

QUALITY CLASSES

ACCORDING TO DIN 68705 PART 2 AND EN 635-1

Face veneers of beech multiply panels (rotary cut veneers) are divided according to their quality based on DIN 68705 in quality classes I, II and III. Through a combination of the quality classes used, a current quality designation of the plywood is determined, the first of the two roman numerals describes the front side of the panel and the second numeral the back side. TS offers five different quality combinations: I / II, I / III, II / II, II / III, III / III



SPECIFICATIONS OF QUALITY CLASS I

Quality class I: wood colour and grain matching to one another. (Of the characteristics named, a max. of 2 can occur in parallel).

- 1 Slight discoloration of up to 1/8 of the surface
- 2 Three healthy knots or knot points up to Ø 15 mm per m²
- 3 Occasionally occurred filled edge splits up to 1/10 of the length of the panel and 3 mm of the width of the panel

SPECIFICATIONS OF QUALITY CLASS II

Of the characteristics named, a max. of 3 can occur in parallel.

- 1 Joints which are occasionally separated.
- 2 Slight discoloration and up to 1/4 of the surface with slight colour defects
- 3 Pin knots as well as individually occurring whirls, cross-grain wood spots, and pitch pockets, the latter also filled.
- 4 Four intergrown knots and cluster of knots up to Ø 25 mm per m²
- 5 Repaired knots capable of coating
- 6 Individually occurring filled splits which can be coated up to 1/5 of the panel length and 3 mm width
- 7 Individually occurring small insect holes
- 8 Slight glue penetration

SPECIFICATIONS OF QUALITY CLASS III

Of the characteristics named, a max. of 4 can occur in parallel.

- 1 Individually occurring defective joints
- 2 Colour defects
- 3 Pin knots, whirls, cross-grain spots and (plugged) blow holes
- 4 Four expanded knots and knot spots per square metre, for panels of three veneer layers knots up to Ø 25 mm, for panels of five or more layers, knots up to Ø 60 mm
- 5 Repaired spots
- 6 Tears up to 1/3 of the panel length and 5 mm width
- 7 Insect holes
- 8 Glue penetration
- 9 Rough spots with torn grains
- 10 Traces of overlapping of core joints

Note:

unobjectionable joints as well as individually occurring pin knots, small whirls and small pitch pockets do not count as defects.



PANELS · DESIGN/MOULDED PLYWOOD · FURNITURE · PROJECTS · MECHANICAL ENGINEERING · TRANSPORT/LOGISTIC · SPECIAL USE

TECHNICAL DATES

BEECH PLYWOOD.

THE HIGH – TECH – WOOD.

ELASTO MECHANICAL PROPERTIES

	Plywood all layers parallel	Multiply plywood with or without surface coating
specific gravity g/cm ³	0,75-0,80	0,78-0,88
e-module bending (load I parallel to the surface) N/mm ²	6500-14000	9000-16000
thrust module (load I parallel to the surface) N/mm ²	400-450	600-800
bending strength (load I parallel to the surface) N/mm ²	30-140	30-160
compression strength (load II parallel to the surface) N/mm ²	25-36	30-35
surface hardness (Brinell) N/mm ²	0,2-0,5	0,3-0,6
shearing of joints N/mm ²	2-4	2-4

PHYSICAL VALUES

RAW DENSITY:
0,70-0,85 g/cm³

**SWELLING IN LENGTH AND WIDTH
PARALLEL TO THE SURFACE:**
0,012-0,021%
according to % moisture increase

HEAT COEFFICIENT OF EXPANSION:
3,2 x 10⁻⁶ -5,0⁻⁶ per °C

HEAT CONDUCTIVITY:
vertical to the panel area
0,12-0,30 kcal/m h °C

INSULATING NUMBER:
1/4 of a 10 mm strong, uncovered veneer panel:
0,23-0,28 m²h°C/kcal

DIFFUSION RESISTANCE:
against steam related to air = 1
300-∞ (metal covered panels)

ELECTRIC PROPERTIES:
surface resistance: 10⁹ . . . 10¹¹ Ω
specific through resistance: 10⁸ . . . 10¹¹ Ω cm

TS beech veneer- and multiply panels offer an enormous variety of versions. Their areas of application are accordingly versatile, of which the most important are specified as examples.

- arm rests
- barrel covers
- bed sides
- boat building
- building of devices
- cable drums
- cable tunnel covers
- cabinet back panels
- container
- container bottoms
- casting moulds
- floor panels
- frameworks
- forms
- furniture
- hospital equipments
- hospital furniture
- lightweight elements for caravan construction
- model making panels
- orthopaedic devices
- pallets panels
- rifle shanks
- school furniture panels
- stage construction
- stair way panels
- shelf boards
- tile cutting tools
- tool boxes
- toy boxes
- vehicle components
- vehicle floors
- warehousing technology
- wooden drawer bottoms
- wooden drawer frames
- wagon building
- work bench panels



STRUCTURE OF THE PANEL

The bending strength and the modulus of elasticity can be changed and be laid out specifically for a certain use by variations of the direction of the layers, the sequence of the veneers of different strength, and/or the veneer strengths.

In the table this is represented by the example of a 15-ply multiply panel produced by equally strong veneers.



PANEL CONSTRUCTIONS:

The TS veneer- and multiply panels are constructed regularly from a usually odd number symmetrically arranged veneers to the centre of the panel: number of the layers and veneer strengths for the respective thickness of the panel are shown by the table. Depending upon accumulation or if differently agreed we supply in addition of it deviating panel constructions.

BEECH VENEER PANELS

thickness mm	number of plies	panel construction (I) long veneer, (-) cross veneer	long/cross % proportional
4	3	I-I	58/42
5	3	I-I	67/33
6	3	I=I	56/44
8	5	I-I-I	60/40
10	5	I=I=I	49/51
12	7	I-I=I-I	53/47

BEECH MULTIPLY PANELS

thickness mm	number of plies	panel construction (I) long veneer, (-) cross veneer	long/cross % proportional
15	7	I=II-II=I	55/45
18	9	I=I=I=I=I	45/55
20	9	I=II=I=II=I	50/50
25	11	I=II=II-II=II=I	53/47
30	13	I=II=II=II=II=II=I	51/49
35	15	I=II=II=II=II=II=II=I	51/49
40	17	I=II=II=II=II=II=II=II=I	50/50
45	19	I=II=II=II=II=II=II=II=II=I	51/49
50	21	I=II=II=II=II=II=II=II=II=II=I	50/50
I	1,23 mm	raw veneer thickness	
I -	1,8 mm	raw veneer thickness	
II =	2,8 mm	raw veneer thickness	

Example of the firmness- and rigidity distribution on the two panel axes by change of the direction of the layers of a 15-ply plywood panel, produced of equally strong veneers.

Ordinal number of the veneer layers	construction factor e-module		construction factor bending strength		e- module N/mm ²		bending strength N/mm ²	
	II to the face veneer	I- to the face veneer	II to the face veneer	I- to the face veneer	II to the face veneer	I- to the face veneer	II to the face veneer	I- to the face veneer
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15								
A - - - - -	1,000	0,000	1,000	0,000	15000	1000	145	15
B - I - - - -	0,740	0,260	0,740	0,300	11000	4000	107	43
C - I - I - - - -	0,626	0,374	0,626	0,430	9400	5600	90	62
D - I - I - I - - - -	0,597	0,403	0,597	0,466	8950	6050	87	67
E - I - I - I - I - - - -	0,593	0,407	0,593	0,470	8900	6100	86	68
F - I - - I - I I - I - I - -	0,489	0,511	0,489	0,590	7350	7650	71	85

All material properties are subjected stochastic sizes and coincidence fluctuations. With plywood approx. 95% of all values lie within the range of 14% of the determined average values.

