Redwood

Architectural Guide

Redwood has long been a favorite among architects, designers, builders and homeowners. The reason is simple: Redwood is the best value in wood. Redwood provides more of the qualities professionals and clients demand of a building material. Beauty. Stability. Durability. Complete performance.

Specifying Redwood

Redwood's natural beauty and performance characteristics make it ideal for a wide variety of architectural projects. There is an ideal grade, grain, seasoning and pattern for every project. The information on this page discusses redwood properties and the descriptive details that comprise a complete specification.

Beauty
Natural beauty is integral to every piece of redwood lumber. Redwood beauty is typified by rich cinnamon-colored heartwood, cream-colored sapwood, distinctive grain and performance that keeps projects looking good for years. Redwood offers a broad array of appearances, giving specifiers several choices in color, visual texture and scale.

Stability
Natural stability is the key to redwood's long-lasting performance. Redwood outperforms other woods because it shrinks and swells less. This means redwood is less likely to warp, cup, check and pop nails. Stability and little or no pitch content also help redwood hold finishes better. Redwood's stability is a guarantee of long-lasting beauty. The top quality architectural grades of redwood can be ordered Certified Kiln Dried which means they will exhibit little or no additional shrinkage in use.

Durability
Redwood heartwood provides resistance to both decay from fungus and damage from insect attack. The cinnamon-colored heartwood has decay resistance throughout the lumber, not just on the surface.

Complete Performance
No other wood provides the complete performance of redwood. Beauty, stability, durability, finish retention and workability ensure that redwood projects look better than others when they are new and after they have aged.

Redwood Grades
Redwood grades are established by the Redwood Inspection Service (RIS). For more detailed grade descriptions, contact either the California Redwood Association or the Redwood Inspection Service.

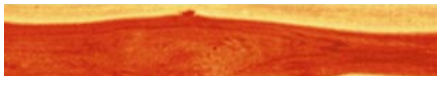
Architectural Grades

Clear All Heart is the finest grade of redwood. It is all heartwood, and the graded face of each piece is free of knots.

Clear is similar in quality to Clear All Heart, except that it includes sapwood in varying amounts. Some boards may have one or two small, tight knots on the graded face.

Heart B is an economical all-heartwood grade containing a limited number of tight knots and other characteristics not permitted in Clear or Clear All Heart. It is graded on one face and one edge.

B Grade is similar to Heart B except that it permits sapwood as well as heartwood.



Grain
Lumber is considered vertical grain when the annual growth rings form an angle of 45 degrees or more with the surface. If the angle is less than 45 degrees, the lumber is flat grain. Vertical grain lumber is not susceptible to grain raising. Clear All Heart and Clear may be ordered either flat or vertical grain. Other grades are sold mixed grain.

Vertical Grain

Flat Grain

Seasoning
Architectural grades are available Certified Kiln Dried for top performance and minimal shrinkage.

Redwood kiln dried to accepted RIS standard will include the words Certified Kiln Dried or CKD on the grademark of each piece.

Patterns
Standard redwood patterns include tongue and groove, plain bevel, rabbeted bevel, shiplap, channel shiplap and V shiplap. Board and batten patterns are laid up using standard dimension lumber.

Pattern Number
Each pattern has a pattern number. To ensure delivery of the proper product, the pattern number should be included in specifications and on lumber orders.

Textures
Surfaced lumber has a smooth-planed face, emphasizing the wood's grain and color.

Saw-textured lumber has a resawn face providing a rough, textured appearance. Saw-textured redwood has a more even appearance and color and holds finishes longer than smooth surfaces.

CRA CERTIFIED KILN DRIED CLR RWD RIS®

Specifying Redwood
To ensure delivery of the proper product, the specification should include: *use, grade, grain, seasoning, pattern description, pattern number and texture*.

For Example
Redwood lumber for [1]exterior siding shall bear RIS grademark, [2]Clear All Heart grade, [3]vertical grain, [4]Certified Kiln Dried [5]1x6 Tongue & Groove [6]pattern #708R, with a [7]saw-textured face exposed.

[1] Use
[2] Grade
[3] Grain
[4] Seasoned
[5] Pattern
[6] Pattern Number
[7] Texture

Note There have been reports of problems arising from the installation of wood sidings over rigid foam insulation. CRA advises caution. Builders should check the latest information for applying redwood sidings over rigid foam insulation. For more information, request CRA's Technical Data Sheet: *Using Redwood Over Rigid Foam Sheathing*.

Cover: (top) Wyatt H. Nelson—Clear All Heart, 1x4 tongue & groove; David Barovetto—Clear, 3/4x6 cove shiplap; (bottom) Burde & Shaw Associates—Clear All Heart, 1x8 and 1x4 tongue & groove.

Exterior

Redwood buildings are a statement of quality and permanence. Redwood siding and trim complement stone, glass, brick, stucco and most other building materials. Redwood gives specifiers and designers a unique opportunity for integrating interior and exterior spaces with a common material.

Outstanding weathering qualities guarantee that projects will retain their handsome appearance. Tests by the USDA Forest Products Laboratory show that redwood loses less than 1/4 inch of wood fiber in 100 years of exterior exposure. When dried to 10% moisture content, redwood shrinks only 1.7% across vertical grain lumber and 3.3% across flat grain. This gives it the least volumetric shrinkage of commercial American woods. Less shrinkage means less warping, cupping and nail popping.

Natural decay and insect resistance protects all redwood heartwood surfaces, including saw-cut edges, end grain and nail holes.

Variety of siding patterns provides architects with solutions for almost any architectural design requirement. The additional options of grade, grain, texture and finishes give the architect a broad palette of appearance and style for the creative process.

Redwood takes and holds finishes extremely well because it has an open cell structure and contains little or no pitch or resin. Combined with redwood's natural stability, this enables redwood to absorb and retain all types of finishes.

Katherine Klawans Smith and Associates—Clear All Heart, 1x6 rabbeted bevel

Interior

The rich beauty of redwood interior paneling provides an atmosphere of warmth and luxury for interiors of homes, offices, businesses and restaurants.

Working with redwood, designers have a choice of color, dimension, texture, grain and pattern.

The excellent workability of fine-grained redwood makes it an ideal material for highly detailed patterns, molding and cabinetry. The extra-long lengths available facilitate work on high ceilings or long walls of custom homes or commercial office spaces.

Natural fire resistance permits redwood's use in closely regulated public spaces. Since redwood contains little or no volatile resin, it is relatively hard to ignite, burns slowly once ignited and forms a protective char layer over the wood beneath. Underwriters' Laboratory tests have established a flamespread rating of 70 for 1-inch redwood lumber. This meets the Class II standards in the UBC and BOCA codes and Group I standards in the NBC and SBCCI codes.

A high degree of insulation ranks redwood, with its low density, as one of the leaders among all woods. Redwood's K value equals 0.83 resulting in R values of 0.62 for 1-inch lumber. Wood provides a relatively high degree of insulation when compared to other materials.

Sound insulation properties of redwood are frequently utilized in performance halls, public spaces and transit stations.

Milford Wayne Donaldson, AIA—Clear All Heart, 1x4 tongue & groove

Tongue & Groove

Clear, 1x8 tongue & groove

Redwood tongue and groove patterns are popular for both paneling and siding applications. Available with square edges, eased edges or a variety of V grooves, tongue and groove redwood can contribute to a wide range of architectural effects.

Standard tongue and groove patterns come from the mill with a smooth-planed face, except those designated with the suffix R, which are reversible. These have a saw-textured surface on one face and the other face is smooth surfaced. All tongue and groove patterns can be special ordered with the face resawn in a saw-textured finish. Saw-textured redwood has a more even appearance and color and holds finishes longer than smooth surfaces.

Lumber Requirements
To estimate the surface measure of lumber required, multiply the area to be covered (in square feet) by the conversion factor shown below. Factors allow for width lost in dressing or lapping. Add 3-5% for end cutting and matching, and 15% for diagonal applications.

Nominal Width Conversion Factors

	4"	6"	8"	10"
Tongue & Groove	1.28	1.18	1.17	1.13

Reading Diagrams and Charts
A Overall width
B Face exposed when installed
C Thickness
CM Center Matched
EE Eased Edge
S2S Surfaced 2 sides
S1S Surfaced 1 side
V1S V Groove 1 side
V2S V Groove 2 sides
R Reversible pattern
(S1S-Saw-textured 1S)

All dimensions in inches.

Jack Smuckler, AIA—Clear All Heart, 1x6 vertical tongue & groove

S2S-CM

Nominal	A	B	C	Pattern
1x4	3-3/8	3-1/8	11/16	632 or 632EE
1x6	5-3/8	5-1/8	11/16	633 or 633EE
1x8	7-1/8	6-7/8	11/16	634 or 634EE

V1S-S2S or V2S-S1S (Saw-textured 1S) 3/32" V

1x4	3-3/8	3-1/8	11/16	707 or 707R
1x6	5-3/8	5-1/8	11/16	708 or 708R
1x8	7-1/8	6-7/8	11/16	715 or 715R
1x10	9-1/8	8-7/8	11/16	716 or 716R

V1S-S2S or V2S-S1S (Saw-textured 1S) 1/4" V

1x4	3-3/8	3-1/8	11/16	709 or 709R
1x6	5-3/8	5-1/8	11/16	711 or 711R
1x8	7-1/8	6-7/8	11/16	712 or 712R
1x10	9-1/8	8-7/8	11/16	713 or 713R

Plain Bevel and Rabbeted Bevel

Clear All Heart, 1/2x6 rabbeted bevel

Daniel F. Williams—Clear All Heart, 3/4x8 rabbeted bevel

The deepest shadow line of all siding patterns and the timeless appeal of traditional craftsmanship are the principal design features of redwood bevel siding. Rabbeted bevel patterns combine a thinner butt edge with the advantages of self-alignment. Plain bevel patterns create the strongest shadow lines with the least material. Rabbeted patterns lay up with greater coverage than plain patterns. During installation, rabbeted bevel siding requires an expansion clearance of 1/8 inch in the rabbet.

Plain bevel patterns have a smooth surface on one face and saw-textured surface on the other face. Either face may be exposed. Rabbeted bevel patterns are available in either smooth or saw-textured face. Care should be taken in selecting the proper pattern number. Saw-textured redwood has a more even appearance and color and holds finishes longer than smooth surfaces.

Lumber Requirements
To estimate the surface measure of lumber required, multiply the area to be covered (in square feet) by the conversion factor shown below. Factors allow for width lost in dressing or lapping. Add 3-5% for end cutting and matching.

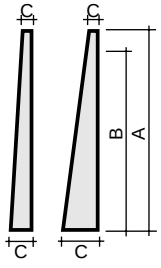
Nominal Width Conversion Factors

	4"	6"	8"	10"
Rabbeted Bevel	1.28	1.17	1.17	1.13
Plain Bevel	1.60	1.34	1.28	1.22

Reading Diagrams and Charts
A Overall width
B Face exposed when installed
C Thickness
S1S-2E Surfaced 1 side, 2 edges
R Reversible pattern (S1S-Saw-textured 1S)

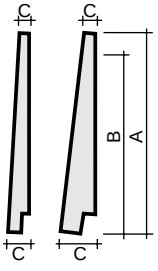
All dimensions in inches.

Plain Bevel S1S-2E



Nominal	A	B	C	Pattern
1/2x4	3-1/2	2-1/2	7/16x3/16	320R
1/2x6	5-1/2	4-1/2	7/16x3/16	322R
1/2x8	7-1/4	6-1/4	7/16x3/16	323R
3/4x6	5-1/2	4-1/2	11/16x3/16	329R
3/4x8	7-1/4	6-1/4	11/16x3/16	330R
3/4x10	9-1/4	8-1/4	11/16x3/16	331R

Rabbeted Bevel S1S-2E (Smooth Surface)

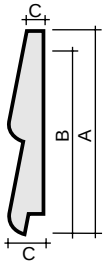


1/2x4	3-1/2	3-1/8	7/16x3/16	360
1/2x6	5-1/2	5-1/8	7/16x3/16	362
1/2x8	7-1/4	6-7/8	7/16x3/16	363
3/4x6	5-1/2	5-1/8	11/16x9/32	371
3/4x8	7-1/4	6-7/8	11/16x9/32	372
3/4x10	9-1/4	8-7/8	11/16x9/32	373

Rabbeted Bevel S1S-2E (Saw-textured Surface)

3/4x6	5-1/2	5-1/8	11/16x9/32	391
3/4x8	7-1/4	6-7/8	11/16x9/32	392
3/4x10	9-1/4	8-7/8	11/16x9/32	393

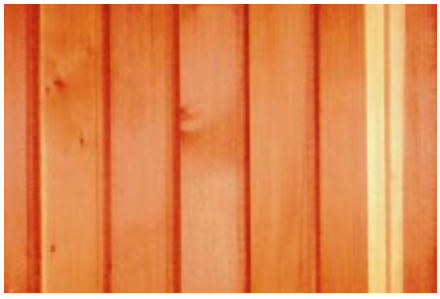
Lap Drop S1S-2E (Round Edge)



1x6	5-3/8	5	11/16x9/32	430
1x8	7-1/8	6-3/4	11/16x19/64	431
1x10	9-1/8	8-3/4	11/16x17/64	433*

*Three lap pattern

Shiplap



B grade, 1x6 channel shiplap

Whether the powerful linear accent of channel shiplap, the crisp shadow line of V groove shiplap or the smooth face of square edge shiplap, these redwood patterns respond to architectural requirements with economy and ease of installation.

All channel and V groove shiplap patterns can be used as either siding or paneling. A 1/4-inch width V groove is standard for shiplap patterns.

Standard shiplap patterns have a smooth finish on both sides, except those patterns designated with the suffix R, which are reversible. These have a saw-textured channel pattern on one side and a smooth finish V groove pattern on the other. All shiplap patterns can be special ordered with a saw-textured face. Saw-textured redwood has a more even appearance and color and holds finishes longer than smooth surfaces.

Lumber Requirements
To estimate the surface measure of lumber required, multiply the area to be covered (in square feet) by the conversion factor shown below. Factors allow for width lost in dressing or lapping. Add 3-5% for end cutting and matching, and 15% for diagonal applications.

Nominal Width Conversion Factors

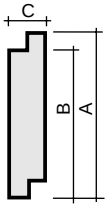
	6"	8"	10"
Shiplap	1.24	1.21	1.16

Reading Diagrams and Charts
A Overall width
B Face exposed when installed
C Thickness
D Channel width
S1S Surfaced 1 side
S2S Surfaced 2 sides
R Reversible pattern (S1S-Saw-textured 1S)

All dimensions in inches.

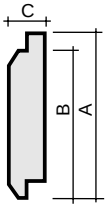
Alex Achimore—Clear All Heart, 1x10 cove shiplap

Shiplap S2S



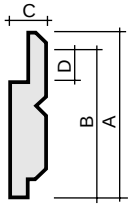
Nominal	A	B	C	D	V Groove	Pattern
1x6	5-3/8	4-7/8	11/16	—	—	761
1x8	7-1/8	6-5/8	11/16	—	—	762
1x10	9-1/8	8-5/8	11/16	—	—	763

V Shiplap S2S



1x6	5-3/8	4-7/8	11/16	—	1/4	793 or 793R
1x8	7-1/8	6-5/8	11/16	—	1/4	794 or 794R
1x10	9-1/8	8-5/8	11/16	—	1/4	795 or 795R

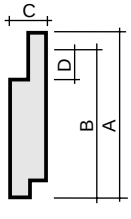
Channel V and CV Shiplap (S1S-Saw-textured 1S)*



1x6	5-3/8	4-7/8	11/16	1	1/4	784R
1x8	7-1/8	6-5/8	11/16	1	1/4	785R
1x10	9-1/8	8-5/8	11/16	1	1/4	786R

*Also available without center V

Channel Shiplap S2S



1x6	5-3/8	4-7/8	11/16	1	—	774
1x8	7-1/8	6-5/8	11/16	1	—	775
1x10	9-1/8	8-5/8	11/16	1	—	776

Board & Batten

James Bischoff—Heart B, 1x10 reverse board and batten

Many interesting board and batten wall patterns can be created by using stock milled redwood lumber. These include: various width battens over wide boards; equally spaced board and batten; and reverse board and batten which resembles a channel pattern in which the designer can select the depth and width of the shadow groove.

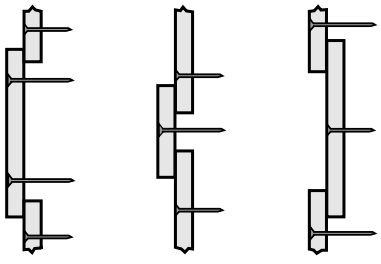
In interior applications, the board and batten pattern may be installed either vertically or horizontally. For siding applications, board and batten should only be installed vertically with a minimum one inch board lap.

Any grade of redwood lumber may be used, with either a smooth or a saw-textured face. For interior uses, Certified Kiln Dried architectural grades are recommended.

The following table lists the actual S4S dry dimensions of boards commonly used in board and batten applications.

Board & Batten Siding

Thickness		Width	
Nominal	Surfaced	Nominal	Surfaced
1	11/16	2	1-1/2
1-1/4	1	3	2-1/2
2	1-1/2	4	3-1/2
		6	5-1/2
		8	7-1/4
		10	9-1/4
		12	11-1/4



Finger Jointed

William Zimmerman—Clear All Heart, 1x10 cove shiplap

Finger-jointed and glued redwood lumber provides the performance and quality of architectural grade redwood at an economical price. It is ideal for fascia, soffits, siding and trim as well as for interior paneling and ceiling uses. Whether end-glued, edge-glued, or both end- and edge-glued, finger-jointed and glued lumber is made from small pieces of Certified Kiln Dried redwood that are precision machined and joined with an exterior adhesive cured by high frequency electrical energy. This process has been tested and refined for over 30 years. It is an efficient technique that makes the most of the top quality wood in each log.

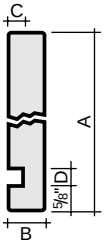
Glued lumber is exceptionally straight and stable. It has the natural stability of Certified Kiln Dried redwood, and because small pieces of joined lumber tend to be more stable than solid lumber, finger-jointed products stay flat, with minimum crook or cup.

Sizes and patterns
Nominal thicknesses from 1/2 inch to 2 inches and nominal widths from 2 to 12 inches are available. Wider panels are also available for special uses. Glued redwood lumber can be run to any standard CRA pattern with either a smooth or a saw-textured surface. Since finger-jointed redwood is manufactured as a continuous board, it can be ordered in specific lengths up to 24 feet, depending upon the manufacturer.

Grades
Glued redwood products are produced in the grades of Clear All Heart, Clear, Heart B and B Grade in accordance with the provisions of RIS *Standard Specifications for Grades of California Redwood Lumber*.

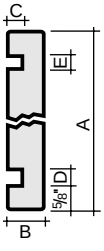
Fascia
Easy to install, finger-jointed fascia patterns are grooved (plowed) to receive a 1/4- or 3/8-inch soffit board and are available in standard 1-inch thicknesses. Single and double plowed fascia are available.

Single Plowed Fascia



Nominal	A	B	C	D	E	Pattern
1x6	5-1/2	11/16	5/16	5/16	—	80
1x8	7-1/4	11/16	5/16	5/16	—	81
1x6	5-1/2	11/16	5/16	7/16	—	84
1x8	7-1/4	11/16	5/16	7/16	—	85

Double Plowed Fascia



1x6	5-1/2	11/16	5/16	7/16	5/16	88
1x8	7-1/4	11/16	5/16	7/16	5/16	89

Finishes

A properly selected finish system can create and maintain a wide range of architectural effects that heighten redwood's natural beauty. Finishes can help redwood harmonize or contrast with other materials while enhancing redwood's superior weathering ability and stability. Redwood's unequaled finish acceptance and retention, as documented by the U.S. Forest Products Laboratory, can increase the service life of properly selected finishes. For more finish information see *Exterior Finishes* and *Interior Finishes*.

Exteriors
The application of a water repellent to all surfaces of redwood siding and trim is recommended to inhibit the movement of moisture which can damage finish coatings. Back priming is recommended for all finishes and highly recommended for paints. Saw-textured redwood holds finishes longer than smooth-surfaced wood.

Clear water repellents with mildewcide are recommended for a natural-looking finish. Paintable water repellents are recommended as a base coat for paints and stains.

Bleaching or weathering stains produce a permanent driftwood gray effect, eliminating redwood's natural darkening stage.

Semitransparent stains tint wood without hiding grain patterns. There are many stains available in redwood shades.

Solid-color stains are available that resemble paints in appearance. Acrylic latex stains should be applied over a compatible stain-blocking primer.

Acrylic latex paints should be applied over a compatible oil- or alkyd-based primer or stain-blocking acrylic primer. Two topcoats will last as long as 8 to 10 years.

Joseph B. Reynolds, Jr.—Clear All Heart, 1x6 cove shiplap

Interiors
Soft finishes, such as waxes, oils and lacquers, may be used where only minimal moisture resistance is required and surface wear is not a consideration. In areas subject to moisture and frequent scrubbing, such as kitchens and baths, alkyd resin or polyurethane finishes are recommended.

Wax finishes with or without stains add soft, rich luster to wood and provide some water resistance.

Penetrating oils such as Danish oil are clear finishes which highlight redwood's appearance and are suitable for walls or ceilings away from moisture.

Clear lacquer is recommended to protect walls, ceilings and other surfaces that do not require heavy cleaning.

Clear sealers and varnishes with alkyd resin or polyurethane formulations are suitable for applications near heat and moisture which require more protection. Use 2 to 6 coats of varnish in areas requiring hard scrubbing such as kitchens and baths.

Semitransparent or solid-color stains may be applied for various color effects. Wax, clear sealer or varnish overcoats are recommended.

Oil base or alkyd resin paints applied over an oil- or alkyd-based primer form a smooth, solid-color, water-resistant film, good for color accents on paneling and cabinet trim or edges and surfaces subject to fingerprints.

Nails and Hardware
For exteriors or wherever moisture is present, use non-corrosive nails and hardware. Nails must be stainless steel, aluminum or top quality, hot-dipped galvanized (electroplated galvanizing is not recommended). Wood-tone color finishing nails are available for interior paneling. Use of proper nails is very important, as poor quality nails may react with redwood's natural, decay-resisting chemicals in the presence of moisture causing unsightly stains.

Nails can be countersunk (not more than 1/16 inch) or driven flush with wood surfaces. Countersunk nails may be concealed using a filler made by mixing sawdust and glue. At mitered corners or near the edge or end of a piece, predrill the nail hole to avoid splitting the wood.

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