

INFORMATION SHEET

STRUCTURAL MATERIALS



SAWN TIMBER PERFORMANCE

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

Characteristic stresses for sawn timber are given in Tables 1 and 2.

Some of these tables have a value for E_{lb} which is the lower bound modulus of elasticity – this is the lower 5%ile value which should be used for the design of deflection-critical members where there is no possibility of load sharing to other members. Single roof beams or lintels are members for which E_{lb} should be used.

For systems with 2 or 3 members acting together the modulus of elasticity $\frac{1}{2}(E+E_{lb})$ is used. Refer to NZS3603:1993, Amendment 4.

Table 1: Characteristic stresses for visually graded timber, radiata pine and Douglas fir

1. Moisture condition – Dry (m/c = 16%)							
Grade	Bending f_b (MPa)	Compression parallel f_c (MPa)	Tension f_t (MPa)	Shear in beams f_s (MPa)	Compression perpendicular f_p (MPa)	Modulus of elasticity E (GPa)	Lower bound modulus of elasticity E_{lb} (GPa)
VSG10	20.0	20.0	8.0	*	8.9	10.0	6.7
VSG8	14.0	18.0	6.0	*	8.9	8.0	5.4
No. 1 Framing	10.0	15.0	4.0	*	8.9	6.0	4.0
2. Moisture condition – Green (m/c = 25%)							
G8	11.7	12.0	4.0	2.4	5.3	6.5	4.4
No. 1 Framing	7.5	11.0	3.0	2.4	5.3	4.8	3.2

NOTES –

* Shear strength for dry Radiata pine shall be taken as $f_s = 3.8$ MPa. Shear strength for dry Douglas fir shall be taken as $f_s = 3.0$ MPa.

Modulus of rigidity shall be taken as $G = E/15$.

No. 1 Framing grade is not verified and is not subject to in-mill monitoring of strength and stiffness properties. No. 1 Framing is visually graded to the requirements of NZS 3631.

VSG grades shall be verified as required by NZ 3622.

VSG10 and VSG8 for green use are visual grades that have been verified in the dry condition.

G8 is a visual grade that has been verified in the green condition.

The green condition stresses and moduli values shall be used where the grades shown are used in service conditions where the moisture condition may be 25% or over. The durability requirements of NZS 3602:2003 must also be met.

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Table 2: Characteristic stresses for dry mechanically graded timber, radiata pine and Douglas fir

Grade	Bending	Compression parallel	Tension	Shear in beams	Compression perpendicular	Modulus of elasticity	Lower bound modulus of elasticity
	f_b (MPa)	f_c (MPa)	f_t (MPa)	f_s (MPa)	f_p (MPa)	E (GPa)	E_{lb} (GPa)
MSG15	41.0	35.0	23.0	*	8.9	15.2	11.5
MSG12	28.0	25.0	14.0	*	8.9	12.0	9.0
MSG10	20.0	20.0	8.0	*	8.9	10.0	7.5
MSG8	14.0	18.0	6.0	*	8.9	8.0	5.4
MSG6	10.0	15.0	4.0	*	8.9	6.0	4.0

NOTES:

* Shear strength for dry radiata pine shall be taken as $f_s = 3.8$ MPa. Shear strength for dry Douglas fir shall be taken as $f_s = 3.0$ MPa.

Modulus of rigidity shall be taken as $G = E/15$.

MSG grades shall be verified as required by NZS 3622.