

INFORMATION SHEET

STRUCTURAL MATERIALS



PLYWOOD FEATURES

The information provided below has been taken from the New Zealand Timber Design Guide 2007, published by the Timber Industry Federation and edited by Professor A H Buchanan. To purchase a copy of the Timber Design Guide, visit www.nztif.co.nz

FEATURES

Plywood has number of significant features which enhance its use as either a structural or appearance product.

WORKABILITY

Plywood can be sawn, drilled, screwed and nailed with ordinary woodworking tools.

IMPACT RESISTANCE

Plywood has high impact resistance. It is ideal for heavy duty industrial use in lining, shelving, containers, pallets, bin linings, etc. In New Zealand, most plywood is made from medium density radiata pine and the surface may mark with sharp objects, and is not suited to highly trafficked floors where a clear finish is required, but is an ideal durable substrate for carpet, parquet or tile wearing surfaces.

FLEXIBILITY

As a thin sheet material plywood may be bent to single curvature (eg., in formwork or barrel vaults) or moulded to double curvature (eg., in furniture). Bending may be assisted by using water or steam. For curved structural elements, shapes for plates and frames can be cut from thick plywood sheets, wide timber or LVL. Thinner plywood for bending may then be screwed or nailed to these frames. The radius depends on thickness and construction. Lower grades will need bigger radii. Typical bending radii for various thicknesses are given in Table 1.

Table 1: Minimum bending radii for various thicknesses of plywood

Thickness (mm)	Along face (m)	Across face (m)
7	1.8	0.6
9	2.3	1.0
12	3.6	2.2
15	4.6	2.9
17	5.9	4.2
19	6.7	4.6
21	7.4	5.2
25	8.6	6.5

DIMENSIONAL STABILITY

Plywood is much more dimensionally stable than most other wood-based products because restraint by adjacent veneers reduces expansion and contraction due to moisture content change. Moisture change is limited because of the resistance of gluelines to the passage of moisture and the reduced absorption of water by wood which has been high temperature dried and hot pressed. Less distortion occurs in plywood sheets manufactured with the veneer quality and thicknesses symmetrical about the neutral axis. Bowing may result from any unequal exposure to moisture.

Moisture content of plywood after manufacture is usually 10% to 12% ex mill, for dry or LOSP-treated plywood, or 16% to 18% for plywood treated with water-based preservative. Consequently, panels used outside or in high moisture environments may increase 2 to 4 mm in width and length due to swelling and allowances for this should be detailed in design, adding space for a bead of sealant if necessary.

TWO-WAY STRENGTH AND NAIL HOLDING

Because of its cross banded construction, plywood possesses significant strength and stiffness both parallel and perpendicular to the face grain. Nails can be driven close to the edges (about 7 mm or three nail diameters) without splitting the panel because of the mutual restraint of adjacent perpendicular layers.

HIGH PANEL SHEAR STRENGTH AND STIFFNESS

The racking resistance of plywood is suited to use in structural bracing applications; shear walls or floor diaphragms where its high strength to weight ratio provides excellent load resistance while at the same time reducing building mass and seismic load. The in-plane strength, limited swell characteristics and high durability makes plywood ideal for the web material in fabricated members like I joists and box beams and it is a very good stiffening material in pallets, bins or boxes.