

# WESTERN RED CEDAR

## QUICK FACTS

### 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. Light weight, easy to work, easy to finish, possessing outstanding dimensional stability, Western Red Cedar is a preferred wood for nearly all purposes where attractive appearance or resistance to weather is important.

### FEATURES OF WESTERN RED CEDAR

Acoustic properties:	Cedar tends to dampen sound transmission
Density (12% mc):	23 lb/ft <sup>3</sup>
Specific 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:	45 (Class II)
Smoke developed classification:	125
k value (12% mc):	0.74 BTU in./ft <sup>2</sup> h°F
R value:	1.35/in. of thickness
Stability:	Cedar is the most stable softwood species
Workability:	Easy to cut, saw, nail and glue.

### PHYSICAL PROPERTIES

#### DENSITY

One of the lightest commercial softwoods, the density of Western Red Cedar at 12% moisture content 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 all other coniferous woods in its resistance to warping, twisting and checking. Shrinkage in both the radial and tangential directions is given in Table 1.

#### 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 trouble free 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 decades of trouble-free 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. This is an important characteristic since 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./ft<sup>2</sup>h°F.

**ACOUSTICAL PROPERTIES**

An important acoustical property of wood is 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.

**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.

**TABLE 2. SIZES OF ROUGH WESTERN RED CEDAR**

Thickness (in.)	Width (in.)
1	2
1 3/4	4
2	6
3	8
4	10
6	12
10	14
12	
14	

**TABLE 1. 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

*Notes to Table*

1. Radial shrinkage applies to the width of vertical grain lumber; tangential to the width of flat grain lumber.
2. Shrinkage does not begin until the fiber saturation point is reached.
3. 15% is the average equilibrium moisture content of wood during the summer in the Pacific Northwest.
4. 12% is the average equilibrium moisture content in most areas of the U.S.
5. 6% is the average equilibrium moisture content for interiors of heated buildings.



**TABLE 3. WESTERN RED CEDAR PRODUCTS**

Product	Thickness in. (nominal)	Width in. (nominal)	Grade	Grading Rule Paragraph		
				NLGA	WWPA	WCLIB
<b>Bevel Siding</b> Clear	1/2, 3/4	4, 6, 8, 10	Clear V.G. Heart A Rustic B C Proprietary	201a 201b 201d 201c 201e N/A	21.11 21.12 N/A 21.13 21.14 N/A	106-aa 106-a N/A 106-b 106-c N/A
Knotty	5/8, 11/16, 3/4, 7/8	6, 8, 10, 12	Select Knotty Quality Knotty Proprietary	205a 205b N/A	N/A N/A N/A	111-e 111-f N/A
Knotty-Rabbetted	3/4, 5/4	6, 8, 10	Select Knotty Quality Knotty	205a 205b	N/A N/A	111-e 111-f
Knotty-Wavy Edged	7/8	10, 12	Select Knotty Quality Knotty	205a 205b	N/A N/A	111-e 111-f
<b>Pattern Siding</b> Clear	1	4, 6, 8	Clear Heart A B	200a 200b 200c	20.11 20.12 20.13	102-b 102-c 102-d
Knotty	1	4, 6, 8	Select Knotty Quality Knotty Standard and Better Proprietary	204a 204b 114a, b, c N/A	N/A N/A N/A N/A	111-e 111-f 118-a, b, c N/A
<b>Clear Finish</b>	1/2, 1, 5/4, 2	2, 3, 4, 6, 8, 10, 12	Clear Heart A B	200a 200b 200c	20.11 20.12 20.13	102-b 102-c 102-d
<b>Boards</b>	1	2, 3, 4, 6, 8, 10, 12	Select Knotty Quality Knotty Standard and Better	204a 204b 114a, b, c	N/A N/A 30.50 (118a, b, c)	111-e 111-f 118-a, b, c
<b>Fence Boards</b>	1	6, 8, 10	Select Knotty Quality Knotty Rustic	210a 210b N/A	N/A N/A N/A	117-a 117-b 117-c
<b>Roof Decking</b>	2, 3, 4	6, 8	Select Commercial	127b 127c	55.11 55.12	127-b 127-c
<b>Outdoor Decking</b> Clear	5/4, 2	4, 6, 8, 10, 12	Architect Clear Custom Clear	} N/A	} N/A	} N/A
Knotty	5/4, 2	4, 6, 8, 10, 12	Architect Knotty Custom Knotty	} N/A	} N/A	} N/A
<b>Paneling</b> Clear	1/2, 1	4, 6, 8	Clear Heart A B	200a 200b 200c	20.11 20.12 20.13	102-b 102-c 102-d
Knotty	1/2, 1	4, 6, 8	Select Knotty Quality Knotty	204a 204b	N/A N/A	111-e 111-f
<b>Garden Lumber</b>	2, 3, 4 2, 3, 4	2, 3, 4 6, 8, 10, 12	Appearance Standard and Better Appearance No. 2 and Better	N/A 122b, c N/A 124a, b, c	N/A 40.11, 40.12 N/A 62.10, 62.11, 62.12	N/A 122-b, c N/A 123-a, b, c
<b>Timbers</b>	5, 6, 8, 10, 12	5, 6, 8, 10, 12 and wider	Appearance Standard and Better	N/A 131a, b, c	N/A 80.10, 80.11, 80.12	N/A 131-a, b, c
<b>Structural Timbers</b>	5, 6, 8, 10, 12	5, 6, 8, 10, 12 * Width more than 2" greater than thickness	*No. 2 and Better	130a, b, cc	70.10, 70.11, 70.12	130-a, b, cc

*Notes to Table*

1. Siding is available kiln-dried or air-dried with smooth or saw-textured surface. Factory primed siding is also available.
2. Paneling is available kiln-dried with smooth or saw-texture surface.
3. Grade descriptions are given in NLGA, WWPA and WCLIB grading rules. Grade descriptions of proprietary products are available from the manufacturer.

**TABLE 4. SIZES OF DRESSED WESTERN RED CEDAR LUMBER**

Item	Thickness (in.)			Width (in.)		
	Nominal	Actual		Nominal	Actual	
		Dry	Green		Dry	Green
Boards	1	11/16	3/4	2	1 1/2	1 9/16
	1 1/4	1	1 1/32	3	2 1/2	2 9/16
				4	3 1/2	3 9/16
				6	5 1/2	5 9/16
				8	7 1/4	7 3/8
				10	9 1/4	9 3/8
				12	11 1/4	11 3/8
Garden Lumber	2	1 1/2	1 9/16	2	1 1/2	1 9/16
	3	2 1/2	2 9/16	3	2 1/2	2 9/16
	4	3 1/2	3 9/16	4	3 1/2	3 9/16
				6	5 1/2	5 9/16
				8	7 1/4	7 3/8
				10	9 1/4	9 3/8
12	11 1/4	11 3/8				
Timbers	5		4 1/2	5		4 1/2
	6		5 1/2	6		5 1/2
	8		7 1/2	8		7 1/2

\* Surfaced timbers 10" and larger available only on special order. Confirm before specifying.

**REFERENCE LITERATURE**

The Western Red Cedar Lumber Association publishes reference material about the specification and use of members' products. The following publications are available from our website in either PDF format for instant download or you can order a hardcopy and request it to be mailed to you.

- Installing Western Red Cedar Siding
- Designers' Handbook
- Guide to Finishing Western Red Cedar
- How to Specify Western Red Cedar

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