00 · Fax +45 99 58 56 42 · www.woodcaredenmark.com

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Record of measuring the moisture content of the screeds

Company's stamp		Contractor	
		Name/Company	
		Street	
		Postal Code	Place
		Telephone	Fax
		Contact person	
		Construction project or construction site	
		Construction section	
Apartment and/or level			
Documentation			
Measuring Nr.:	1	2 <i>only requested, if the screeds were too wet when measuring the first time</i>	3 <i>only requested, if the screeds were too wet when measuring a second time</i>
Room No.			
Inspector			
Date			
Result of the inspection			
Weighed portion [g]			
Indication of manometer [bar]			
Moisture content ⁽¹⁾ [%]			
<small>(1) Value from the table of the producer of the MC measuring device – corresponds to "MC %"</small>			
<i>The undersigned confirm the correctness of the measuring(s):</i>			
PLACE, DATE, STAMP AND SIGNATURE OF THE BUILDER/CONSTRUCTOR:			
PLACE, DATE, STAMP AND SIGNATURE OF THE SITE MANAGER/ARCHITECT:			
PLACE, DATE, STAMP AND SIGNATURE OF THE CONTRACTOR/INSTALLER:			

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Record of objections

Building project

After inspection of the above building project we record the following objections (according to country specific standards).

Reason

Damages to be expected

We request acknowledgement and a written notice about the further course of action with regard to the installation of the floor and/or preparation of the sub-floor. An installation according to the rules is NOT possible for the above mentioned reasons.

PLACE, DATE and SIGNATURE

PLACE, DATE and SIGNATURE

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Record of the acceptance of the construction work

Construction site

Constructor

Architect

Notes

I/we hereby confirm the suitability of the subfloor and whole installation area for the installation of engineered wooden flooring products based on the guidelines listed above. The maintenance instructions for the floor have been handed over to me/us.

PLACE, DATE, SIGNATURE of the CONSTRUCTOR/ARCHITECT

--

PLACE, DATE, SIGNATURE of the CONTRACTOR

--

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Initial and regular maintenance care with WOCA Maintenance Oil



Before a new floor is taken into use it is recommended to buff it – both industrially oiled floors and residentially oiled floors. The final buffing provides a hard-wearing surface and may take place either by hand or with machine.

Oiled floors should be maintained regularly – normally once a year, but more often in case of floors exposed to extremely hard wear.



1. Cleaning

Clean the floor with 125 ml Wood Cleaner mixed into 5 l water. Leave the floor to dry for at least 8 hours. The floor must be completely dry. In case of extreme dirt scrub floor manually using a pad or by machine. Wipe clean with mop or cloth. Always wipe a second time in order that as little water as possible remains on the surface. Repeat cleaning procedure if necessary.

Tip: Always work with two buckets – one with Wood Cleaner mixed with water and one with rinse water.

2. Application

Leave the floor to dry for at least 8 hours. The floor must be completely dry. Shake the container carefully. Apply approx. 100 ml oil per 4 m² with a pad, paint roller or cotton cloth, or use a polishing machine for large surfaces.



3. Polishing

It is important that the Maintenance Oil is carefully polished into the wood. Continue polishing until the wood appears saturated and the surface looks uniform.

4. Final polishing

Wipe the floor with clean, dry cotton cloths before proceeding with the next section of floor to be finished. The floor should not appear wet and there should not be any excess oil left on the surface after polishing. Continue in sections until the floor has been finished.

When polished with polishing machine, the floor will be pre-hardened after approx. 4 hours at 20° C and may cautiously be taken into use. Manually polished floors may be taken into use after 24 hours. The surface is fully hardened after 24 hours. Do not expose the floor to water during the hardening time.



Risk of self-ignition:

Due to the risk of self-ignition it is important that sanding dust and oilwetted cloths are soaked in water and disposed of in a tightly closed container after use.

All information and pictures taken from:



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Tel. +45 99 58 56 00 · Fax +45 99 58 56 42 · www.woodcaredenmark.com

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Regular cleaning of oiled surfaces

Natural Soap white is recommended for light wood species, while Natural Soap natural is ideal for dark wood. May be used for the cleaning and maintenance of all known oil systems. Natural Soap is a quality soap, which due to its nourishing properties quickly closes the pores of the wood and protects against dirt and penetration of liquids.



Always work with two buckets: one with Wood Cleaner mixed with water and one with rinse water.

Natural Soap white is shaken carefully before use. 125 ml Natural Soap is mixed with 5 l of lukewarm water. It is recommended always to work with 2 buckets: one with soap water and one with rinse water. Clean the floor with minimum quantity of water – leave soap water on floor briefly in order to dissolve dirt. Remove dirty soap water with hard wrung out mop or cloth and rinse out in bucket with rinse water. Always wipe floor with soap water with hard wrung mop or cloth in order to re-establish the protective Natural Soap film.

Tip: Very dirty floors may be cleaned with Wood Cleaner and subsequently with Natural Soap. Areas with heavy wear may be maintained with Maintenance Paste after cleaning with Wood Cleaner. Particularly difficult stains may be removed with Spot Remover.

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Occasional care and maintenance of oiled wood floors



WOCA Oil Refresher, natural is typically used for natural oiled and colour oiled floors, and WOCA Oil Refresher, white for white oiled wood floors.

WOCA Oil Refresher combines efficient cleaning with re-oiling, as additional oil is penetrating into the wood forming a mat protective layer on the surface.

1. Shake the bottle well before use.
2. The floor must be free from dust before treatment.
3. Mix WOCA Oil Refresher into lukewarm water:
 - » For traditionally oiled floors: 1:20 (250 ml WOCA Oil Refresher into 5 litres of water).
 - » For UV-oiled and oil-waxed floors: 1:40 (125 ml WOCA Oil Refresher into 5 litres of water).
 - » The mixture ratio can vary depending on wear and requirement.
4. Use two buckets – one with WOCA Oil Refresher mixed into water and one with rinse water. At first, dip the floor cloth or mop into the Oil Refresher mixture and clean the floor with the light wrung cloth or mop lengthwise of the floor. Then rinse the cloth or mop in clear water, wring hard and dip it into the Oil Refresher mixture again. This time the cloth or mop needs to be extremely hard wrung before wiping the floor again lengthwise of the floor, in order to leave as little moisture on the floor as possible. It is recommended to clean an area of approx. 10 m² at the time. By doing it this way the floor is exposed to moisture only for a short period.
5. Leave the floor to dry for approx. two hours before use.
6. If a light shine is wanted, polish the dry floor with a white pad.

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Comprehensive Waterbased Lacquer Care for the additional protection of lacquered surfaces

Lacquer Care strengthens the lacquer, as it protects against wear and scratches and hereby prolongs the lifetime of the lacquered surface.

Lacquer Care does not build up a thick layer on the floor surface as the old layer is renewed with the next application.

Regular cleaning of lacquered surfaces

Lacquer Soap is used for the regular cleaning of lacquered or painted surfaces and for surfaces of vinyl, floor tiles, linoleum, laminate etc. Lacquer Soap does not build a soap film and is therefore ideal for surfaces requiring frequent cleaning.



1. Cleaning

Important! Mix Wood Cleaner into water in the ratio 1:10. Clean the floor thoroughly until the surface is completely clean. The floor must be absolutely dry before application of Lacquer Care.

Tip: Always work with two buckets – one with Wood Cleaner mixed with water and one with rinse water.

2. Application

Apply the concentrated Lacquer Care to the cloth, wring out any excess liquid and apply the damp treated cloth on the floor. If dirty, rinse the cloth/mop in the clear water and wring it hard. Continue the application. Do not continue application of Lacquer Care when the floor has started to dry. Leave the surface to dry for approx. 30 minutes.



Always work with two buckets: one with Wood Cleaner mixed with water and one with rinse water.

Mix 125 ml Lacquer Soap into 5 l water for the regular cleaning. Clean the floor lengthwise. It is recommendable to work with two buckets – one with rinse water for the wringing out of the mop and another one with the soap solution.

It is recommendable to use as little water as possible for the cleaning and make sure that no water is left on the surface after cleaning.

Please notice! Particularly dirty floors may be cleaned with Wood Cleaner, and stubborn stains may be removed with Spot Remover.

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