



***Tsuga mertensiana* (Bong.) Carr.**

Family: Pinaceae

Mountain Hemlock

The genus *Tsuga* contains about 14 species native to North America [4] and southern and eastern Asia [10]. The word *tsuga* is the Japanese name for the native hemlocks of Japan. The word *mertensiana* is named for Karl Heinrich Mertens (1796-1830), German naturalist and physician, who discovered it at Sitka, Alaska.

Other Common Names: Alpine hemlock, alpine spruce, berg-hemlock, black hemlock, mountain hemlock, Olympic fir, Pacific Coast hemlock, Patton's hemlock, Patton's spruce, Prince Albert's fir, tsuga de California, tsuga de Californie, tsuga de l'ouest, tsuga de Patton, tsuga di California, vastamerikansk berg-hemlock, weeping spruce, westamerikanische hemlocktanne, western hemlock, western hemlock spruce, Williamson's spruce.

Distribution: Mountain hemlock is native to the Pacific Coast region from southern Alaska (Kenai Peninsula) southeast through southeastern Alaska and western British Columbia and south in the mountains from western Washington to western Oregon, and the Sierra Nevada to central California. Also in the Rocky Mountain region from southwestern British Columbia south to northeast Oregon, northern Idaho and northwest Montana.

The Tree: Mountain hemlock trees reach heights of 50 to 150 feet, with diameters of 1 to 5 feet. A record is reported at 113 feet tall, with a diameter of 88 inches.

General Wood Characteristics: The heartwood is near white, sometimes with a purple tinge, while the sapwood is somewhat lighter. It is moderately light in weight and moderate in strength, hardness, stiffness and shock resistance. Trees may contain wetwood and/or have ring shake. The wood is intermediate in nail holding ability and has a tendency to split when nailed. It is satisfactory with respect to being glued and in taking stains, polish, varnish and paint.

Mechanical Properties (2-inch standard)

	Specific gravity	MOE GPa	MOR MPa	Compression		WML ^a Kj/m ³	Hardness N	Shear MPa
				Parallel MPa	Perpendicular MPa			
Green	0.42	7.17	43.4	19.9	2.55	75.8	2090	6.41
Dry	0.51	9.17	79.3	44.4	5.93	71.7	3020	10.6

^aWML = Work to maximum load.
Reference (56).

Drying and Shrinkage

Type of shrinkage	Percentage of shrinkage (green to final moisture content)		
	0% MC	6% MC	20% MC
Tangential	7.1	NA	NA

Radial	4.4	NA	NA
Volumetric	11.1	NA	NA
References: (56).			

Kiln Drying Schedules^a

Conventional temperature/moisture content-controlled schedules^a

Condition	4/4, 5/4 stock	6/4 stock	8/4 stock	10/4 stock	12/4 stock	British schedule 4/4 stock
Standard	T12-C5	T11-C5	T11-C4	T8-A4	T8-A3	K

^aReference (28, 185).

Conventional temperature/time-controlled schedules^a

Condition	Lower grades			Upper grades			
	4/4, 5/4 stock	6/4 stock	8/4 stock	4/4, 5/4 stock	6/4 stock	8/4 stock	12/4, 16/4 stock
Standard	291	291	291	NA	NA	NA	NA

^aReferences (28, 185).

High temperature^a

Condition	4/4, 5/4 stock	6/4 stock	8/4 stock	Other products
Standard	400	400	400	NA

^aReferences (28, 185).

Working Properties: The wood is intermediate in nail holding ability and has a tendency to split when nailed. It is satisfactory with respect to being glued and in taking stains, polish, varnish and paint.

Durability: Hemlocks are rated as being slightly or nonresistant to heartwood decay.

Preservation: Western hemlock is resistant to preservative treatment (5).

Uses: Roof decking, laminating stock, moldings, architectural trim, general construction, newsprint and plywood.

Toxicity: May cause dermatitis (4,8&13).

Additional Reading and References Cited (in parentheses)

1. Boone, R. S.; Kozlik, C. J.; Bois, P. J., and Wengert, E. M. Dry kiln schedules for commercial woods - temperate and tropical. Madison, WI: USDA Forest Service, FPL-GTR-57; 1988.
2. Dallimore, W.; Jackson, A. B., and Harrison, S. G. A handbook of Coniferae and Ginkgoaceae. London, UK: Edward Arnold Ltd.; 1966.
3. Elias, T. S. The complete trees of North America, field guide and natural history. New York, NY: van Nostrand Reinhold Co.; 1980.
4. Hausen, B. M. Woods injurious to human health. A manual. New York, NY: Walter de Gruyter; 1981.
5. Henderson, F. Y. A handbook of softwoods. London: HMSO; 1977.
6. Little, jr. E. L. Checklist of United States trees (native and naturalized). Washington, DC: USGPO, USDA Forest Service, Ag. Handbook No. 541; 1979.
7. Means, J. E. *Tsuga mertensiana* (Bong.) Carr. Mountain Hemlock. in: Burns, R. M. and Honkala, B. H., tech. coords. Silvics of North America. Volume 1, Conifers. Washington, DC: USDA Forest Service; 1990; pp. 623-634.

8. Mitchell, J. and Rook, A. Botanical dermatology: plants and plant products injurious to the skin. Vancouver, BC: Greenglass Ltd.; 1979.
9. Simpson, W. T. Dry kiln operator's manual. Madison, WI: USDA Forest Service, FPL Ag. Handbook No. 188; 1991.
10. Summitt, R. and Sliker, A. CRC handbook of materials science. Vol. 4. Boca Raton, FL: CRC Press, Inc.; 1980.
11. Taylor, R. J. The relationship and origin of *Tsuga heterophylla* and *Tsuga mertensiana* based on phytochemical and morphological interpretations. Am. J. Bot. 1972; 59(2):149-157.
12. USDA. Wood handbook: wood as an engineering material. Madison, WI: USDA Forest Service, FPL Ag. Handbook No. 72; 1974.
13. Woods, B. and Calnan, C. D. Toxic woods. British Journal of Dermatology. 1976; 95(13):1-97.
14. Youngs, R. L. Strength and related properties of mountain hemlock. Madison, WI, USA.: USDA Forest Service, Forest Products Laboratory, Research Paper FPL3.; 1963.