

MAXIMUM SPANS FOR JOISTS AND RAFTERS*

The following tables provide a handy means of determining the maximum clear spans for wood joists and rafters. They are based upon a wide range of strength values and cover ordinary load conditions.

The span length should be limited by deflection to prevent cracks where ceilings are covered with some hard, inelastic material such as plaster. Where ceilings are not so covered and where a small amount of sag or spring is not objectionable the span length may be determined by the

bending strength of the member instead of by its stiffness.

All spans given in these tables are based on the actual sizes of lumber.

When the allowable stresses for timber are not prescribed in the local building code use the values given below. They are taken from the recommendations of the Forest Products Laboratory, Department of Agriculture, at Madison, Wisconsin, that were officially adopted by the American Society for Testing Materials and the American Railway Engineering Association.

ALLOWABLE UNIT STRESSES FOR STRUCTURAL TIMBER

(Pounds Per Square Inch)

Species of Timber	Modulus of Elasticity	BENDING		COMPRESSION	
		Stress in Extreme Fibre	Horizontal Shear Stress	Parallel to Grain, "Short Columns"	Perpendicular to Grain
Cedar, Western Red.....	1,000,000	900	80	700	200
Cedar, Northern White.....	800,000	750	70	550	175
Chestnut.....	1,000,000	950	90	800	300
Cypress.....	1,400,000	1,300	100	1,100	350
Douglas Fir (No. 1 Struct.).....	1,600,000	1,600	100	1,200	350
Douglas Fir (No. 2 Struct.).....	1,500,000	1,300	90	1,000	300
Douglas Fir, Rocky Mt. Region.....	1,200,000	1,100	85	800	275
Fir, Balsam.....	1,000,000	900	70	700	150
Gum, Red.....	1,200,000	1,100	100	800	300
Hemlock, Western.....	1,400,000	1,300	75	900	300
Hemlock, Eastern.....	1,100,000	1,000	70	700	300
Larch, Western.....	1,300,000	1,200	100	1,100	325
Maple, Sugar or Hard.....	1,600,000	1,500	150	1,200	500
Maple, Silver or Soft.....	1,100,000	1,000	100	800	350
Oak, White or Red.....	1,500,000	1,400	125	1,000	500
Pine, Southern Yellow (Dense).....	1,600,000	1,600	125	1,200	350
Pine, Southern Yellow (Sound).....	1,500,000	1,300	105	1,000	300
Pine, Eastern White.....	1,000,000	900	85	750	250
Pine, Western White.....	1,000,000	900	85	750	250
Pine, Norway.....	1,200,000	1,100	85	800	300
Redwood.....	1,300,000	1,200	70	1,000	250
Spruce, Red, White or Sitka.....	1,200,000	1,100	85	800	250
Spruce, Engelmann.....	800,000	750	70	600	175
Tamarack, Eastern.....	1,300,000	1,200	95	1,000	300

* Prepared by Richard G. Kimbell, primarily as a service to Building Officials.