Designation: swp
Version: 01.06.2018
Source: Holzforschung Austria
Preparation: HFA, PLB

Solid wood panel

Range of applications

_ as stated in the manufacturer's approval or
_ according to EN 13353

Technical class	Requirement	Service classes acc. to EN 1995-1-1
SWP1 S resp. SD	dry conditions, load bearing	1
SWP2 S resp. SD	humid conditions, load bearing	1 and 2
SWP3 S resp. SD	exterior conditions, load bearing	1, 2 and 3

General Description

In solid wood panels, individual softwood lamellae are sorted, planed, and assembled into multi-layered boards consisting of parallel outer layers and at least one core layer perpendicular to the orientation of the outer layers. Adhesive is used to bond the lamellae. Thus swelling and shrinkage due to climatic changes is minimal. Solid wood panels have a symmetric lay-up and the thickness of the outer layers is recommended to be at least 5 mm to fulfil the requirements for loadbearing structural timber components. No open joints are allowed in the core layer.

Typical board sizes [mm]

Width	Length		
	4000	5000	5050
1025		•	•
1250		•	
2050	•	•	•

Typically boards are 19 to 27 mm thick (please note: board thickness can also range between 16 and 42 mm)

Technical References

_ Approval provided by the manufacturer or

EN 13353	Solid wood panels (SWP) – Requirements
EN 13986	Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking
EN 1058	Wood-based panels – Determination of characteristic 5-percentile values and characteristic mean values
EN 1995-1-1/2	Eurocode 5 – Design of timber structures Part 1-1: General – Common rules and rules for buildings Part 1-2: General – Structural fire design
ÖNORM B 1995-1-1/2	Eurocode 5: Nationale Festlegungen, nationale Erläuterungen und nationale Ergänzungen zu ÖNORM EN 1995-1-1/2 (Eurocode 5: National specifications for the implementation of EN 1995-1-1/2, national comments and national supplements
EN 12369-3	Wood-based panels – Characteristic values for structural design Part 3: Solid-wood panels
EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests

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Mechanical properties

_ as stated in the manufacturer's approval or
_ according to EN 12369-3

The mechanical properties and densities for solid wood panel (characteristic values) are provided in Table 1 and Table 2. These values apply if the product is used as load-bearing board in service class 1 conditions. Please note that all the characteristic values regarding mechanical properties and densities provided in Table 1 have to be modified according to EN 1995-1-1 based on the service class and the duration of load (k_{mod}, k_{def}). To obtain the 5%-characteristic value of the stiffness, the average value listed in Table 1 should be multiplied by 0,85. For single-layer and multi-layer solid wood panels the modification factors for solid wood respectively plywood apply.

		multi-layer solid wood panels			
Thickness [mm]		12–20	>20–30	>30–42	>42
ρ [kg/m³]		410	410	410	410
f_m [N/mm²]	0	35,0	30,0	16,0	12,0
	90	5,0	5,0	9,0	9,0
f_p [N/mm²]	0	25,0	14,0	12,0	10,0
	90	12,0	12,0	12,0	12,0
f_t [N/mm²]	0	16,0	9,0	6,0	6,0
	90	6,0	6,0	6,0	6,0
f_c [N/mm²]	0	16,0	16,0	10,0	10,0
	90	10,0	10,0	16,0	16,0
f_v [N/mm²]	0	4,0	4,0	3,5	2,5
	90	5,0	3,5	2,5	2,0
f_r [N/mm²]	0	1,6	1,6	1,2	1,2
	90	1,4	1,4	1,4	1,4
E_m [N/mm²]	0	10000	8200	7600	7100
	90	550	550	1500	1500
E_p [N/mm²]	0	4700	2900	2400	1800
	90	3500	3500	4700	4700
E_t [N/mm²]	0	4700	3500	2400	2400
	90	2900	2900	2900	2900
G_v [N/mm²]	0	470	470	470	470
	90	470	470	470	470
G_r [N/mm²]	0	41	41	41	41
	90	41	41	41	41

Table 1: Characteristic values of multi.layer solid wood panels manufactured acc. to EN 13353 (excerpt from EN 12369-3)

		single-layer solid wood panels
Thickness[mm]		20–30
ρ [kg/m³]		410
f_m [N/mm²]	0	40,0
E_m [N/mm²]	0	10000

Table 2: Characteristic values of single-layer solid wood panels manufactured according to EN 13353 (excerpt from EN 12369-3)

Physical properties

_ as stated in the manufacturer's approval or
_ according to EN 13986 and EN ISO 10456

	Solid wood panels			
ρ [kg/m³]	300	500	700	1000
λ [W/mK]	0,09	0,13	0,17	0,24
μ	50/150	70/200	90/220	110/250

Please note: the μ-value of a material can be subject to substantial deviations. When uncertain use values provided in testing reports if such documents are available.

Fire performance

_ as stated in the manufacturer's approval or
_ according to Commission Decision 2007/348/EC

	≥400 kg/m³, ≥12 mm*
Euroclass	D
Smoke production	s2
Flaming droplets	d0

... except floor assemblies
* end-use conditions according to EN 13986 are to be considered

_ according to EN 1995-1-2

	ρ_k=450 kg/m³, 20 mm
charring rate $ß_0$	0,9 mm/min

Please note: for other densities and thicknesses < 20 mm the charring rate is to be calculated according to the following equation

$ß_{0,\rho,t} = ß_0\ k_\rho\ k_h$ where
$k_\rho = \sqrt{(450/\rho_k)}$
$k_h = \sqrt{(20/h_p)}$
ρ_k ... characteristic densit in kg/m³
h_p ... board thicknes in mm