

# WESTERN RED CEDAR

Botanical Name:

*Thuja plicata* Donn ex D. Don

Western red cedar grows at low-to-mid elevations along the Coast and in the wet belt of the Interior, where the climate is cool, mild and moist. It is a large tree, up to 60 metres tall when mature and 2.5 metres in diameter. It is rarely found in pure stands and is often mixed with Douglas-fir, Sitka spruce, black cottonwood and red alder. Western red cedar makes up approximately 8% of British Columbia's total growing stock, and is one of the most commercially valuable species.

## Common Uses

Due to the unique properties of western red cedar, have been developed for a variety of different applications. The main attribute of western red cedar is its excellent durability and dimensional stability, leading to uses such as roof shingles, exterior siding, exterior cladding, decking, weather boarding, greenhouses, portable buildings, bee-hives, poles, posts, fences, ship and boat building, as well as boxes and crates. Red cedar is a popular wood for outdoor furniture and playground equipment.

Western red cedar is an attractive wood that is also used in interior applications. This wood is popular for sashes, doors and windows, ceiling and wall panelling, as well as for millwork. Due to its dimensional stability it is perfectly suited to uses such as sauna panelling, mouldings and window blinds. Red cedar is also a good choice for musical instruments due to its superb acoustic resonance properties.



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Western red cedar lumber is often sold green due to its unique properties and longer drying times. When dried, lumber is dried according to end-use and customer specifications. Kiln drying inhibits natural staining of the wood, improves its strength and stiffness, enhances its appearance, and increases its resistance to decay and attack by insects.

PHYSICAL PROPERTIES		
DENSITY (kg/m <sup>3</sup> )	Green	330
	Air Dry	339
SPECIFIC GRAVITY (12% M.C.)	Standard	0.33
HARDNESS (N)	Side	1470
	End	3000
MOE (Mpa)	Green	7240
	Air Dry	8270
MOR (Mpa)	Green	36.5
	Air Dry	53.8
COMPRESSION PARALLEL (Mpa)	Air Dry	33.9
COMPRESSION PERPENDICULAR (Mpa)	Air Dry	3.43
SHEAR (Mpa)	Air Dry	5.58
CLEAVAGE (N/mm Width)	Air Dry	25.4
SHRINKAGE OD = oven dry air = air dry 12%	Radial (OD)	2.1%
	Tangential (OD)	4.5%
	Volumetric (OD)	7.8%
	Volumetric (air)	4.8%
	Tang / Rad ratio	2.1

VISUAL PROPERTIES	
COLOUR	
Heartwood	Pinkish- or reddish-brown to dark chocolate-brown. On exposure to light, the colour becomes more uniform. Exposed to the weather, it assumes a pleasing silver-grey colour over time.
Sapwood	Straw coloured.
Heartwood / Sapwood Contrast	The sapwood is narrow and distinct from heartwood.
Latewood / Earlywood Contrast	The annual growth rings are distinct, defined by narrow bands of latewood. Transition from earlywood to latewood is abrupt in narrow rings and gradual in fast-growing, wide-ringed wood.
GRAIN	
The wood is generally straight-grained; has a uniform but medium coarse texture.	
FIGURE	
Plainsawn lumber or rotary-cut veneer: Distinct, inconspicuous growth ring. Quartersawn lumber or quarter-sliced veneer: Faint growth ring stripe. Other: Wood is non-resinous.	
KNOTS	
Medium to large knots.	
OTHER	
Wood of western red cedar is aromatic and is often described as sweet or chocolate-like. Free from pitch and resin.	



## WORKING PROPERTIES

Western red cedar is a fairly lightweight wood, which is moderately soft and low in strength. It is known for its excellent working properties, and its ability to take a smooth, satiny finish with sharp tools. It is relatively easy to work, with good machining qualities. It planes and shapes well and can be sanded to a smooth finish. The wood glues easily, has moderate nail and screw holding ability, and takes a good finish.

PROCESS	PERFORMANCE	COMMENTS
<b>MACHINING</b>		
Planing	Moderate to good	Recommended planer settings: 20° hook and 20 kmpi (knife marks per inch). Wood is subject to compression during planing. Must use sharp cutting tools. Wood is somewhat brittle and splintering is common.
Turning	Medium to low surface quality	Common defects: torn out grain.
Sawing	Easy to work with tools	Easy to saw because of its low density. Corrosive properties can be damaging to cutting blades.
Boring	Good to medium	Good boring quality with brad point bits and moderate quality with single twist bits.
Mortising	Moderate	Better mortising quality is found with a hollow chisel mortise.
Shaping	Good shaping quality	Splintering on the end-grain may be an issue. Recommended: The use of a counter piece for end-grain shaping.
Veneering	N/A	
Sanding	Excellent	
<b>FASTENING</b>		
Screwing	Low to moderate	Average screw retention: 308 lb.
Lateral Nail Holding	N/A	
Nail Retention	Low to moderate	Due to the acidic properties of its extractives this wood tends to accelerate the corrosion of metals, particularly when in contact with unprotected ferrous metal. Hot-dipped galvanized nails are recommended. It is essential that stainless steel, brass, aluminium, copper or metals with a protective coating be used when applying fittings, fixtures or fasteners.
Gluing	Easy	Bonds very easily with adhesives of a wide range of properties and under a wide range of bonding conditions.
<b>FINISHING</b>		
Staining	Easy	Very smooth texture achieved, but sometimes difficult to hide natural texture of wood. Very soft wood that loses some grain design as stain becomes darker. Some wild grain was present in Interior red cedar.
Painting	Moderate to good paint holding ability	
Lacquering	Good	Clear coats with little difficulty. A high build clear coat works best for the coastal wood while it was recommended for Interior red cedar to use a clear finish, nitrocellulose/alkyd sealer and finish system. Performed well in the tape test (i.e. small flakes of the coating were detached along edges and at intersections of cuts) and in the pull-off test (i.e. average strength of 25 kg/cm <sup>2</sup> ).
Waxing	Good	Good results are obtained when using light-, medium- or dark-coloured waxes (e.g. Mellow Pine, Chestnut or Jacobean).
<b>DRYING</b>		
Ease of Drying	Moderately easy to difficult	The drying of thin boards is generally easy with little degrade occurring. As red cedar tends to hold its moisture at the centre, care is required when drying thicker stock as internal honey-combing and collapse are common defects. Longer drying times are required.
<b>DURABILITY</b>		
Natural Decay Resistance	Durable	Appropriate for outdoor usage.
Treatability	Impermeable to extremely impermeable	Can be improved by incising.



## Commercial Availability

Western red cedar can be graded structurally under National Lumber Grades Authority (NLGA) grade rules. However, western red cedar is more often graded for appearance and specialty applications. These include clears, shop, fence, panelling, siding and other NLGA grades.



Data for this factsheet has been compiled by Forintek Canada Corp. from internal and external scientific sources. Forintek is a not-for-profit technical research institute serving the Canadian forest sector.