To ensure lumber quality will meet design expectations, it is essential for designers to understand and specify the appropriate species and grades. Refer to Species & End Uses section for information on standard species and species combinations, individual species characteristics, and recommended end uses for various species.

WWPA publishes three manuals as visual references to Western lumber grades. Two of these manuals have proven useful to designers:

- **WWPA Species Book Volume 1: Dimension Lumber**
  32 pages of color photographs of selected structural product grades in multiple Western species.

- **WWPA Species Book Volume 2: Selects-Finish/Commons-Boards**
  52 pages of color photographs of appearance grades in multiple Western species.

In addition, WWPA’s Western Woods Use Book (1996 - 4th edition) (WWUB), the Western Lumber Product Use Manual (A), and Western Lumber Span Tables (572) are basic reference texts on wood design, structural lumber products and how to use them. Refer to the Literature section to download or order these and other titles.

Lumber grades are divided into three basic categories:

I) **Structural framing products** (including dimension lumber) visually and/or mechanically (MSR) graded for their strength and physical working properties (appearance is secondary, unless specified);

II) **Appearance products** graded for aesthetic qualities, ranging from the exquisitely beautiful to the most utilitarian; and

III) **Industrial products** including a variety of structural and non-structural grades, of which the largest category is Factory & Shop products intended for remanufacturing purposes. These products, graded to be recut for the recovery of clear pieces in predetermined sizes, are available in large volumes, mill direct to remanufacturers.

**Grade Categories**

The following list is organized by end-use categories; actual grade names appear in capital letters. (Species characteristics and end-use recommendations are addressed in the Species & End Uses: grades along with standard sizes are provided in table format in the Lumber Specifying section; and design value tables and adjustment factors for structural grades are provided in the Design Values section.)

1. **STRUCTURAL FRAMING PRODUCTS** - Structural lumber is graded for its strength and physical working properties; aesthetics are secondary unless specified. The basic framing classifications are organized by size classifications and performance capabilities.

   **Dimension Lumber** - 2" to 4" thick and 2" (nominal) and wider. Framing lumber in 2" thickness is typically produced with a 1/8" eased edge. However, some mills produce lumber with a 1/4" eased edge to assist in handling. These products are identified on the grademark as "1/4" EE."

   Western Dimension Lumber design values, beginning in the Design Values section, are expressed as Base Values. These values must be adjusted for size and repetitive member use, prior to adjusting for other conditions of use. Dimension Lumber grades are divided into the following classifications:
Structural Light Framing
(2x2 through 4x4, used where high-strength design values are required in light framing sizes, such as in engineered wood trusses.) Grades are:

SELECT STRUCTURAL
No. 1 & BTR (DF-L, DF & Hem-Fir species only)
No. 2
No. 3

Light Framing
(2x2 through 4x4, basic framing lumber, as used in most light-frame construction, e.g. wall framing, sills, plates, cripples, blocking, etc.) Grades are:

CONSTRUCTION
STANDARD
UTILITY

Stud
(2x2 through 4x18, an optional grade intended for vertical use, as in load bearing walls.) The grade is:

STUD

Structural Joists & Planks
(2x5 through 4x18, intended for engineering applications for lumber 5" and wider, such as floor and ceiling joists, rafters, headers, small beams, trusses and general framing applications. Grades are:

SELECT STRUCTURAL
No.1 & BTR (in Douglas Fir, Douglas Fir-Larch, or Hem-Fir species only.)
No. 1
No. 2
No. 3

SPECIAL DIMENSION LUMBER

Structural Glued Products
U.S. Model Building Codes accept the same design values for both solid sawn dimension lumber and structural glued products. WWPA currently certifies structural glued dimension products under the classifications of Light Framing and Studs, Structural Light Framing, Stress-Rated Boards and Structural Joists & Planks; the grade names are the same as for solid sawn products. A WWPA grade stamp is used only if products comply with all applicable sections of WWPA’s Glued Products Procedures for Certification & Quality Control. Products may be certified for all uses [Cert Ext Jnts] or for stud use [Vert Use Only-Cert Glued Jnts or Vert Use Only-Cert Ext Jnts].

Machine Stress-Rated (MSR) Lumber
MSR lumber is evaluated by mechanical stress-rating equipment to measure modulus of elasticity (E), but it also must meet certain visual grade requirements. MSR lumber is intended for any engineered application where low variability in strength and stiffness properties is primary product consideration, e.g. trusses, floor or ceiling joists or rafters. Grades are designated by Fb and E. The grade stamp may also include allowable stress parallel-to-grain (Ft), and specific gravity (SG), for horizontal shear (Fv) and compression perpendicular-to-grain (Fc|) values, when any of these additional properties are specifically qualified through testing and daily quality control. Grades are:

2850 Fb-2.3E
2700 Fb-2.2E
2550 Fb-2.1E
2400 Fb-2.0E
2250 Fb-1.9E
2100 Fb-1.8E
1950 Fb-1.7E
1800 Fb-1.6E
1650 Fb-1.5E
Structural Decking (also known as "roof decking") - should not be confused with lumber intended for residential and non-residential outdoor decks. Standard structural decking patterns are 2" nominal, tongued and grooved (T&G) and 3" and 4" double T&G products, available with vee or eased edges, to meet discriminating architectural requirements. The load bearing capacities of structural decking also make it useful as floor decking and solid sidewall construction. Grades are:

SELECTED DECKING
COMMERCIAL DECKING

Beams & Stringers - nominal 5" & thicker with the width more than 2" greater than thickness. Grades are:

SELECT STRUCTURAL
No. 1
No. 2
No. 3 (no design values assigned)

DENSE SELECT STRUCTURAL (in DF-L only)
DENSE No. 1 (in DF-L only)
DENSE No. 2 (in DF-L only)

(Note: DENSE grades are not as widely available.)

Posts & Timbers - nominal 5" x 5" with the width not more than 2" greater than thickness. Grades are:

SELECT STRUCTURAL
No. 1
No. 2

DENSE SELECT STRUCTURAL (in DF-L only)
DENSE No. 1 (in DF-L only)
DENSE No. 2 (in DF-L only)

(Note: DENSE grades are not as widely available.)

II. APPEARANCE PRODUCTS - This broad category of products can be inclusively defined as those products sized as a nominal 1" and thicker by 2" and wider. Grade names will also apply when these products are run-to-pattern for paneling, siding, etc. Aesthetics govern in the appearance grades. The highest grades are clear or nearly clear, and are intended for applications where beauty reigns. The lowest grades are useful for applications where economy governs.

There is a wide variety of quality levels, with allowable characteristics defined by the grading rules, available in all of the knotty (general purpose) grades, ranging from handsome products with small, sound, tight knots to rustic, blue-stained boards (which make a dramatic contrast to stainless steel and other "hi- tech" interior materials), to boards with knot holes. WWPA's Volume 2 Species Book(11), with color photographs of the various grades, provide a visual understanding of these grades for specification purposes.

High Quality Appearance Grades - clear and nearly-clear products, not as abundant as products with more characteristics (and priced accordingly), usually shipped as a combination of vertical or flat grain unless specified otherwise.

Selects - applies to all Western species. Grades are:
B & BTR SELECT
C SELECT
D SELECT

Equivalent grades in Idaho White Pine
SUPREME
CHOICE
QUALITY

**Finish** - usually available only in Douglas Fir and Hem-Fir species groups. Grades are:

SUPERIOR
PRIME
E

**Special Western Red Cedar Grades** - includes Finish, Paneling, Ceiling and Siding grades (WWPA Grading Rules). Grades are:

CLEAR HEART
A
B

**Special Western Red Cedar Bevel Siding Grades** - for siding applications. Grades are:

CLEAR VG HEART
A BEVEL
B BEVEL
C BEVEL

*(Note: Cedar grades are often proprietary and can be confusing. Additional information is provided in the Lumber Specifying section. Also, for specific questions about cedar products, contact the Western Red Cedar Lumber Association.)*

**General Purpose Appearance Grades** - knotty products with a wide variety of allowable natural characteristics and manufacturing imperfections as limited by individual grade descriptions; useful for multitude of applications ranging from high-end (small, tight knots) paneling and siding and other run-to-pattern products, shelving and furniture to purely utilitarian uses as crating.

**Common Boards** (WWPA Grading Rules) - primarily for pine, spruce and cedar species. Grades are:

1 COMMON
2 COMMON
3 COMMON
4 COMMON
5 COMMON

Equivalent grades in Idaho White Pine
COLONIAL
STERLING
STANDARD
UTILITY
INDUSTRIAL

**Alternate Boards** (WCLIB Grading Rules) - primarily for Douglas Fir and Hem-Fir. Grades are:

SELECT MERCHANTABLE
CONSTRUCTION
STANDARD
UTILITY
Western Radius-Edged Patio Decking Grades - although classified an appearance product, these grades have been specifically developed for outdoor decks. Patio decking is intended to be used flat-wise in load-bearing applications where spans do not exceed 16" on center. Ponderosa Pine species graded to the WWPA rules for Patio Decking is span rated for 24" on center.

Its thin profile and oversized eased edges make it suitable for outdoor and landscaping applications where stock, thinner than 2", is desirable. There are two grades, PATIO 1 & PATIO 2. Each grade is available surfaced in two sizes:

1/4" radius edge: (Dry) 1" x 5-1/2" (Green) 1-1/32" x 5-5/8"
3/8" radius edge: (Dry) 1-5/32" x 5-1/2" (Green) 1-3/16" x 5-5/8"

III. INDUSTRIAL PRODUCTS - These specialty products may be used in either structural and non-structural applications.

Structural Products

Mining Timbers - for shoring and bracing; timber sizes apply; no assigned design values. Grades are:

NO. 1 MINING
NO. 2 MINING

Scaffold Plank - available in Douglas Fir-Larch (design values for other species available on request); 1/4" & thicker by 8" & wider; has assigned design values. Grades are:

SCAFFOLD NO. 1
SCAFFOLD NO. 2

Foundation Lumber - intended for sill plates; only in Western Red Cedar and Incense Cedar; 2" & thicker by 4" & wider; one grade available; no assigned design values. The grade is:

FOUNDATION

Stress-Rated Boards - available in all Western species and suitable for special applications when lumber less than 2" thick is to have assigned design values, such as for light trusses, belt rails, horizontal bracing, rafters and box beams. The designation "SRB" will appear on the grade stamp. Assigned design values are the same as for Dimension Lumber, sizes are from nominal 1" to 1-1/2" thick by 2" to 8" & wider in width. Grades are:

SELECT STRUCTURAL (SRB)
NO. 1 & BTR (SRB)
NO. 1 (SRB)
NO. 2 (SRB)
NO. 3 (SRB)
CONSTRUCTION (SRB)
STANDARD (SRB)
UTILITY (SRB)
STUD (SRB)

Non-Structural Products - refer to printed publications, Western Lumber Product Use Manual (A) Western Lumber Grading Rules (G-5), for additional information on the following specialty products: or WWPA

GUTTER
PICKETS - NO. 1 & NO. 2
LATH - NO. 1 & NO. 2
BATTENS - S1S1E or S4S
STEPPING - 1-1/4" thickness with radius, nosed edge of 5/8" by 12" wide
Factory & Shop Grades - complex category of products provided for cut up and remanufacturing; includes numerous grades intended for moulding and parts for doors, shutters, windows, furniture and cabinets. These grades are generally shipped mill direct, in railcar volumes, to manufacturers. For additional information, order WWPA Volume 3 Species Book (12) for color photographs of these grades.

WWPA Quality Services

Western Wood Products Association is the leader in the West in lumber grade rules writing, lumber grading and lumber quality control inspection. Representing sawmills in the 12 Western states and Alaska, WWPA is one of the largest associations of lumber manufacturers in the United States assuring customers that Western lumber products, under WWPA supervision and inspection, meet stated product quality standards. WWPA grade stamps are one of the most well-regarded marks in the building materials market today.

The Association’s Quality Services division supervises lumber grading by maintaining a field staff of lumber inspectors who regularly check the quality of mill production, including visual grade requirements and quality control records, for glued products and machine stress-rated (MSR) lumber. As an accredited rules-writing agency under the American Lumber Standard Committee, Inc. (ALSC) system, WWPA establishes the Western Lumber Grading Rules.

Lumber grading rules are a set of criteria used to determine how various characteristics, such as wane, knots, grain, texture or manufacturing defects affect the structural properties of dimension lumber or the aesthetic value of appearance grades. Lumber manufacturers are responsible for grading lumber products according to these rules, with oversight and inspection services conducted by an ALSC-accredited agency such as WWPA.

WWPA Quality Services include:

- **Lumber inspection and grade rules writing**
  
  WWPA is one of seven grading agencies in North America authorized by the Board of Review of the ALSC, under the U.S. Department of Commerce, to write and publish grading rules for lumber. As such, WWPA establishes the Western Lumber Grading Rules, which specify size and levels of quality in conformance with the American Softwood Lumber Standard PS 20.

  The Association conducts regular inspections at mills, monitoring for consistent quality standards compliance among WWPA mills. Each year, WWPA's staff of lumber inspectors check lumber representing more than 8 billion board feet of production. Use of the WWPA grademark is strictly monitored; its continued use by subscribing mills is contingent on conformance with the Association's published grading rules and adherence to the policies and procedures stated therein.

- **Grade certification**
  
  Lumber carrying the WWPA grade stamp is backed by a host of quality standards services offered through the Association.

  The Association provides special export certificates on lumber shipped to foreign ports, as well as certification for Japanese Agricultural Standards, or JAS, grading stamping. If disputes between a WWPA mill and the customer occur on a shipment of lumber, WWPA can act as an impartial third party to reinspect the lumber, determining if it meets invoiced specifications.

- **Special products**
  
  WWPA is one of the largest providers of quality control services for glued lumber and machine stress-rated (MSR) lumber. The Association pioneered the quality control procedures used by the lumber industry to make MSR products, and WWPA provides quality control for more finger-jointed lumber operations than any other lumber grading agency in the U.S.

**Interpreting the Grade Stamp**

*This information is available in the publication WWPA Grade Stamps (TG-6) which can be purchased or downloaded in Adobe Acrobat (PDF) format.*
The Association’s certification mark on the grade stamp is recognized worldwide as a symbol of integrity. This mark represents the mill’s commitment to consistently deliver a product which meets uniform quality standards, whether the lumber is intended for structural or appearance purposes. WWPA lumber also comes with the Association’s technical and product support services that give users the design and engineering data needed to use lumber in construction. WWPA is the only Western lumber association that provides this level of product support and technical services for its Member companies' grademarked products.

WWPA uses a set of marks to identify lumber graded under its supervision. The grademarks are stamped on the lumber:

Most grade stamps, except those for rough lumber or heavy timbers, contain 5 basic elements:

- **WWPA certification mark.** A registered trademark.
- **Mill Identification.** Firm name, brand, or assigned mill number.
- **Grade Designation.** Grade name, number or abbreviation.
- **Species Identification.** Indicates species by individual species or species combination.
- **Condition of Seasoning.** Indicates condition of seasoning at time of manufacturing:
  - MC-15, KD-15 - 15% maximum moisture content
  - S-DRY, KD, KD-HT - 19% maximum moisture content
  - S-GRN, HT - over 19% moisture content (unseasoned)

**Selecting for Lumber Quality**

Under the ALSC structure, lumber agencies can be approved to provide inspection services for lumber graded to their own grading rules (if ALSC-accredited as a rules-writing agency) and/or to other ALSC-certified agency grading rules.

For instance, WWPA is accredited to provide inspection services on lumber graded to its own WWPA rules and the West Coast Lumber Inspection Bureau rules, the National Lumber Grades Authority rules for Canadian lumber, the Redwood Inspection Service rules, and the Scaffold and National Grade Rule portion of the Southern Pine Inspection Bureau rules. WWPA is also approved to supervise glued and machine stress-rated (MSR) lumber. Likewise, other ALSC-certified agencies can be approved to provide inspection services for lumber graded to WWPA rules.

These arrangements are reflected in the grade stamp. The certification mark (registered trademark or logo) of the agency providing inspection services will appear on the stamp. If the identified agency is grading products to another certified agencies' rules, the grading rules of reference also will be noted on the stamp.

When the Association provides inspection and quality control services for Western lumber products, the WWPA registered trademark will appear in the grademark on all structural products. Timbers are often hammer branded on the ends. In upper-grade appearance products, which are not stamped (to avoid marring the beauty of the wood), agency identification will be in the products’ written documentation.

**Only those products, or their documentation, that carry the WWPA registered trademark have been subjected to the rigorous inspection and quality control mechanisms of the Western Wood Products Association.**
When a grade stamp or documentation indicates "WWPA RULES," but does not include the WWP registered trademark, it indicates the products claim to have been graded to WWPA’s *Western Lumber Grading Rules*, but *have not been subjected to WWPA’s own quality control and inspection services.*

The integrity of the WWPA grademark, and the inspection and quality control mechanisms behind it, is not only well recognized throughout the U.S. but internationally as well. WWPA is the only U.S. grading agency recognized by the Japanese government as a Foreign Testing Organization authorized and approved to grade Western lumber products according to Japanese Agricultural Standards and authorized to provide WWPA grade marked products (in U.S. ALS grades and sizes) directly into the Japanese marketplace. WWPA is additionally authorized to oversee lumber graded to selected Australian and British standards.

**Product Satisfaction**

To ensure lumber specified will meet design expectations for both structural performance and physical appearance, it is essential for designers to understand lumber grade designations. This not only avoids inappropriate structural applications but also reduces potential miscommunication and disappointment. Lumber is available in a multitude of grades to meet the requirements of the economically minded or most discriminating customer. Knowing which grade to specify for an intended application is critical to a successful project and product satisfaction.

If you encounter a problem with lumber quality, real or perceived, take these steps:

1) determine the species (refer to the *Species & End Uses* section for a table providing a list of Western lumber species);

2) if it is a Western softwood species, identify the grading agency (WWPA supports its Member companies’ products in the marketplace);

3) if it is a WWPA grade marked product, bearing the WWPA registered trademark either on the grade stamp or identifying WWPA in the written documentation for the lumber, note the mill number; then

4) contact WWPA and ask for Quality Services. (Note: WWPA represents only its companies' products and does not address problems with non-Western species nor with Western lumber products graded by other agencies, even if indicated as graded to WWPA rules.)

*While every effort has been made to ensure the accuracy of the Western lumber information included in this Online Technical Guide, WWPA accepts no responsibility for errors or omissions in the information presented herein, or for errors which may occur in downloading and printing any of the files, nor any liability resulting from the use of this information for design and construction applications.*

The *WWPA Online Technical Guide* is copyrighted by Western Wood Products Association in Portland, Oregon. © 1997 WWPA
Understanding WWPA Grade Stamps

Western Wood Products Association is one of the largest associations of lumber manufacturers in the United States, representing sawmills in the 12 western states and Alaska. The Association's Quality Services Division supervises lumber grading by maintaining a highly competent staff of lumber inspectors who regularly check the quality of mill production, including visual grade requirements of glued products and machine stress-rated lumber.

The Association's Grading Rules for Western Lumber establishes standards of size and levels of quality in conformance with the American Softwood Lumber Standard PS 20. The Association is certified as a rules writing and inspection agency by the Board of Review, American Lumber Standard Committee. The Association is approved to provide mill supervisory services under its rules and the rules of the West Coast Lumber Inspection Bureau, the Redwood Inspection Service, the National Lumber Grades Authority for Canadian Lumber and the NGR portion of the Southern Pine Inspection Bureau Rules. In addition, WWPA is approved to supervise finger-jointed and machine stress-rated lumber.

Interpreting Grade Marks

WWPA uses a set of marks to identify lumber graded under its supervision. The grade marks are stamped on the lumber and appear near the ends of the product:

Most grade stamps, except those for rough lumber or heavy timbers, contain 5 basic elements:

- **WWPA certification mark** certifies Association Quality standards and is a registered trademark.

- **Mill identification** Firm name, brand, or assigned mill number. WWPA can be contacted to identify an individual mill whenever necessary.

- **Grade designation** Grade name, number or abbreviation.

- **Species identification** Indicates species by individual species or species combination.

- **Condition of seasoning** Indicates condition of seasoning at time of surfacing:

  - **MC-15, KD-15**
15% maximum moisture content

**S-DRY, KD**

19% maximum moisture content

**S-GRN**

over 19% moisture content (unseasoned)

Lumber carrying the WWPA grade stamp will meet or exceed the performance and aesthetic standards set for each grade. For additional information about lumber grades, sizes and specifications, go to WWPA's exclusive [Online Technical Guide](#) or check out the [WWPA publications list](#).