



Hem-Fir

Western Hemlock

Tsuga heterophylla

California Red Fir

Abies magnifica

Grand Fir

Abies grandis

Noble Fir

Abies procera

Pacific Silver Fir

Abies amabilis

White Fir

Abies concolor





Hem-Fir

WESTERN WOODS REGION

Of the West's approximately 136 million acres of forested land, there are nearly 40 million acres of commercial timberland* and nearly 50 million acres of forested land, including some 13 million acres of designated "old growth," permanently set aside in parks, scenic reserves, wilderness areas, habitat reserves and research areas — forever protected from harvesting. In addition, as of 1996, more than 80% of the forested area in the region's National Forests has been withdrawn from timber harvesting due to legislative, administrative, or judicial actions as even more progressive ecosystem management plans are implemented.

The Western Woods region is subjected to some of the toughest forest practice regulations in existence anywhere. In Western forests, growth exceeds harvest by more than 35% overall and by more than 50% in some areas. Refer to the section on "Environmental Performance" for additional information.

THE HEM-FIR SPECIES GROUP

In the Western Woods region, the 12 contiguous Western states plus Alaska, there are approximately 20 commercially important species well suited to softwood lumber production. While each has unique characteristics, physical and mechanical working properties, making it appropriate for specific applications, these Western softwood species are grouped into six primary combinations. These combinations simplify production, inventories and distribution, and facilitate engineering and product specification for design.

Hem-Fir is a species combination of Western Hemlock (*Tsuga heterophylla*) and five of the true firs: California Red Fir (*Abies magnifica*), Grand Fir (*Abies grandis*), Noble Fir (*Abies procera*), Pacific Silver Fir (*Abies amabilis*), and White Fir (*Abies concolor*). While Western Hemlock and the true firs are sometimes marketed separately in products graded for appearance, these species share similar design values making products graded for structural applications interchangeable.

The Hem-Fir species combination is one of the most important in the Western region, second only to the Douglas Fir-Larch species group in terms of abundance, production volumes, strength, and versatility in end use.

RANGE, GROWTH HABITS & PRODUCTION

In the West, the species in the Hem-Fir group commonly grow in intermingled stands along the Pacific Coast, from the Kenai Peninsula in Alaska to northwestern California. They also grow inland in a narrow, scattered pattern along the U.S.-Canadian border and then spread out, fanlike to climb the mountain slopes of northeastern Washington, northern Idaho, northwestern Montana, and through the Selkirk Mountains of southeastern British Columbia. The largest stands are found in the humid, coastal mountains and on the western slopes of the Cascade Range in Oregon, Washington, British Columbia and Alaska. They thrive in this mild and humid climate, where frequent fogs and rain provide moisture during the growing season.

Western Hemlock, also known as West Coast Hemlock or Pacific Hemlock, was discovered by botanist Stephen L. Endlicher in 1847. He christened hemlock "tsuga." In Japanese, *tsuga* means "yew-leaved," referring to its short, flat — and contrary to legend — non-pointed



Like Douglas Fir, Western Hemlock "prunes" its branches as it grows, leaving clear trunks up to three-quarters of its height.

Opposite: Hem-Fir species are abundant in Western forests; products are widely available in structural, appearance and remanufacturing grades. Here, Hem-Fir is used for paneling, doors and mouldings.

* Timberland is forested area that is producing or is capable of producing crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. Any reference to standing volumes of sawtimber or acres of multiple-use timberland available for timber products in this text do not include any of the forested land that is permanently set aside, protected from harvesting.



Western Hemlock is a strong, straight tree averaging 150' to 225' in height, ranging from 2' to 4' in diameter and developing best at elevations between sea level and 6,000 feet.

Opposite: Western Hemlock bark appears cinnamon-red to brown in color with broad, deep ridges. The needles are soft to the touch.

In most cases, paneling products in Hem-Fir will be run-to-pattern from the exquisitely beautiful, clear and nearly-clear "Finish & Select" grades. Hem-Fir accepts many types of finishes well, including enamels; however, a transparent or lightly-tinted finish is a classic choice.

sonous needles. Among the true firs, White Fir was first discovered along the Columbia River in 1831 by Scottish botanist David Douglas. Douglas Fir, *Pseudotsuga menziesii*, which is not a fir at all but a distinct species, was named after this famous botanist.

Western Hemlock can be easily distinguished from other conifers in Western forests by its downward sweeping branches and drooping top. The needles have rounded tips and grow from the sides of the stems in pairs. Seed-bearing brown cones sprout at the ends of branch shoots. Like Douglas Fir, the lower branches of Western Hemlock die and fall away because of competition for sunlight. Thus, as the tree grows, it "prunes" itself and develops clear trunks up to three-quarters of its height. This natural characteristic is highly desirable in softwoods, as it leads to increased volumes of clear lumber in large logs.

Abundant in managed forests, it is estimated there are more than 380 billion board feet of Hem-Fir sawtimber on the managed timberlands of the Western region. Second only to Douglas Fir-Larch, Hem-Fir accounted for nearly 22% of Western Lumber production in 1995, some 3.45 billion board feet. This important species combination is nearly as versatile as Douglas Fir-Larch (which accounted for 42% of total Western production volume), lending itself to a variety of products.

CHARACTERISTICS & BEST USES

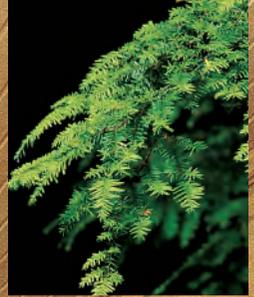
In its unique way, Hem-Fir is a perfect combination of strength and extraordinary beauty and is quite literally one of the most handsome, elegant and versatile softwood species combinations on the market today.

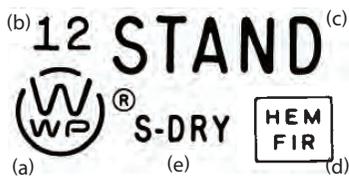
Hem-Fir lumber is light and bright in color, varying from a creamy, nearly-white to a light, straw-brown color. It can be as light or lighter in color than some of the Western pines and is often considered, by those seeking a strong wood with a very light color, as the most desirable of the Western softwoods. Sometimes Western Hemlock may have a slight lavender cast, especially around the knots and in the transition area between the spring and summerwood growth rings. Attractive, delicate, dark grey or black streaks may be apparent in the wood. There is little variation in color between the heartwood and sapwood.

Hem-Fir lumber products are available in structural, appearance and remanufacturing grades. In strength properties, Western Hem-Fir is slightly below the Douglas Fir-Larch species combination, and above both the Douglas Fir-South and Spruce- Pine-Fir (South) species combinations. Hem-Fir is useful for a multitude of general-purpose framing applications and is capable of meeting the span requirements of many installations. (Refer to Tables 1 and 2 under "Framing Products.")

In the clear and nearly clear appearance grades, Hem-Fir "Finish & Select" products are fine grained and even textured, lending formality to wood paneling, cabinets and trim. Hem-Fir "Factory & Shop" grade products are remanufactured into handsome solid wood doors, louvers, shutters, moulding, case goods, furniture and more. Limited volumes of knotty, board products are available in Hem-Fir and these are graded primarily to the West Coast Lumber Inspection Bureau's "Alternate Board" grade rules, and to some extent to WWPA's rules for the "Common" grades. Lower-grade knotty products are useful for those utilitarian applications in construction where economy governs.

Preservative pressure-treated Hem-Fir products are both visually appealing and strong, and in comparison to the naturally durable Western cedars and redwoods, among the more economical species considerations for decks and other outdoor amenities. Among the Western species, Hem-Fir is a preferred species group for preservative pressure treating.





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

- a. WWPA certification mark. Certifies Association Quality Standards and is a registered trademark.
- b. Mill Identification. Firm name, brand, or assigned mill number. WWPA can be contacted to identify an individual mill whenever necessary.
- c. Grade Designation. Grade name, number or abbreviation.
- d. Species Identification. Indicates species by individual species or species combination.
- e. 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)

GRADING

Recognized worldwide as a symbol of integrity, the Western Wood Products Association's grade stamp is a lumber buyer's guide to lumber satisfaction. This mark represents each WWPA Member mill's commitment to consistently deliver a product which meets uniform quality standards, whether the lumber is intended for structural or appearance purposes. Hem-Fir products carrying the WWPA certification mark are backed by the Association's quality control and inspection services, technical and field services, and the design and engineering data necessary to use Western Lumber products in construction. WWPA is the only Western Lumber association that provides this level of product support to the buyers of its Member companies' grademarked lumber.

Lumber grades are divided into three basic categories:

- structural framing products** visually graded and/or mechanically sorted for strength and physical working properties (appearance is secondary, unless specified);
- appearance products** graded for aesthetic qualities in non-structural applications, ranging from the beautifully refined to the most utilitarian; and
- industrial products** including a variety of structural and non-structural grades, of which the largest category for Hem-Fir is "Factory & Shop" lumber intended for remanufacturing purposes.

MOISTURE CONTENT, SEASONING & MARKETPLACE PREFERENCES

"Green" lumber is unseasoned lumber. It is gradestamped as "S-GRN" and has a moisture content (MC) level above 19% at the time of surfacing. The same design values apply to both S-GRN (unseasoned) and dry lumber. However, the term "dry" can be confusing in lumber terminology.

In general, "dry" indicates a product was either air-seasoned or kiln-dried to 19% or less moisture content at the time of surfacing. S-DRY can mean kiln dried or air seasoned, while KD specifically means kiln dried. The moisture content level of "dry" lumber is further qualified depending on the general classification (i.e. structural- or appearance-grade categories), the grading rules for specific grades (e.g. MC for "Finish & Select" grades is specifically qualified), and/or by the specific terms of buyer/seller agreements.

In **structural grades**, "dry" indicates a product was either air- or kiln-dried to 19% or less MC at the time of surfacing. It will be stamped S-DRY or, if kiln dried, KD. Any lumber surfaced at a moisture content level of 15% or less may be stamped MC15, or if kiln dried, KD15.

Historical practices and regional market preferences influence the availability of structural framing lumber at certain moisture content levels. Over time, certain regions evolved as "green markets," with a preference for S-GRN products such as Douglas Fir-Larch framing lumber, while other areas evolved as "dry markets," for such products as S-DRY or KD Hem-Fir.

Historically, Hem-Fir products were shipped to inland U.S. markets and Western Lumber manufacturers dried their Hem-Fir prior to surfacing in order to reduce its weight for overland transporting. Over time, builders began to like these dry framing products and, as a result, certain areas became "dry markets" for Hem-Fir.

Tradition continues to influence current practices for Hem-Fir manufacturing. Approximately 80% of Western Hem-Fir framing products are manufactured and shipped either S-DRY or KD. Dry Hem-Fir performs well and historical production practices have led to today's wide availability of Hem-Fir in the "dry" STUD and other "Dimension" and "Special Dimension" lumber grades.

In appearance-grade products, the term “dry” indicates a product was either air- or kiln- dried to 19% or less moisture content in the “Alternate Board” and “Common” grades. However, due to marketplace preferences, these products are occasionally manufactured and shipped by WWPA mills at lower moisture-content levels. If dried to 15% or less moisture content, these grades can be gradestamped (on either wide face or the ends) MC15 or KD15, as appropriate. In the clear and nearly-clear high-end appearance-grade products, such as the “Finish & Select” grades, “dry” specifically means a maximum of 15% moisture content. In addition, as specified in WWPA’s *Western Lumber Grading Rules*, 85% of the items in “Finish & Select” grades are shipped with a MC level of 12% or less. Often the highest-quality, appearance-grade products are not gradestamped to avoid marring the beauty of the wood. In these cases, grade and moisture-content information is included in the written documentation accompanying products.

For millwork, remanufacturing applications, or glued products, Hem-Fir is seasoned in temperature- and humidity-controlled dry kilns or stickered and air-dried until its moisture content reaches the desired level for the intended purpose — a level often set by the buyer. Unless specified otherwise by agreement, Western Hem-Fir production in the “Factory & Shop” grades is shipped at MC15 or KD15 with 85% of the items at 12% or less MC.

FRAMING PRODUCTS

Since Hem-Fir framing lumber products are nearly as strong as Douglas Fir-Larch, they can meet many of the structural load-bearing and load-carrying requirements of residential, light commercial and heavy construction. With their good strength and stiffness properties, S-DRY and KD Hem-Fir structural-grade products are well suited to framing systems where solid-sawn, structural lumber is needed for immediate use in an assembly of other dry framing products (e.g. I-beams, structural-glued finger-jointed lumber, stress-rated boards, etc.). Dry Hem-Fir framing products are subject to minimal shrinkage and checking, and thus perform extremely well in hot, dry climates, or in cold, low-humidity climates, and in multi-story framing.

Recently, in some regions of the U.S., end users have experienced “bouncy” floors when imported species have been used to their maximum allowable published spans. In contrast, published design values for all U.S. species combinations have proven reliable in end use and U.S. species perform well to published allowable maximum spans. Hem-Fir’s modulus of elasticity (MOE or E) value, a stiffness factor in floor systems, exceeds all other Western species combinations except Douglas Fir-Larch, the species combination which is held as the standard against which all other framing lumber is measured, worldwide. It is the combination of stiffness (MOE value) and strength (F_b value) that yields a satisfactory floor system. The following table provides for a comparison of these performance indicators in those Western species combinations commonly used for floor systems.



Hem-Fir is straight grained, stiff, strong, easy to work, and relatively free from pitch.

STRENGTH & STIFFNESS FACTOR RELATIONSHIPS AMONG WESTERN SPECIES & GRADES COMMONLY USED FOR FLOOR SYSTEMS

Table 1

Species Combination	Grade	Modulus of Elasticity or "E" Value (stiffness)	Fiber Stress in Bending Base Value (F_b) (strength)
Douglas Fir-Larch	SEL. STRUCT.	1,900,000	1450
Hem-Fir	SEL. STRUCT.	1,600,000	1400
Douglas Fir (South)	SEL. STRUCT.	1,400,000	1300
Spruce-Pine-Fir (South)	SEL. STRUCT.	1,300,000	1300
Douglas Fir-Larch	NO. 1&BTR	1,800,000	1150
Hem-Fir	NO. 1&BTR	1,500,000	1050
Douglas Fir-Larch	NO.1	1,700,000	1000
Hem-Fir	NO.1	1,500,000	950
Douglas Fir (South)	NO.1	1,300,000	900
Spruce-Pine-Fir (South)	NO.1	1,200,000	850
Douglas Fir-Larch	NO.2	1,600,000	875
Hem-Fir	NO.2	1,300,000	850
Douglas Fir (South)	NO.2	1,200,000	825
Spruce-Pine -Fir (South)	NO.2	1,100,000	750
Douglas Fir- Larch	NO.3	1,400,000	500
Hem-Fir	NO.3	1,200,000	500
Douglas Fir (South)	NO.3	1,100,000	475
Spruce-Pine-Fir (South)	NO.3	1,000,000	425

Span tables are another way to compare the performance capabilities of various species and grades in floor systems. Table 2 provides for a comparison of Hem-Fir's span capabilities relative to other widely-used Western species combinations when used as floor joists, spaced 16" on center.

WESTERN SPECIES FLOOR JOIST SPANS - 16" on center /360, 40# Live Load, 10# Dead Load

Table 2

Design Criteria: Strength - 10 lbs. per sq. ft. Dead Load plus 40 lbs. per sq. ft. Live Load. Deflection - Limited to span in inches divided by 360 for Live Load only.

Species Combination	Grade	Span in feet and inches			
		2x6	2x8	2x10	2x12
Douglas Fir-Larch	NO.1&BTR	10-2	13-4	17-0	20-5
	NO.1	9-11	13-1	16-5	19-1
	NO.2	9-9	12-7	15-5	17-10
	NO.3	7-6	9-6	11-8	13-6
Hem-Fir	NO.1&BTR	9-6	12-7	16-0	19-6
	NO.1	9-6	12-7	16-0	18-7
	NO.2	9-1	12-0	15-2	17-7
	NO.3	7-6	9-6	11-8	13-6
Douglas Fir-South	NO.1	9-1	12-0	15-3	18-1
	NO.2	8-10	11-8	14-11	17-4
	NO.3	7-4	9-3	11-4	13-2
Spruce-Pine-Fir (South)	NO.1	8-10	11-8	14-11	17-7
	NO.2	8-7	11-4	14-3	16-6
	NO.3	6-11	8-9	10-9	12-5

For additional design aids to calculate spans, order WWPA's **Western Lumber Span Tables (#570)** a comprehensive set of span tables for all Western species combinations; the **Western Lumber Span Computer**, a slide rule for calculating spans; or the **Western Lumber SpanMaster™** a hand-held electronic calculator for designing joists, rafters, beams, and headers in Western species.



Hem-Fir is widely available at S-DRY and KD moisture content levels. These framing products have good strength and stiffness properties and are subject to minimal shrinkage and checking, thus performing extremely well in hot, dry climates and in multi-story framing.

Hem-Fir is additionally preferred by many builders because of its: resistance to splitting in nailing and screwing; ability to hold nails and screws securely; ease of sawing without splintering; ability to hold a variety of glues and adhesives; and moderate lightness in weight. It is straight grained, stiff, strong, easy to work, and relatively free from pitch.

Dimension Lumber: The bulk of S-DRY and KD Hem-Fir is produced in the Dimension Lumber sizes (2" to 4" thick by 2" and wider). Dimension Lumber Hem-Fir products include:

"Structural Light Framing" grades fit applications where high design values are needed in light-framing sizes for engineered applications, trusses, laminated products and multi-story projects. (Grades include SELECT STRUCTURAL, NO.1&BTR, NO.1, NO.2, and NO.3.) These grades may be a special order for some retail lumber suppliers.

"Light Framing" grades are intended for general framing applications such as wall framing, plates, sills, cripples, blocking, etc. (CONSTRUCTION, STANDARD, and UTILITY).

"STUD" grade is intended for vertical installations in wall systems and other applications including blocking and furring.

"Structural Joists & Planks," in 2x5 through 4x18 sizes (with the majority of production in 2x6 through 4x12), are available in SELECT STRUCTURAL, NO.1&BTR J&P, NO.1, NO.2 and NO.3 to fit engineered applications where larger-sized members are required.

Special Dimension: Hem-Fir products in this category include Machine Stress-Rated (MSR) lumber for components manufacturing and engineered applications, and structural-glued (end- or fingerjointed) products which are recognized by all U.S. model building codes as interchangeable with solid-sawn lumber products of the same grade, species and intended end use.

One-quarter of the lumber used in components and truss manufacturing is MSR lumber. Hem-Fir MSR products are commonly available in several stress levels, occasionally up to 2400 Fb-2.0E. These MSR products offer good strength-to-weight properties, recognized plate-holding ability, exceptional stiffness and consistent availability in a variety of lengths, widths and grades.

Hem-Fir is ideally suited for structural-glued products. The USDA Forest Products Laboratory rates Hem-Fir in the top group of softwoods for ease of gluing, based on glueability under varying conditions and with different types of adhesives. This, along with Hem-Fir's inherent strength properties, make the species combination a natural for end- or finger-jointed, edge- and face-glued structural products. And because of its beauty, it's a natural for finger-jointed millwork and mouldings, edge- and face-glued boards, and laminated stock. These products make excellent use of short lengths, thus increasing utilization of available timber resources. WWPA provides testing and quality control for glued prod-

Opposite: Because of its strength, beauty and ability to bond well with adhesives, Hem-Fir is an excellent choice for glulam beams.

ucts, currently certifying the manufacture of Hem-Fir structural-glued Dimension Lumber and Board products under the following classifications: Light Framing and Studs, Structural Light Framing, Structural Decking, Stress-Rated Boards, and Structural Joists and Planks.

Larger sizes: The bulk of production in the larger sizes is manufactured and shipped S-GRN. Hem-Fir products in the 5" & thicker and 5x5 & larger sizes of "Beams & Stringers" and "Posts & Timbers" are unique products well suited to meet specific design criteria.

(Refer to WWPAs Western Lumber Product Use Manual and Wood Frame Design for additional design information, to the Structural-Glued and MSR Technical Information Product Sheets for information on these products, and to WWPAs Vol. 1 Species Book: Dimension Lumber for color photographs of structural grades.)

Structural Decking

Hem-Fir is a discerning selection for exposed ceilings and a practical choice for roofing, flooring or subflooring. Of the many products available in Hem-Fir, "Structural Decking" truly showcases Hem-Fir's combination of strength and beauty. These products, which are also known as "roof decking," are 2" to 4" thick by 4" & wider in width and available in two grades: SELECTED DECKING (for fine visual aesthetics) and COMMERCIAL DECKING (when appearance is less important).

SELECTED DECKING can be used so that the face, or better side, will show the sophisticated, casual elegance of Hem-Fir in applications such as exposed ceilings. Its moderately light weight makes it easy to handle and install. Hem-Fir is usually run to standard decking patterns, in nominal 2" and 3" single tongue-and-groove (T&G), and is available with V or rounded edges. While SELECTED DECKING is a structural-grade product, some WWPAs Member mills provide a proprietary variation of this product through buyer/seller agreement. These proprietary products give consideration to appearance characteristics in order to meet discriminating architectural requirements and/or a specification for MC15 or KD15 in a 2x structural-grade product. As with any product to be used in a T&G application, it should be acclimated to the surrounding atmosphere prior to installation.

COMMERCIAL DECKING is ideally suited for subflooring in both solid-sawn and structural-glued products. Because Hem-Fir is nearly as strong as Douglas Fir-Larch in extreme fiber stress in bending (F_b) and modulus of elasticity (E or MOE), it can meet engineering requirements for many structural decking installations. Some T&G decking is manufactured to pattern from NO.2 & BTR or NO.3, 2x6 or 2x8 framing lumber. These products are generally used for concealed subfloors in deck and girder construction.

APPEARANCE PRODUCTS

In products graded for appearance, wood-savvy architects and designers often choose Hem-Fir for trim, fascia, paneling, moulding and millwork, as well as for exposed wood ceilings. Substantial volumes are available in the clear and nearly-clear appearance grades and whether used extensively, such as for paneling, or in small decorative elements, Hem-Fir boasts remarkable versatility and usefulness. It compliments many architectural styles and design themes. When acclimated prior to installation, MC15 or KD15 Hem-Fir products retain their shape and size without shrinking, swelling, cupping, warping, bowing, or twisting. Adding to its aesthetic qualities, Hem-Fir, like all wood, is a very good insulating material. It has a coefficient of heat transmission, or K value, of .89 BTU per inch of net thickness at 12% moisture content, which puts it among the best species for insulating properties.

Interior designers often like Hem-Fir for two primary reasons: its color and natural resistance to darkening from exposure to light. While all wood darkens over time with exposure to sunlight, Hem-Fir often remains true to its original, freshly-milled pastel color.



These cabinets showcase the subtle variations in color of the Hem-Fir species combination.



Hem-Fir is a species combination of Western Hemlock and several of the true firs. The characteristics of the individual species vary somewhat, but after manufacturing into lumber, the wood fibers are virtually indistinguishable from one another except under laboratory inspection. The species share similar design values and are interchangeable for structural applications.

Figure 1: Exemplified here are C&BTR grade in the "Selects" category and SUPERIOR in the "Finish" category of lumber graded for appearance. This clear and nearly-clear lumber may be marketed as boards or run-to-pattern for paneling.

Figure 2: These NO.2&BTR COMMON boards reveal Hem-Fir's flat grain, with colors ranging from a pleasing off-white to a very light, reddish brown. A variety of natural characteristics and manufacturing imperfections are permitted in the COMMON grades.

Figure 3: The majority of Hem-Fir is manufactured into S-DRY and KD structural lumber, primarily in the Dimension Lumber grades and sizes. "Structural Light Framing" NO.1&BTR products, as shown here, are used in applications where high-strength is necessary in members 2" to 4" thick by 2" & wider.

Figure 4: In SELECT STRUCTURAL "Joists & Planks" (nominal 2x5 through 4x18), knots are limited to sound, firm encased and pith knots, if tight and well spaced, with one unsound or loose knot per four lineal feet. Size, type and spacing for centerline, edge, unsound or loose knots are restricted by the rules for this high-strength, larger-size Dimension Lumber grade. Hem-Fir J&P and other Dimension Lumber grades are often manufactured S-DRY or KD.



Figure 1



Figure 2



Figure 3



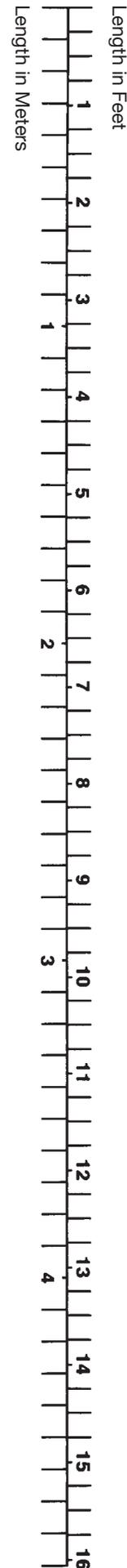
Figure 4



Figure 5



Figure 6



Western Hemlock's light color tones and subtle variations between spring and summerwood are revealed in this rough cut log.

"Factory & Shop" grades are often considered the economical "clears" of the lumber industry. Such lumber is graded for the amount of clear wood that can be obtained by ripping and cross cutting a piece. These clear "cuttings" are then used in doors, windows, mouldings, millwork, cabinets and furniture.

Figure 5: Hem-Fir is widely used for baseboard and door jamb mouldings. MOULDING STOCK grade is lumber suitable for ripping into strips 1" and wider, 10" and longer. Lines indicate where this 5/4 & THICKER RWL MOULDING STOCK grade would be cut to recover the percentage of moulding rips required for the grade. Wane, stain, skips in dressing or other characteristics (that would surface off in making mouldings of standard sizes) are permitted in computing the percentage of rips available.

Figure 6: Hem-Fir is one of several Western species ideally suited for paneled and louvered doors. This grade, 5/4 & THICKER RWL NO.1 SHOP FLUSH DOOR STOCK, is intended for paneled doors. Lines indicate how the specified number and sizes of door cuttings (muntins and stiles), of specified quality, would be recovered from the pieces.



Hem-Fir's straight grain and fine texture sand to a silky, reflective smoothness.

Finish carpenters, remanufacturers and woodworkers like Hem-Fir for other reasons. The straight grain and fine texture sands to a silky, reflective smoothness with virtually no tendency to split. Hem-Fir yields clean, straight edges and accurate contours with either machine or hand tools, and can be worked easily by either. The wood grips fasteners securely and accepts adhesives without a problem. It readily accepts finishes, ranging from clear coatings, transparent lacquer, varnishes, oils, or wax to a full selection of stains and bright or subdued tints or paints.

The clear and nearly-clear products dominate the appearance grades in Hem-Fir. The highest grade categories, "Finish & Selects," may be specified in either vertical or flat grain. If grain pattern is not specified, these grades will be shipped as a combination of vertical and flat grain. These high-appearance Western Lumber products include "Selects" (B&BTR SELECT, C SELECT, and D SELECT) and "Finish" (SUPERIOR, PRIME, E). Such products are recommended for interior wall and ceiling paneling, trim and cabinet work with either natural, stain, or enamel finishes that respect their fine appearance. These products may be wrapped at the mill for protection in shipping and handling.

Most of the knotty fiber in Hem-Fir is generally manufactured into structural products whenever possible. However, some knotty, appearance-grade products are manufactured in Hem-Fir. These products are manufactured and shipped about half and half in S-GRN and S-DRY and are intended more for general construction applications than fine interior installations. For the most part, the general-purpose, knotty-appearance grades in Hem-Fir are manufactured, by tradition, in the "Alternate Board" grades of the West Coast Lumber Inspection Bureau's (WCLIB) grading rules. These grades include SELECT MERCHANTABLE (used primarily in housing and light construction for soffits and fascia, and occasionally for shelving where sound, tight knots are acceptable), CONSTRUCTION and STANDARD (for general construction purposes and serviceability in sub-floors, roof, wall sheathing, and let-in bracing), and UTILITY and ECONOMY (for use in applications where economy is the basic requirement).

(Refer to WWPA's Vol. 2 Species Book: Boards and Commons for additional information and color photographs of appearance grades in a variety of Western softwood species.)

Paneling

The clear and nearly-clear paneling products available in Hem-Fir give a stunning, soft glow to ceiling and wall paneling in traditional and contemporary homes as well as a subtle, sophisticated ambience in family and living rooms, dens, bedrooms, and kitchens. Because Hem-Fir has a flame-spread rating of 73, it qualifies for a Class 2 (or B) rating. Consequently, it is frequently specified as paneling in public buildings such as theaters, shopping centers and restaurants. Europeans have made Hem-Fir a popular choice for paneling because of its uniform tone, luster and hardness.

Like all patterned products, solid wood paneling products reflect the grade of their starting, appearance-grade material (as described above), adhering to similar requirements for permissible characteristics. In most cases, paneling products in Hem-Fir will be run-to-pattern from the exquisitely beautiful, clear and nearly-clear "Finish & Select" grades and are available in a variety of patterns. Whereas several grades of knotty paneling products are widely available in the Western pines, knotty grades in Hem-Fir are not commonly remanufactured into paneling products.

Refer to WWPA's Standard Patterns for dimensioned profiles of run-to-pattern products and to the TIP Sheet on Flame-Spread Ratings and Smoke-Developed Indices for Western Species for additional information.

Opposite: Clear Hem-Fir paneling products are manufactured from Select and Finish grades, doors and moulding products are manufactured from the Factory and Shop grades.



In this room, Hem-Fir is used for the ceiling paneling, cabinets, mouldings and doors.



FACTORY AND SHOP PRODUCTS

Lumber intended for trim and other non-structural applications may be from the appearance category of grades, as described earlier. Or, if intended to be run-to-pattern or further manufactured into specialty wood products, it may be from the “Factory & Shop” category of grades. These MC15 and KD15 Hem-Fir products are available in a variety of grades for such end uses as mouldings, doors, windows, case goods, etc. This category of lumber products, which is graded to be re-cut for the recovery of clear pieces in pre-determined sizes, is usually available only in large volumes, mill direct to remanufacturers.

Owing to its unique combination of attributes, Hem-Fir is a dominant species combination for manufactured woodwork. It is readily and accurately milled to sharp detail. Its smooth surfaces and high dimensional stability assure continuing fine appearance over time. Hem-Fir mouldings and interior trim do not splinter, are resistant to scuffing and the effects of use over time, and the color tones remain light.

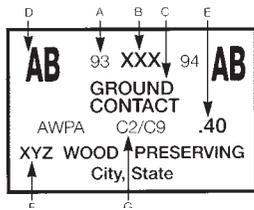
On the West Coast of the U.S., residential baseboard and door-jamb mouldings are more often manufactured from Hem-Fir than any other species. Hem-Fir mouldings come in a wide choice of attractive patterns and varying lengths. Stair components made from Hem-Fir are exceptionally hard wearing and will readily take paint or stain finishes. And because it can be machined easily with exact precision, a number of decorative items are also made from Hem-Fir: turned and worked cornices, crown mouldings, shutters, louvers, blinds, ornamental trim pieces, furniture and cabinets, wine and spice racks, knife holders, serving trays, cutting boards and more.

TREATED PRODUCTS

Hem-Fir is readily pressure treated with preservatives. Such products, generally in Dimension Lumber grades and sizes, are widely used for backyard outdoor decks. Treated Hem-Fir is easily stained to resemble cedar or redwood, or it may be given a clear protective finish to enhance its natural color. It is a preferred Western species group for preservative pressure-treating. Because of its combination of strength properties and beauty, this species combination is useful for both the load-bearing as well as non-structural components of outdoor installations. It is also very abundant which makes it more cost competitive than the naturally durable species. With incising (small cuts are made in the surface of the wood before treating), Hem-Fir may be treated to appropriate retention levels for above-ground, ground-contact, or in-ground installations.

Opposite: Stronger than the naturally durable Western species, and easily pressure treated with preservatives, Hem-Fir is useful for both the load-bearing and non-structural elements of outdoor amenities.





- A Year of treatment if required by AWWPA Standard M1-95
- B Preservative used
- C Proper exposure condition
- D Trademark of the ALSC-accredited agency
- E Retention level
- F Treating company and location
- G Treating Standard

The American Wood Preservers Association (AWPA) provides treating standards and retention levels for a number of preservative and fire-retardant chemicals. All pressure-treated wood should bear the mark of a quality control agency approved by the American Lumber Standard Committee. Chemical retention is stated in terms of the weight of the chemical retained (in pounds) per cubic foot (pcf) of wood after treatment; the larger the number, the more chemical retained. In general, relevant AWWPA standards and retention levels for waterborne preservatives are:

- 0.25 pcf to AWWPA Standard C-2 is required when the product is used above ground;
- 0.40 pcf to AWWPA Standard C-2 is required if the lumber is in contact with soil or fresh water;
- 0.60 pcf to AWWPA Standard C-15 is required if the lumber is used as a permanent wood foundation.

For more information refer to WWPMA's *Treated Lumber TIP Sheet* or the Western Wood Preservers Institute's brochure *Guide to the Characteristics, Uses and Specifications of Pressure Treated Wood*, 601 Main Street, Suite 401, Vancouver, Washington, 98660.

WWPA WESTERN LUMBER ENVIRONMENTAL PERFORMANCE

WWPA Member companies are leaders in addressing the environmental challenges facing the U.S. forest products industry. Approximately 90% of the lumber produced in the Western Woods region comes from Oregon, Washington, California, Idaho and Montana where *State Forest Practices Acts* and *Best Management Practices* are the toughest forest practice laws in place in the U.S.

To foster the sustainability of all Western timberlands in perpetuity, where timber for products is but one of the many values assigned to and respected in these working forests, the following and more are fully regulated:

- protection for threatened and endangered species;
- wildlife habitat and stream protection;
- watershed, wetlands and riparian areas protection;
- soil conservation and site productivity;
- logging practices, with a State Forester overseeing every logging operation on both private and publicly-owned timberlands;
- time-specified, site-specific, multi-species reforestation;
- limitations on the application of fertilizer and herbicides; and
- scenic corridors protection (in Oregon).

The environmental burdens associated with WWPMA Western Lumber harvesting, manufacturing and transportation have been audited by an independent third party (Scientific Certification Systems, Oakland, CA), with results available in a benchmark study: *Eco-Profile of Lumber Produced in the Western United States - Life Cycle Inventory of WWPMA Western Lumber*.

WWPA Member companies are dedicated to
Perpetuating Western Forests for Products and the Environment©

QUALITY CONTROL & WWPMA FIELD SUPPORT

The WWPMA grade mark identifies Western Lumber products backed with assurances for quality, performance and technical support. WWPMA maintains a team of lumber inspectors throughout the Western region to monitor the grading and quality control of Western Lumber products from WWPMA Member mills, ensuring products consistently meet grade specifications. Additionally, WWPMA provides a team of professional field staff in key market locations throughout the U.S. and overseas. With training and work experience in design, engineering, lumber specifications, code conformance, construction, manufacturing, wood technology and forestry, this field team offers technical assistance in all aspects of Western Lumber end use for WWPMA Member company products.



WWPA FULL MEMBER MILLS

The following companies support the services WWPA provides to the marketplace.

Bennett Lumber Products, Inc.
Blue Mtn. Lumber Products LLC
Boise Cascade Company
C&D Lumber Company
Canyon Lumber Company, Inc.
Collins
Columbia Vista Corporation
Devil's Tower Forest Products
F. H. Stoltze Land & Lumber Co.
Georgia-Pacific Wood Products
Northwest LLC
Guy Bennet Lumber Company
Hampton Lumber Mills-Cowlitz Div.
Hampton Lumber Mills-Darrington Div.
Hills Products Group-
McLaughlin Sawmill
Idaho Forest Group, LLC
Interfor U.S. Inc.
Malheur Lumber Company
Mid-Columbia Lumber
Montrose Forest Products, LLC
Northland Wood Products, Inc.
Ochoco Lumber Company
Plum Creek Manufacturing, Inc.
Potlatch Corporation
Pyramid Mountain Lumber, Inc.
Reidhead Brothers Lumber

Rushmore Forest Products, Inc.
S.K. Fingerjoint, LLC
SDS Lumber Company
Seattle-Tacoma Box Company
Seneca Noti, LLC
Sierra Forest Products
Sierra Pacific Industries
Simpson Lumber Company LLC
Spearfish Forest Products, Inc.
Stimson Lumber Company
Sturgis Sawmill
Sun Mountain Lumber
Swanson Group
T & T Forest Products
Teal-Jones Group
Thompson River Lumber Company
of Montana, Inc.
Tillamook Lumber Company
Unity Forest Products
Vaagen Brothers Lumber, Inc.
Warm Springs Forest Products Industries
Warrenton Lumber Company
Willamina Lumber Company
White Mountain Apache Forest Industries
Yakama Forest Products of the
Yakama Indian Nation
Zosel Lumber Company

Oregon's Forest Practices Act celebrated its 25th anniversary in 1996 and has been a national model for forest protection since it was passed by the State Legislature in 1971. This Act influenced State Forest Practices Acts in Washington and California, the Best Management Practices in Idaho, and the evolving forestland management strategies which are now in effect throughout the Western Woods region. These progressive environmental regulations foster a multiplicity of forest values, helping to ensure the availability of Western Lumber products in perpetuity.



Treated Hem-Fir products may be stained a number of ways. Products are both visually appealing and strong, and in comparison to the naturally durable Western cedars and redwoods, among the more economical species considerations for outdoor decks.



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