

WESTERN RED CEDAR

Western Red Cedar (*Thuja plicata*) is one of North America's great renewable resources. Slow growing and naturally durable, Western Red Cedar has one of the longest life spans of any North American softwood. It produces long lengths of timber with true, straight grain. It is free from pitch and its heartwood has natural decay resistance. Its low density gives it an insulation value superior to most other species. Lightweight, easy to work, easy to finish, possessing excellent dimensional stability, Western Red Cedar is a preferred wood for nearly all purposes where attractive appearance or resistance to weather is important.

DENSITY

One of the lightest commercial softwoods, the density of Western Red Cedar at 12% moisture content (mc) is approximately 23 pounds per cubic foot with a relative density (specific gravity) of 0.32. The density of oven-dry material is 21 pounds per cubic foot.

Cedar's low density enhances its insulation value and makes it an easy wood to transport and handle.

DIMENSIONAL STABILITY

Like all woods, Western Red Cedar is hygroscopic and will absorb or discharge moisture to attain equilibrium with the surrounding atmosphere. However, it has a very low shrinkage factor and is superior to other coniferous woods in its resistance to warping, twisting, and checking. Shrinkage in both the radial and tangential directions is given in the shrinkage table on the back page.

DECAY RESISTANCE

One of Western Red Cedar's most valuable characteristics is its well-known high resistance to decay. It is one of the most durable coniferous species and can be counted on to give long and reliable service under most conditions.

Cedar's decay resistance comes from the presence of naturally occurring fungicidal compounds in the wood called thujaplicins.

Another extractive present in the wood, thujic acid, helps make the wood resistant to insect attack.

Properly finished and maintained, cedar will deliver years of reliable service. If exposed for prolonged periods to conditions where decay could be a factor, such as where the wood is in contact with the ground, cedar should be treated with suitable wood preservatives.

THERMAL CONDUCTIVITY

Wood is an excellent thermal insulator—an important characteristic because good thermal insulators help keep buildings cool in the summer and reduce heating costs in winter. The conduction of heat in wood is directly related to its density. Woods with low density have the highest thermal insulating value because such woods contain a high proportion of cell cavities. In dry wood, these cavities are filled with air, which is one of the best known thermal insulators.

With its low density and high proportion of air spaces, Western Red Cedar is the best thermal insulator among the commonly available softwood species and is far superior to brick, concrete, and steel. It has a coefficient of thermal conductivity (k value) at 12% mc of 0.74 BTU in./ft²h°F.

ACOUSTIC PROPERTIES

An important acoustic property of wood is

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its ability to damp vibrations. Wood has a cellular network of minute interlocking pores, which converts sound energy into heat by frictional and viscoelastic resistance.

Because of the high internal friction created by the cellular pore network, wood has more sound-damping capacity than most structural materials. Floor, ceiling, and wall assemblies of wood can provide effective economical sound insulation and absorption when properly utilized. Western Red Cedar is particularly effective in this regard and can be used to help reduce noise or to confine it to certain areas.

FLAME-SPREAD AND SMOKE DEVELOPMENT RATINGS

Western Red Cedar has flame-spread and smoke development classifications that are superior to the minimums set by the building codes. These ratings permit CedarOne® wood

to be used in many interior applications without treatment. The surface burning characteristics are used to regulate and control the rate of flame spread in case of fire. Lower ratings indicate more resistance to the spread of fire. Western Red Cedar has a class II rating of 69. This compares to Canadian and U.S. code requirements of 150 and 200 respectively. The smoke development classification for Western Red Cedar is 98, which is less than the code specifications of 300 and 450 for Canada and the U.S. respectively.

TERMITE RESISTANCE

The death rate of termites consuming Western Red Cedar varies with fiber source and the species of termites from 100% in several days to 40% in several weeks. Termites prefer food sources other than Western Red Cedar; however, in the absence of alternative food sources, some termites will attack Western Red Cedar. It is best to consult local experts

on their experience with Cedar's resistance to the specie of termite that inhabits the region. In the absence of local knowledge it is recommended that preventative treatments be made to ensure consistent resistance to attack in areas that are prone to termite attacks.

FASTENING

Western Red Cedar has good fastening properties but its natural preservatives have a corrosive effect on some unprotected metals in close contact, causing a black stain on the wood. Fasteners should be corrosion resistant— such as aluminum, hot-dipped galvanized, or stainless steel.

Nails and screws used to fasten Western Red Cedar should be about one-third longer than those used to fasten hardwood species.

Features of Western Red Cedar

Acoustic properties	Cedar tends to dampen sound transmission
Density (12% mc)	23 lb/ft ³
Specify gravity (12% mc)	0.32
Durability	Durable species
Fasteners	Corrosion resistant only (aluminum, hot-dipped galvanized, stainless steel)
Finishing	Paints, stains, varnishes, oils and waxes all work well
Flame-spread rating	69 (Class II)
Smoke development classification	98
k value (12% mc)	0.74 BTU in./ft ² h°F
R-value	1.35/in. of thickness
Stability	Cedar is one of the most stable softwood species
Workability	Easy to cut, saw, nail, and glue

Shrinkage of Western Red Cedar

Direction of Shrinkage	Shrinkage in Percentage					
	From green (25% or greater moisture content) to			From kiln dried (15% average moisture content) to		
	15%	12%	6%	15%	12%	6%
Radial	0.96	1.2	1.8	0	0.3	1.0
Tangential	2.0	2.6	3.8	0	0.7	2.1

Table Notes

- Radial shrinkage applies to the width of vertical grain lumber; tangential to the width of flat grain lumber.
- Shrinkage does not begin until the fiber saturation point is reached.
- 15% is the average equilibrium moisture content of wood during the summer in the Pacific Northwest.
- 12% is the average equilibrium moisture content in most areas of the U.S.
- 6% is the average equilibrium moisture content for interiors of heated buildings.

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Source: WRCLA "Western Red Cedar Quick Facts"