Timber Advisory Notes

Department of Conservation and Land Management

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IMPORTED TIMBER 13

Species: *Pseudotsuga menziesii* (Mirb.) Franco

Standard Trade Name: Douglas fir.

Common Names: Oregon, oregon pine.

1. Size of tree / type of forest: The most important softwood of North America, growing on the western fringe from Mexico to British Columbia. It is used as a plantation species in other countries, but there are only small areas of it in Australian plantations.

2. Wood description: Heartwood yellow brown to pale reddish brown. Sapwood distinctly paler, varying in width from about 50 mm in mature trees to 75 mm in fast growing plantation trees. Growth rings are very prominent because of the considerable difference in density and colour between earlywood and latewood, which leads to a coarse and uneven texture. Grain generally straight. Resin content can be high, causing occasional bleed-through of paint films, and a distinctive odour to the freshly cut surface. Spiral grain is rare and compression wood is relatively uncommon. Good quality wood near the pith.

3. Wood density:

Green density (kg/m^3):	About 650 kg/m^3
Air-dry density (kg/m^3):	About 530 kg/m^3
Basic density (kg/m^3):	About 370 kg/m^3

4. Drying and shrinkage:

	Tangential Shrinkage (%)	Radial Shrinkage (%)
Before reconditioning:	4.0	1.9
After reconditioning:	3.5	1.7

5. Workability: As it is one of the hardest softwoods it is only moderately easy to work. Care is needed in dressing as the softer earlywood may be compressed and later, on recovery, produces a ridged surface. This characteristic makes it unsuitable for wood turning. The strong contrast in hardness between earlywood and latewood makes it liable to wear unevenly. Poor base for paint because of the uneven nature of the wood, and in external applications early failure on the latewood of backsawn material is sometimes experienced. Inclined to split when nailed near the ends.

6. Durability Class: 4 Decay 4 Decay + termites (CSIRO revised ratings 1996).

7. Strength Groups: S5 and SD5.

8. Strength Properties:

Property	Units	Green	Dry
Modulus of Rupture	**MPa**	56	90
Modulus of Elasticity	**MPa**	12000	13000
Max Crushing Strength	**MPa**	26	55
Hardness	**kN**	2.1	3.1

9. Uses: Its availability in large sections and long lengths has made it suitable for structural framing, scantling, and laminated beams. It is also used in joinery, furniture, panelling, vats, boat building and for many years as window joinery timber. In North America the most important plywood species but seldom used for that purpose in Australia.

10. Availability: Readily available and in large sections.

BACKGROUND INFORMATION

1. **Size of tree and type of forest**

   Small trees have average heights up to 15 m, medium 15 to 30 m, and large over 30 m. Types of forest are sclerophyll (with closed canopy), woodland (with scattered trees), or rain forest. Diameter breast height is stem diameter at 1.3 m above ground.

2. **Wood description**

   For example, sapwood and heartwood colour, grain, figure

3. **Wood density (kg/m^3)**

   Green density is the density of wood in the living tree, defined as green mass divided by green volume, and useful for estimating transport costs. It varies with season and growing conditions.
   Air-dry density is the average mass divided by volume at 12 per cent moisture content (this is the average environmental condition in the coastal capital cities around Australia).
   Basic density is oven-dry mass divided by green volume. This measure has the advantage that moisture content variations are avoided.

4. **Drying and shrinkage**

   As wood dries, it shrinks more in the tangential direction (i.e. parallel to the growth rings) than it does in the radial direction (i.e. at right angles to the growth rings). The figures given are shrinkage from green to 12 per cent moisture content, before and after steam reconditioning treatment. Reconditioning recovers any cells that may have collapsed during drying, and is essential for species such as the ash-type eucalypts.

5. **Workability**

   Comments are made on the comparative ease or difficulty of turning, nailing and bending, on susceptibility to splitting and other working properties.

6. **Durability**

   The CSIRO Durability Classes are based on the performance in ground of outer heartwood when exposed to fungal and termite attack. Class 1 gives more than 25 years life, Class 2 gives 15 to 25 years, Class 3 gives 8 to 15 years, and Class 4 less than eight years. The ratings are not relevant to above-ground use. In late 1996, CSIRO published revised ratings, which include termite susceptibility.

7. **Strength grouping**

   In grading of structural timber, each species is allocated a ranking for green timber of S1 (strongest) to S7, and for seasoned timber SD1 (strongest) to SD8.

Minimum values for strength groups for green timber (units are MPa)

Strength property	S1	S2	S3	S4	S5	S6	S7
Modulus of rupture	103	86	73	62	52	43	36
Modulus of elasticity	16300	14200	12400	10700	9100	7900	6900
Maximum crushing strength	52	43	36	31	26	22	18

Minimum values for strength groups for seasoned timber (units are MPa)

Strength property	SD1	SD2	SD3	SD4	SD5	SD6	SD7	SD8
Modulus of rupture	150	130	110	94	78	65	55	45
Modulus of elasticity	21500	18500	16000	14000	12500	10500	9100	7900
Maximum crushing strength	80	70	61	54	47	41	36	30

8. **Strength Properties**

   Values are from Bootle, K.R. (1983). 'Wood in Australia. Types, properties and uses'. (McGraw-Hill)

9. **Uses**

   Various past and potential uses are given, but the list is obviously not conclusive.

10. **Availability**

    Timber from many species is available only near the areas that the trees grow naturally or in plantations. Imported timbers and their current availability are identified.