

Particleboard



Range of applications

as stated in the manufacturer's approval or according to EN 312

Technical class	Requirement	Service classes acc. to EN 1995-1-1
P4 board	Load-bearing boards for use in dry conditions.	1
P5 board	Load-bearing boards for use in humid conditions	1 & 2
P6 board	Load-bearing boards for use in dry conditions, heavy duty	1
P7 board	Load-bearing boards for use in humid conditions, heavy duty	1 & 2

General Description

Particleboards are products manufactured from wood particles or particles from lignocellulosic raw materials using a binder. Additives such as wax emulsion for increased water resistance or wood preservatives may also be added. Particleboards usually contain several layers of materials or are pressed with gradual transition between layers. The relatively small particles are not aligned in a particular way, but are generally oriented parallel in the plane of the board. The boards are generally manufactured in continuous presses at high temperatures.

Typical board sizes [mm]

Length	2800 / 5610
Width	2070
Thickness	6 – 40

Technical references

Approval provided by the manufacturer or

EN 312	Particleboards – Specifications
EN 13986	Wood-based panels for use in construction Characteristics, evaluation of conformity and marking
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 12369-1	Wood-based panels Characteristic values for structural design Part 1: OSB, particleboards and fibreboards
EN 13501-1	Fire classification of construction products and building elements Part 1: Classification using data from reaction to fire tests

Particleboard

**Mechanical properties**

\_ as stated in the manufacturer's approval or  
 \_ according to EN 12369-1

P4 board

Thickness [mm]	>6-13	>13-20	>20-25	>25-32	>32-40	>40
$\rho_k$ [kg/m <sup>3</sup> ]	650	600	550	550	500	500
$f_{m,k}$ [N/mm <sup>2</sup> ]	14,2	12,5	10,8	9,2	7,5	5,8
$f_{t,k}$ [N/mm <sup>2</sup> ]	8,9	7,9	6,9	6,1	5,0	4,4
$f_{c,k}$ [N/mm <sup>2</sup> ]	12,0	11,1	9,6	9,0	7,6	6,1
$f_{v,k}$ [N/mm <sup>2</sup> ]	6,6	6,1	5,5	4,8	4,4	4,2
$f_{r,k}$ [N/mm <sup>2</sup> ]	1,8	1,6	1,4	1,2	1,1	1,0
$E_m$ [N/mm <sup>2</sup> ]	3200	2900	2700	2400	2100	1800
$E_{t,c}$ [N/mm <sup>2</sup> ]	1800	1700	1600	1400	1200	1100
$G_v$ [N/mm <sup>2</sup> ]	860	830	770	680	600	550

Table 1: Characteristic values for P4 type boards manufactured according to EN 312

P5 board

Thickness [mm]	>6-13	>13-20	>20-25	>25-32	>32-40	>40
$\rho_k$ [kg/m <sup>3</sup> ]	650	600	550	550	500	500
$f_{m,k}$ [N/mm <sup>2</sup> ]	16,5	15,0	13,3	12,5	11,7	10,0
$f_{t,k}$ [N/mm <sup>2</sup> ]	10,5	9,5	8,5	8,3	7,8	7,5
$f_{c,k}$ [N/mm <sup>2</sup> ]	14,1	13,3	12,8	12,2	11,9	10,4
$f_{v,k}$ [N/mm <sup>2</sup> ]	7,8	7,3	6,8	6,5	6,0	5,5
$f_{r,k}$ [N/mm <sup>2</sup> ]	1,9	1,7	1,7	1,7	1,7	1,7
$E_m$ [N/mm <sup>2</sup> ]	4400	4100	3500	3300	3100	2800
$E_{t,c}$ [N/mm <sup>2</sup> ]	2500	2400	2100	1900	1800	1700
$G_v$ [N/mm <sup>2</sup> ]	1200	1150	1050	950	900	880

Table 2: Characteristic values for P5 type boards manufactured according to EN 312

P6 board

Thickness [mm]	>6-13	>13-20	>20-25	>25-32	>32-40	>40
$\rho_k$ [kg/m <sup>3</sup> ]	650	600	550	550	500	500
$f_{m,k}$ [N/mm <sup>2</sup> ]	15,0	13,3	11,7	10,0	8,3	7,5
$f_{t,k}$ [N/mm <sup>2</sup> ]	9,4	8,5	7,4	6,6	5,6	5,6
$f_{c,k}$ [N/mm <sup>2</sup> ]	12,7	11,8	10,3	9,8	8,5	7,8
$f_{v,k}$ [N/mm <sup>2</sup> ]	7,0	6,5	5,9	5,2	4,8	4,4
$f_{r,k}$ [N/mm <sup>2</sup> ]	1,9	1,7	1,5	1,3	1,2	1,0
$E_m$ [N/mm <sup>2</sup> ]	3500	3300	3000	2600	2400	2100
$E_{t,c}$ [N/mm <sup>2</sup> ]	2000	1900	1800	1500	1400	1300
$G_v$ [N/mm <sup>2</sup> ]	960	930	860	750	690	660

Table 3: Characteristic values for P6 type boards manufactured according to ÖNORM EN 312

The mechanical properties and densities (characteristic values) for P4 and P6 boards are provided in Table 1 and Table 3. These values apply if P4 and P6 boards are used as load-bearing boards in service class 1 conditions. The mechanical properties and densities (characteristic values) for P5 and P7 boards are provided in Table 2 and Table 4. These values

apply if P5 and P7 boards are used as load-bearing boards in service class 1 conditions. If P5 and P7 boards are used as load-bearing boards in accordance with the conditions of service class 2, the characteristic values regarding mechanical properties and densities are provided in Table 2 and Table 4. Please note that all the characteristic values regarding mechanical properties and densities provided in this table have to be modified according to EN 1995-1-1 based on the service class and the duration of load ( $k_{mod}$  and  $k_{def}$ ). To obtain the 5%-characteristic value of the stiffness, the average value listed in this tables should be multiplied by 0,8.

**Physical properties**

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

	Particleboard		
$\rho$ [kg/m <sup>3</sup> ]	300	600	900
$\lambda$ [W/mK]	0,10	0,14	0,18
$\mu$	10/50	15/50	20/50

\_ as stated in the research report " Determination of thermal, acoustic and fire performance of wood and wood-based composites" (in German), MA 39-VFA (2002)

	P4	P5
$\rho$ [kg/m <sup>3</sup> ]	623	672
$\mu$ min - max	23,3 - 121,4	25,6 - 72,4
$f_K$ [Hz]	3400 - 3700 (12,1)	2700 - 3120 (12,1)
(d [mm])	2025 - 2270 (19,2)	1700 - 1970 (19,2)
	985 - 1350 (39,6)	1350 - 1610 (26,1)

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

## Particleboard

P7 board						
Thickness [mm]	>6-13	>13-20	>20-25	>25-32	>32-40	>40
$\rho_k$ [kg/m <sup>3</sup> ]	650	600	550	550	500	500
$f_{m,k}$ [N/mm <sup>2</sup> ]	18,3	16,7	15,4	14,2	13,3	12,5
$f_{t,k}$ [N/mm <sup>2</sup> ]	11,5	10,6	9,8	9,4	9,0	8,0
$f_{c,k}$ [N/mm <sup>2</sup> ]	15,5	14,7	13,7	13,5	13,2	13,0
$f_{v,k}$ [N/mm <sup>2</sup> ]	8,6	8,1	7,9	7,4	7,2	7,0
$f_{r,k}$ [N/mm <sup>2</sup> ]	2,4	2,2	2,0	1,9	1,9	1,8
$E_m$ [N/mm <sup>2</sup> ]	4600	4200	4000	3900	3500	3200
$E_{t,c}$ [N/mm <sup>2</sup> ]	2600	2500	2400	2300	2100	2000
$G_v$ [N/mm <sup>2</sup> ]	1250	1200	1150	1100	1050	1000

Table 4: Characteristic values for P7 type boards manufactured according to EN 312

### Fire performance

- \_ as stated in the manufacturer's approval or
- \_ acc. to Commission Decision 2007/348/EC

	$\geq 600 \text{ kg/m}^3, \geq 9 \text{ mm}$
Euroclass	D
Smoke production	s2
Flaming droplets	d0

...except floor assemblies

- \_ according to EN 1995-1-2

	$\rho_k = 450 \text{ kg/m}^3, 20 \text{ mm}$
charring rate $\beta_0$	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:

$$\beta_{0,\rho,t} = \beta_0 k_\rho k_h \text{ where}$$

$$k_\rho = \sqrt{(450/\rho_k)}$$

$$k_h = \sqrt{(20/h_p)}$$

$\rho_k$  ... characteristic density in kg/m<sup>3</sup>  
 $h_p$  ... board thickness in mm