technology transfer *fact sheet*

Center for Wood Anatomy Research
USDA Forest Service • Forest Products Laboratory • One Gifford Pinchot Drive • Madison, Wisconsin 53705–2398

Pinus rigida Mill.
Family: Pinaceae
Pitch Pine

The genus *Pinus* is composed of about 100 species native to temperate and tropical regions of the world. Wood of pine can be separated microscopically into the white, red and yellow pine groups. The word *pinus* is the classical Latin name. The word *rigida* means rigid or stiff, referring to the cone scales. Pitch pine is one of the southern pines.

Other Common Names: Black Norway pine, black pine, hard pine, jack-pine, longleaf pine, longschat pine, mountain pine, northern pitch pine, Norway black pine, pech kiefer, pek-pijn, Pennsylvania yellow pine, pin a feuilles rigides, pin a l'aubier, pin raide, pin rigida, pino bronco, pino rigido, pino rogido, pitch pine, pitchpin, pond pine, red pine, regida pijn, ridge pine, rigid pine, sap pine, shortleaf pine, soderns gul-tall, southern yellow pine, torch pine, wiesen kiefer, yellow pine.

Distribution: Pitch pine is native to southern Maine west to New York, New Jersey and Pennsylvania and southwest, mostly in the mountains, to southern Ohio, Kentucky, eastern Tennessee, northern Georgia and northwestern South Carolina. Also locally in extreme southern Quebec and extreme southeastern Ontario.

The Tree: Pitch pine trees reach heights of 80 feet, with diameters of 2 feet.

General Wood Characteristics: The sapwood of pitch pine is a yellowish white, while the heartwood is a reddish brown. The sapwood is usually wide in second growth stands. Heartwood begins to form when the tree is about 20 years old. In old, slow-growth trees, sapwood may be only 1 to 2 inches in width. The wood of pitch pine is very heavy and strong, very stiff, hard and moderately high in shock resistance. It also has a straight grain, medium texture and is difficult to work with hand tools. It ranks high in nail holding capacity, but there may be difficulty in gluing. All the southern pines have moderately large shrinkage but are stable when properly seasoned. The heartwood is rated as moderate to low in resistance to decay. The sapwood is more easily impregnated with preservatives.

Mechanical Properties (2-inch standard)

	Specific gravity	MOE $x10^6$ lbf/in^2	MOR lbf/in^2	Compression		WML[a] in-lbf/in^3	Hardness lbf	Shear lbf/in^2
				Parallel lbf/in^2	Perpendicular lbf/in^2			
Green	0.47	1.20	6800	2950	360	9.2	470	860
Dry	0.52	1.43	10800	5940	820	9.2	620	1360

[a]WML = Work to maximum load.
Reference (56, 192).

Drying and Shrinkage

Type of shrinkage	Percentage of shrinkage (green to final moisture content)

	0% MC	6% MC	20% MC
Tangential	7.1	5.7	2.4
Radial	4.0	3.2	1.3
Volumetric	10.9	8.7	3.6

References: (56, 192).

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	T13-C6	T12-C5	T12-C5	T10-C4	T10-C4	L
Highest quality	279	279	279	T10-C4	T10-C4	NA

[a]Reference (28, 92, 185).

Conventional temperature/time-controlled schedules[a]

	Lower grades			Upper grades			
Condition	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	281	NA	282	281	NA	282	284

[a]References (28, 92, 185).

High temperature[a]

Condition	4/4, 5/4 stock	6/4 stock	8/4 stock	Other products
Standard	401/402	NA	NA	2 by 4's 403
				2 by 10's 403
				4 by 4's 404

[a]References (28, 184).

Working Properties: It also has a straight grain, medium texture and is difficult to work with hand tools. It ranks high in nail holding capacity, but there may be difficulty in gluing.

Durability: The heartwood is rated as moderate to low in resistance to decay.

Preservation: The sapwood is more easily impregnated with preservatives.

Uses: The denser and higher strength southern pine is used extensively in construction of factories, warehouses, bridges, trestles, and docks in the form of stringers, and for roof trusses, beams, posts, joists, and piles. Lumber of lower density and strength finds many uses for building material, such as interior finish, sheathing, subflooring, and joists and for boxes, pallets, and crates. Southern pine is also used also for tight and slack cooperage. When used for railroad crossties, piles, poles and mine timbers, it is usually treated with preservatives. The manufacture of structural grade plywood from southern pine has become a major wood-using industry.

Toxicity: In general, working with pine wood may cause dermatitis, allergic bronchial asthma or rhinitis in some individuals (5,10&15).

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. Gaby, L. I. The southern pines, an American wood. Washington, DC, USA: USDA Forest Service, FS-256; 1985.
5. Hausen, B. M. Woods injurious to human health. A manual. New York, NY: Walter de Gruyter; 1981.
6. Henderson, F. Y. A handbook of softwoods. London: HMSO; 1977.
7. Koch, P. Utilization of the southern pines. I. The raw material. II. Processing. Washington, DC, USA.: USDA Forest Service, Ag. Handbook No. 420.; 1972.
8. Little, jr. E. L. Checklist of United States trees (native and naturalized). Washington, DC: USGPO, USDA Forest Service, Ag. Handbook No. 541; 1979.
9. Little, S. and Garrett, P. W. *Pinus rigida* Mill. Pitch Pine. in: Burns, R. M. and Honkala, B. H., tech. coords. Silvics of North America. Volume 1, Conifers. Washington, DC: USDA Forest Service; 1990; pp. 456-462.
10. Mitchell, J. and Rook, A. Botanical dermatology: plants and plant products injurious to the skin. Vancouver, BC: Greenglass Ltd.; 1979.
11. Simpson, W. T. Dry kiln operator's manual. Madison, WI: USDA Forest Service, FPL Ag. Handbook No. 188; 1991.
12. Sternitzke, H. S. and Nelson, T. C. The southern pines of the United States. Economic Botany. 1970; 24(2):142-150.
13. Summitt, R. and Sliker, A. CRC handbook of materials science. Vol. 4. Boca Raton, FL: CRC Press, Inc.; 1980.
14. USDA. Wood handbook: wood as an engineering material. Madison, WI: USDA Forest Service, FPL Ag. Handbook No. 72; 1974.
15. Woods, B. and Calnan, C. D. Toxic woods. British Journal of Dermatology. 1976; 95(13):1-97.