Southern Pine Use Guide

Strength • Treatability • Beauty

SOUTHERN FOREST PRODUCTS ASSOCIATION

SouthernPine.com

NEW SOUTHERN PINE DESIGN VALUES

Wood: The Right Choice

➤ No other building material can match wood's unique combination of benefits, including value, strength, ease of use and environmental superiority.

➤ Wood-frame construction has a 100-year track record for safety and dependability. That's why some nine out of ten homes built today use wood.

➤ Wood can be locally sourced and is usually less expensive than alternative building materials. Building with wood, whether custom or prefabricated, is fast and efficient, and can be undertaken year-round in almost any climate. Wood building systems typically cost less to install than other mainstream structural materials. Experienced wood contractors are widely available, and workers of varying skill levels can quickly learn wood construction techniques.

➤ Wood can be used in many types of buildings, from single-family homes to multi-story residences and offices, schools, health facilities, recreational centers and public gathering areas. It is suitable not only as a finish material, bringing warmth and natural beauty to interior and exterior applications, but as a structural material, offering a cost-effective way to meet building code requirements for safety and performance.

➤ Today's North American building codes, coupled with advances in wood science and building technology, have expanded the options for wood construction. These codes recognize wood's safety and structural performance capabilities and allow its use in a wide range of building types.

➤ With growing pressure to reduce the carbon footprint of the built environment, building designers are increasingly being called upon to balance functionality and cost objectives with reduced environmental impact. Wood is a cost-effective material and a renewable resource that can help to achieve that balance.

For more information, visit: *reThinkWood.com* and *WoodNaturally.com*

SOUTHERN FOREST PRODUCTS ASSOCIATION®

SFPA is a nonprofit trade association that has represented manufacturers of Southern Pine lumber since 1915.

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NEW SOUTHERN PINE DESIGN VALUES

Contents

The Southern Forest Products Association (SFPA) does not test lumber or establish design values. The purpose of the Use Guide is to collect and organize data available from other sources for the convenience of builders, engineers, architects and other professionals. The Southern Pine design values contained herein are taken from the *Standard Grading Rules for Southern Pine Lumber, 2014 Edition*, published by the Southern Pine Inspection Bureau, and the adjustment factors are taken from the *National Design Specification® (NDS®) for Wood Construction*, published by the American Wood Council. Neither the Southern Forest Products Association, nor its members, warrant that the data from such sources on which the recommended uses of Southern Pine lumber contained herein are based is correct, and disclaim responsibility for injury or damage resulting from the use of such design values.

The conditions under which lumber is used in construction may vary widely, as does the quality of workmanship and construction methods. Neither the Southern Forest Products Association, nor its members, have knowledge of the quality of the workmanship or construction methods used on any construction project, and, accordingly, do not warrant the design or performance of the lumber in completed structures.

Why Southern Pine?

Southern Pine lumber has been popular since Colonial times and remains the preferred choice for today's design/build professionals. Southern Pine provides great value in a wide variety of applications. From framing a house to building a deck, Southern Pine is a dependable product for any project.

Here are a few inherent advantages of Southern Pine:

New Design Values

The lumber industry conducts ongoing testing and invests millions of dollars to provide the most accurate and reliable design values for structural lumber. New design values for visually graded Southern Pine dimension lumber became effective June 1, 2013. The new design values were determined from destructive tests of more than 7,400 full-size samples of commercially-produced Southern Pine that resulted in more than 300,000 data points.

Cost Savings

Wood products are the most cost-effective building material on the market. Southern Pine is competitively priced because of an abundant timber supply, manufacturing expertise and established market preference.

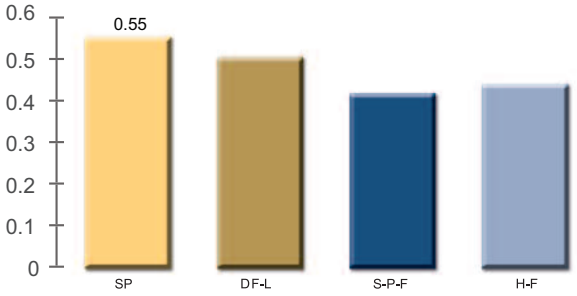
Best Treatability

Southern Pine has long been the preferred species for pressure treatment because of its unique cellular structure that permits deep, uniform penetration of preservatives. Some 85% of all pressure-treated wood produced in the U.S. is Southern Pine.

Highest Density

Southern Pine has the highest specific gravity of all common structural lumber species, providing superior fastener-holding power and load-bearing capacity.

Specific Gravity by Species



SP: SOUTHERN PINE DF-L: DOUGLAS FIR-LARCH S-P-F: SPRUCE-PINE-FIR H-F: HEM-FIR

Source: 2012 National Design Specification® for Wood Construction

Comparable Strength and Stiffness

Design values for Southern Pine are comparable to other softwood species used in residential and commercial construction. Users can choose from a variety of visual grades and an increasing supply of mechanical grades providing a wide range of dependable strength and stiffness properties to meet the needs of any project.

Natural Beauty

Southern Pine offers a distinct grain pattern and an appealing golden color. Because of this natural beauty, exposed Southern Pine provides architectural appeal.

Widespread Availability

Southern Pine is an abundant and renewable resource, growing in a vast band across the Southern United States from East Texas to Virginia. These forests are in close proximity to hundreds of Southern Pine lumber manufacturing facilities, offering ready availability to major markets.

Dimensional Stability

Southern Pine dimension lumber 2″ and less in thickness must be dried to a maximum moisture content of 19%. This minimizes shrinkage associated with green lumber and provides long-term stability.

Proven Quality

Southern Pine lumber is graded in accordance with the Southern Pine Inspection Bureau (SPIB) *Standard Grading Rules for Southern Pine Lumber.*

Green Building Material

Southern Pine consists of four main species – longleaf, loblolly, shortleaf and slash. Southern Pine forests are some of the most productive and sustainable timberlands in the world, capturing large amounts of carbon from the air and storing it in lumber used every day. Southern Pine is grown and manufactured in the U.S. South, further improving local economies, reducing transportation costs and minimizing impacts on the environment.

Southern Pine Product and Grade Descriptions

Based on SPIB Grading Rules
See SouthernPine.com for Product Locator

Product	Grade	Grade Characteristics and Typical Uses
Dimension Lumber: 2″ to 4″ thick, 2″ and wider *See Table 1 for design values*		
NEW SOUTHERN PINE DESIGN VALUES	*Dense Select Structural Select Structural *Select Structural Non-Dense	High quality, limited in characteristics that affect strength or stiffness. Recommended for uses where high strength, stiffness and good appearance are desired.
	*No.1 Dense No.1 *No.1 Non-Dense	Recommended for construction where high strength, stiffness and good appearance are desired.
	*No.2 Dense No.2 *No.2 Non-Dense	Recommended for most general construction uses where moderately high design values are required. Allows well-spaced knots of any quality.
	No.3	Recommended for general construction purposes where appearance is not a controlling factor. Many pieces included in this grade would qualify as No.2 except for a single limiting characteristic.
	Stud	Suitable for stud uses including use in load-bearing walls. Composite of No.3 strength and No.1 edge characteristics for a better nailing surface.
	*Construction (2″ to 4″ wide only)	Recommended for general framing purposes. Good appearance, but graded primarily for strength and serviceability.
	*Standard (2″ to 4″ wide only)	Recommended for same purposes as Construction grade. Characteristics are limited to provide good strength and excellent serviceability.
	*Utility (2″ to 4″ wide only)	Recommended where a combination of economical construction and good strength is desired. Used for such purposes as studding, blocking, plates, bracing and rafters. Design values only apply to utility lumber that is 4" wide.
	Design values are not assigned Economy	Usable lengths suitable for bracing, blocking, bulkheading and other general utility purposes where strength and appearance are not a consideration.
Prime Dimension: 2″ to 4″ thick, 2″ to 12″ wide *See Table 1 for design values*		
	No.1 Prime	Recommended where appearance and strength are a consideration. Grade based on No.1 Dimension Lumber except wane and other characteristics that affect appearance are limited.
	No.2 Prime	Recommended where appearance and strength are a consideration. Grade based on No.2 Dimension Lumber except wane and other characteristics that affect appearance are limited.
***Timbers: 5″ x 5″ and larger** *See Table 3 for design values*		
	Dense Select Structural Select Structural	Recommended where high strength, stiffness and good appearance are desired.
	No.1 Dense No.1	Recommended for general construction uses. Similar in appearance to No.1 Dimension Lumber.
	No.2 Dense No.2	Recommended for general construction uses. Similar in appearance to No.2 Dimension Lumber.
	Design values are not assigned No.3	Non-stress rated, but economical for general utility purposes such as bracing, blocking, bulkheading, etc.

*Most mills do not manufacture all products and make all grade separations. Those products and grades not manufactured by most mills are noted with an asterisk.

SOUTHERN PINE PRODUCT AND GRADE DESCRIPTIONS (CONT'D)

Based on SPIB Grading Rules
See SouthernPine.com for Product Locator

Product	Grade	Grade Characteristics and Typical Uses
***Mechanically Graded Lumber – Machine Stress Rated (MSR) Lumber: 4″ and less in thickness, 2″ and wider** *See Table 2 for design values*		
	750f–1.4E thru 3000f–2.4E	Machine Stress Rated (MSR) lumber is evaluated by mechanical stress rating equipment. MSR lumber is distinguished from visually stress graded lumber in that each piece is non-destructively tested. MSR lumber is also required to meet certain visual grading requirements. The grade mark can include "1W" or "2W" if visually graded to the wane restrictions for No.1 or No.2 dimension lumber, respectively.
***Mechanically Graded Lumber – Machine Evaluated Lumber (MEL): 4″ and less in thickness, 2″ and wider** *See Table 2 for design values*		
	M–5 thru M–42	Well-manufactured material evaluated by calibrated mechanical grading equipment which measures certain properties and sorts the lumber into various strength classifications. Machine Evaluated Lumber is also required to meet certain visual requirements. The grade mark can include "1W" or "2W" if visually graded to the wane restrictions for No.1 or No.2 dimension lumber, respectively.
***E-rated Structural Laminations: 4″ and less in thickness, 2″ and wider** *Design Values by qualification*		
	E–grades	Suitable for use as individual laminations for structural glued laminated timbers. This lumber has been non-destructively evaluated by an American Lumber Standard Committee approved machine.
***Glued Lumber: 4" and less in thickness, widths vary by product** *See Table 1 for design values*		
	See Dimension Lumber Grades	End-glued, face-glued, and edge-glued Southern Pine in glued assemblies, including stress-rated grades of finger-jointed 2" Dimension Lumber.
***Scaffold Plank: 2″ and 3″ thick, 8″ and wider** *See Table 4 for design values*		
	Dense Industrial 72 Scaffold Plank Dense Industrial 65 Scaffold Plank	All Scaffold Plank design values are calculated using ASTM Standards D245 and D2555. These values are modified using procedures shown in "Calculating Apparent Reliability of Wood Scaffold Planks," as published by the Journal on Structural Safety, 2 (1984) 47-57, and updated in 1993.
	MSR Scaffold Plank: 2400f–2.0E MSR Scaffold Plank: 2200f–1.8E	Dressed to standard dry size prior to machine stress rating, and visually graded to assure that characteristics affecting strength are no more serious than the limiting characteristics for each grade. MSR Scaffold Plank is available 2″-thick only.
***Stadium Grade: 2″ thick, 4″ to 12″ wide** *See Table 1 for design values*		
	No.1 Dense Stadium Grade No.1 Stadium Grade	For outdoor seating. Free of pitch pockets, pitch streaks and medium pitch on one wide face, but otherwise conforms to No.1 Dense or No.1 Dimension Lumber.
***Seawall Grades: 2″ to 4″ thick, 6″ to 14″ wide** *See Table 1 for design values*		
	Any grade of Dimension Lumber	One wide face and both adjacent narrow faces must be free of pith and/or heartwood. Application of the product requires pressure treatment by an approved treating process and preservative for marine usage.

* Most mills do not manufacture all products and make all grade separations. Those products and grades not manufactured by most mills are noted with an asterisk.

SOUTHERN PINE PRODUCT AND GRADE DESCRIPTIONS (CONT'D)

Based on SPIB Grading Rules
See SouthernPine.com for Product Locator

Product	Grade	Grade Characteristics and Typical Uses
***Marine Grades: 1″ to 20″ thick, 2″ to 20″ wide** *See Tables 1 and 3 for design values*		
	Any grade of Dimension Lumber or Timbers	All four longitudinal faces must be free of pith and/or heartwood. Application of the product requires pressure treatment by an approved treating process and preservative for marine usage.
***Decking, Heavy Roofing and Heavy Shiplap: 2″ to 4″ thick, 4″and wider** *See SPIB Grading Rules for design values*		
	Dense Standard Decking	A superior decking grade, suitable for plank floor where face serves as finish floor. Has a better appearance than No.1 Dense Dimension Lumber because of additional restrictions on firm red heart, pith, knots and wane.
	Dense Select Decking Select Decking	An excellent decking grade that can be used face side down for roof decking or face side up for floor decking.
	Dense Commercial Decking Commercial Decking	An economical roof decking which conforms to No.2 Dimension Lumber characteristics.
Boards: 1″ to 1-1/2″ thick, 2″ and wider *See Table 1 for design values*		
	Industrial 55	Graded as per No.1 Dimension Lumber.
	Industrial 45	Graded as per No.2 Dimension Lumber.
	Industrial 26	Graded as per No.3 Dimension Lumber.
Design values are not assigned		
	No.1	High quality with good appearance characteristics. Generally sound and tight-knotted. Largest hole permitted is 1/16″. Superior product suitable for a wide range of uses including shelving, boxing, crating, and form lumber.
	No.2	Good-quality sheathing, fencing, shelving and other general purpose uses.
	No.3	Good, serviceable sheathing; usable for many economical applications without waste.
	No.4	Admits pieces below a No.3 grade which can be used without waste, or which contain less than 25% waste by cutting.
***Industrial Lumber: 2″ and thicker, 2″ and wider** *See SPIB Special Product Rules for design values*		
	Industrial 86	Appearance is same as B&B Finish for thicknesses of 4″ and less and widths 12″ and less. Larger sizes conform to Dense Structural 86 Structural Lumber except for dense grain requirement.
	Industrial 72	Appearance is same as C Finish for thicknesses of 4″ and less and widths 12″ and less. Larger sizes conform to Dense Structural 72 Structural Lumber except for dense grain requirement.
	Industrial 65	Appearance is same as D Finish for thicknesses of 4″ and less and widths 12″ and less. Larger sizes conform to Dense Structural 65 Structural Lumber except for dense grain requirement.

*Most mills do not manufacture all products and make all grade separations. Those products and grades not manufactured by most mills are noted with an asterisk.

SOUTHERN PINE PRODUCT AND GRADE DESCRIPTIONS (CONT'D)

Based on SPIB Grading Rules
See SouthernPine.com for Product Locator

Product	Grade	Grade Characteristics and Typical Uses
***Structural Lumber: 2″ and thicker, 2″ and wider** *See SPIB Special Product Rules for design values*		
	Dense Structural 86 Dense Structural 72 Dense Structural 65	Premier structural grades. Provides good appearance with some of the highest design values available in any softwood species.
Radius Edge Decking: 1-1/4″ thick, 4″ to 6″ wide *Maximum recommended support spacing is 24″ on center (16″ on center for Imported Southern Pine)*		
	Premium	High-quality product, recommended where smallest knots are desired and appearance is of utmost importance. Excellent for painting or staining.
	Standard	Slightly less restrictive than premium grade. A very good product to use where a more rustic appearance is desired. Excellent for painting or staining.
Finish: 3/8″ to 4″ thick, 2″ and wider *Design values are not assigned*		
	*B&B	Highest recognized grade of Finish. Generally clear, although a limited number of pin knots are permitted. Finest quality for natural or stain finish.
	C	Excellent for painting or natural finish where requirements are less exacting. Reasonably clear, but permits limited number of surface checks and small tight knots.
	C&Btr	Combination of B&B and C grades; satisfies requirements for high-quality finish.
	D	Economical, serviceable grade for natural or painted finish.
Flooring, Drop Siding, Paneling, Ceiling and Partition, OG Batts, Bevel Siding, Miscellaneous Millwork *Design values are not assigned*		
	*B&B, C C&Btr, D	See Finish grades for face side; reverse side wane limitations are lower.
	No.1	No.1 Drop Siding is graded as No.1 Boards; No.1 Flooring and Paneling not provided under SPIB Grading Rules as a separate grade, but if specified, will be designated and graded as D.
	No.2	Graded as No.2 Boards. High utility value where appearance is not a factor.
	No.3	Suitable for economical use as sheathing or lathing.
Moulding *Design values are not assigned*		
	B&B, C C&Btr, D	Recommended for moulding and millwork applications.

*Most mills do not manufacture all products and make all grade separations. Those products and grades not manufactured by most mills are noted with an asterisk.

Southern Pine Seasoning Requirements*

Based on SPIB Grading Rules

Southern Pine grading rules restrict moisture content of lumber 2″ and less in thickness to a maximum of 19%. If specified as "KD," "KD19," "dry" or "air-dried" the maximum is 19%. If specified as "KD15" (kiln-dried) or "MC15" the maximum is 15%. Material identified by a certified grade mark is evidence that Southern Pine has been properly seasoned.

Moisture content restrictions apply at time of shipment, as well as time of dressing if dressed lumber is involved, and at time of delivery to buyer unless shipped exposed to the weather.

Moisture Content Limit		
Items *(Nominal thickness)*	**Kiln-Dried**	**Dry**
D and Better Grades		
1″ and 1-1/4″	Max. 12% on 90% of pieces 15% on remainder	15%
1-1/2″, 1-3/4″ and 2″	15%	18%
Over 2″, but not over 4″	15%	19%
Over 4″	18%	20%
Paneling	12%	12%
Boards[1]	19%	19%
Dimension[1, 2]	19%	19%
Decking[3]	19%	19%
Timbers[2]	20%	23%

* Lumber dressed at a moisture content within the limits of these rules is sufficiently stabilized for most uses, but limited size changes will occur from shrinkage or expansion if the moisture content is further reduced or increased after dressing. The normal shrinkage allowance is 1% reduction in size for each 4-point reduction in percentage of moisture content and same tolerance for any expansion.

(1) KD15 or MC15 may be specified if desired.

(2) Moisture content provisions must be specified for material 2-1/2″ and thicker because seasoning is not mandatory for these sizes.

(3) All thicknesses of roof decking should be specified at 15% maximum moisture content.

American Softwood Lumber Standard

The *American Softwood Lumber Standard PS 20*, of the U.S. Department of Commerce relates lumber size to moisture content. Separate size schedules for green and dry lumber assure that both products will approximate the same size in service. All bills and invoices are required to show actual net sizes of lumber. Strength and stiffness values for Southern Pine products in current SPIB rules have been approved by the Board of Review of the American Lumber Standard Committee. *PS 20* provides for a *National Grading Rule (NGR) for Dimension Lumber* ‡ with simplified grade names and sizes to assure uniformity, efficiency and economy in the use of dimension lumber. The *NGR* is incorporated in the *SPIB Standard Grading Rules for Southern Pine Lumber,* published by the Southern Pine Inspection Bureau.

‡ *NGR* applies to dimension lumber and excludes items such as crossarms, factory and shop lumber, finish (selects), foundation lumber, industrial clears, ladder stock, laminating stock, railroad stock, rough lumber, scaffold planks, ship decking and plank stock, stadium plank, worked lumber, and special product rules for items such as radius edge decking, and prime & merchantable dimension.

Dimension lumber sizes and grades are:

Structural Light Framing: 2″ to 4″ thick, 2″ to 4″ wide
Select Structural, No.1, No.2, No.3
Select Structural, No.1 and No.2 grades also include Dense and Non-Dense options.

Light Framing: 2″ to 4″ thick, 2″ to 4″ wide
Construction, Standard, Utility

Studs: 2″ to 4″ thick, 2″ and wider
Stud

Structural Joists & Planks: 2″ to 4″ thick, 5″ and wider
Select Structural, No.1, No.2, No.3
Select Structural, No.1 and No.2 grades also include Dense and Non-Dense options.

Southern Pine Reinspection Availability

In absence of special agreement between buyer and seller, the *SPIB Standard Grading Rules for Southern Pine Lumber* provide that the purchase, sale or shipment of lumber designated by grades described in these rules must be construed as involving agreement to abide by all applicable provisions of the rules, including submission to inspection of any lumber under complaint as to size, grade or tally. For complete reinspection information, contact:

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Standard Sizes of Southern Pine

Based on SPIB Grading Rules

	Thickness					Width				
	Nominal	Dressed				Nominal	Dressed			
		Dry		Green			Dry		Green	
	inches	*inches*	*mm*	*inches*	*mm*	*inches*	*inches*	*mm*	*inches*	*mm*
Dimension Lumber dressed, S4S[1]	2	1-1/2	38			2	1-1/2	38		
	2-1/2	2	51	2-1/16	52	3	2-1/2	64	2-9/16	65
	3	2-1/2	64	2-9/16	65	4	3-1/2	89	3-9/16	90
	3-1/2	3	76	3-1/16	78	5	4-1/2	114	4-5/8	117
	4	3-1/2	89	3-9/16	90	6	5-1/2	140	5-5/8	143
						8	7-1/4	184	7-1/2	190
						10	9-1/4	235	9-1/2	241
						12	11-1/4	286	11-1/2	292
						14	13-1/4	337	13-1/2	343
						16	15-1/4	387	15-1/2	394
						18	17-1/4	438	17-1/2	444
						20	19-1/4	489	19-1/2	495
Timbers dressed, S4S[1]	5" & thicker	1/2" off nominal		1/2" off nominal		5" & wider	1/2" off nominal		1/2" off nominal	
	Nominal	Dressed				Nominal	Dressed			
	inches	*inches*	*mm*			*inches*	*inches*	*mm*		
Boards dressed, S4S, dry	1	3/4[2]	19			2	1-1/2	38		
	1-1/4	1	25			3	2-1/2	64		
	1-1/2	1-1/4	32			4	3-1/2	89		
						5	4-1/2	114		
						6	5-1/2	140		
						7	6-1/2	165		
						8	7-1/4	184		
						9	8-1/4	210		
						10	9-1/4	235		
						11	10-1/4	260		
						12	11-1/4	286		
						over 12	3/4" off nominal	19 mm off nominal		
	Nominal	Dressed				Nominal	Dressed			
	inches	*inches*	*mm*			*inches*	*inches*	*mm*		
Finish dressed, dry	3/8	5/16	8			2	1-1/2	38		
	1/2	7/16	11			3	2-1/2	64		
	5/8	9/16	14			4	3-1/2	89		
	3/4	5/8	16			5	4-1/2	114		
	1	3/4	19			6	5-1/2	140		
	1-1/4	1	25			7	6-1/2	165		
	1-1/2	1-1/4	32			8	7-1/4	184		
	1-3/4	1-3/8	35			9	8-1/4	210		
	2	1-1/2	38			10	9-1/4	235		
	2-1/2	2	51			11	10-1/4	260		
	3	2-1/2	64			12	11-1/4	286		
	3-1/2	3	76			14	13-1/4	337		
	4	3-1/2	89			16	15-1/4	387		
	Nominal	Dressed				Nominal	Dressed			
	inches	*inches*	*mm*			*inches*	*inches*	*mm*		
Radius Edge Decking dressed, S4S, dry	1-1/4	1	25			4	3-1/2	89		
						5	4-1/2	114		
						6	5-1/2	140		

(1) Dimension Lumber 2" thick and less than 14" wide is required to be dry with a moisture content of 19% or less. Heavy Dimension Lumber (2x14 and wider, 2-1/2" thick by all widths, and 3x3 and larger) and Timbers are not required to be dry unless specified. Thicknesses apply to their corresponding widths as squares and wider, except a thickness of 1-9/16" applies to nominal 2" in widths of 14" and wider if dressed green. (In 2" Dimension, widths over 12" are not customary stock sizes, so 2x14 and wider sizes are usually produced only on special order.)

(2) Boards less than the minimum dressed thickness for 1" nominal but which are 5/8" or greater thickness dry may be regarded as American Standard Lumber, but such Boards shall be marked to show the size and condition of seasoning at the time of dressing. They shall also be distinguished from 1" Boards on invoices and certificates.

Lumber Grades and Design Values

There are three grading methods for sorting Southern Pine dimension lumber and assigning design values:

Visually graded lumber
Machine Stress Rated (MSR) lumber
Machine Evaluated Lumber (MEL)

Visually graded lumber is the oldest and most common of the three methods. Visual grading is performed by qualified graders in the mill. These graders sort each piece of lumber into various grades based on visual characteristics known to affect lumber strength and stiffness, such as knot size and slope-of-grain. Consistent visual grading is achieved through proper training, education and supervision of the lumber graders. Visually graded lumber will adequately meet the structural requirements for most traditional applications.

Machine grading, which categorizes both MSR and MEL, reduces the variability associated with assigning stress grades to lumber. MSR and MEL can be advantageous, therefore, in more demanding engineered applications, such as trusses or long-span joists and rafters.

Machine Stress Rated (MSR) lumber is evaluated by mechanical stress rating equipment. MSR lumber is distinguished from visually graded lumber in that each piece is nondestructively tested and then sorted into bending strength and stiffness classes. In addition, each piece must meet certain visual requirements before it can be assigned design values. MSR also requires daily quality control tests for bending strength and stiffness.

Machine Evaluated Lumber (MEL) is similar to MSR in that each piece is evaluated by nondestructive grading equipment, checked for visual requirements and then sorted into various strength classifications. MEL requires daily quality control tests for tension strength in addition to the daily bending strength and stiffness tests required for MSR.

Grade marks for MSR and MEL can include "1W" or "2W" if visually graded to the wane restrictions for No.1 or No.2 visual grades, respectively.

Availability

The *Standard Grading Rules for Southern Pine Lumber* provide for numerous visual, MSR and MEL grades. However, not all of those possible grade/size combinations are produced or used in the marketplace. Available grades and sizes are subject to change, so check sources of supply at the time of your project.

Southern Pine Reference Design Values

Based on SPIB Grading Rules and AWC National Design Specification®
Values in pounds per square inch (psi)

Table 1 Dimension Lumber – 2″ to 4″ thick, 2″ and wider

Effective June 1, 2013

Based on Normal Load Duration and Dry Service (MC≤ 19%) — See Tables A-1 thru A-4 for Adjustment Factors

NEW SOUTHERN PINE DESIGN VALUES

Effective June 1, 2013

Size	Grade	Bending F_b	Tension Parallel to Grain F_t	Shear Parallel to Grain F_v	Compression Perpendicular to Grain $F_{c\perp}$	Compression Parallel to Grain F_c	Modulus of Elasticity E	Modulus of Elasticity E_{min}
2″ to 4″ thick, 2″ to 4″ wide Includes: 2x2 2x3 2x4 3x3 3x4 4x4	Dense Select Structural	2700	1900	175	660	2050	1,900,000	690,000
	Select Structural	2350	1650	175	565	1900	1,800,000	660,000
	Non-Dense Select Structural	2050	1450	175	480	1800	1,600,000	580,000
	No.1 Dense	1650	1100	175	660	1750	1,800,000	660,000
	No.1	1500	1000	175	565	1650	1,600,000	580,000
	No.1 Non-Dense	1300	875	175	480	1550	1,400,000	510,000
	No.2 Dense	1200	750	175	660	1500	1,600,000	580,000
	No.2	1100	675	175	565	1450	1,400,000	510,000
	No.2 Non-Dense	1050	600	175	480	1450	1,300,000	470,000
	No.3 and Stud	650	400	175	565	850	1,300,000	470,000
	Construction	875	500	175	565	1600	1,400,000	510,000
	Standard	475	275	175	565	1300	1,200,000	440,000
	Utility[1]	225	125	175	565	850	1,200,000	440,000
2″ to 4″ thick, 5″ to 6″ wide Includes: 2x5 2x6 3x5 3x6 4x5 4x6	Dense Select Structural	2400	1650	175	660	1900	1,900,000	690,000
	Select Structural	2100	1450	175	565	1800	1,800,000	660,000
	Non-Dense Select Structural	1850	1300	175	480	1700	1,600,000	580,000
	No.1 Dense	1500	1000	175	660	1650	1,800,000	660,000
	No.1	1350	875	175	565	1550	1,600,000	580,000
	No.1 Non-Dense	1200	775	175	480	1450	1,400,000	510,000
	No.2 Dense	1050	650	175	660	1450	1,600,000	580,000
	No.2	1000	600	175	565	1400	1,400,000	510,000
	No.2 Non-Dense	950	525	175	480	1350	1,300,000	470,000
	No.3 and Stud	575	350	175	565	800	1,300,000	470,000
2″ to 4″ thick, 8″ wide Includes: 2x8 3x8 4x8[2]	Dense Select Structural	2200	1550	175	660	1850	1,900,000	690,000
	Select Structural	1950	1350	175	565	1700	1,800,000	660,000
	Non-Dense Select Structural	1700	1200	175	480	1650	1,600,000	580,000
	No.1 Dense	1350	900	175	660	1600	1,800,000	660,000
	No.1	1250	800	175	565	1500	1,600,000	580,000
	No.1 Non-Dense	1100	700	175	480	1400	1,400,000	510,000
	No.2 Dense	975	600	175	660	1400	1,600,000	580,000
	No.2	925	550	175	565	1350	1,400,000	510,000
	No.2 Non-Dense	875	500	175	480	1300	1,300,000	470,000
	No.3 and Stud	525	325	175	565	775	1,300,000	470,000
2″ to 4″ thick, 10″ wide Includes: 2x10 3x10 4x10[2]	Dense Select Structural	1950	1300	175	660	1800	1,900,000	690,000
	Select Structural	1700	1150	175	565	1650	1,800,000	660,000
	Non-Dense Select Structural	1500	1050	175	480	1600	1,600,000	580,000
	No.1 Dense	1200	800	175	660	1550	1,800,000	660,000
	No.1	1050	700	175	565	1450	1,600,000	580,000
	No.1 Non-Dense	950	625	175	480	1400	1,400,000	510,000
	No.2 Dense	850	525	175	660	1350	1,600,000	580,000
	No.2	800	475	175	565	1300	1,400,000	510,000
	No.2 Non-Dense	750	425	175	480	1250	1,300,000	470,000
	No.3 and Stud	475	275	175	565	750	1,300,000	470,000
2″ to 4″ thick, 12″ wide[3] Includes: 2x12 3x12 4x12[2]	Dense Select Structural	1800	1250	175	660	1750	1,900,000	690,000
	Select Structural	1600	1100	175	565	1650	1,800,000	660,000
	Non-Dense Select Structural	1400	975	175	480	1550	1,600,000	580,000
	No.1 Dense	1100	750	175	660	1500	1,800,000	660,000
	No.1	1000	650	175	565	1400	1,600,000	580,000
	No.1 Non-Dense	900	575	175	480	1350	1,400,000	510,000
	No.2 Dense	800	500	175	660	1300	1,600,000	580,000
	No.2	750	450	175	565	1250	1,400,000	510,000
	No.2 Non-Dense	700	400	175	480	1250	1,300,000	470,000
	No.3 and Stud	450	250	175	565	725	1,300,000	470,000

(1) For Utility, design values apply to 4"-wide lumber only. **(2)** For lumber 4" thick *and* 8" or wider, multiply the F_b value by C_F =1.1. **(3)** For lumber wider than 12", multiply these 12"-width design values for F_b, F_t and F_c by C_F = .90, and use these 12"-width design values for the other properties.

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Based on SPIB Grading Rules and AWC National Design Specification®
Values in psi (pounds per square inch)

Table 2 Mechanically Graded Lumber – 4˝ and less in thickness, 2˝ and wider

Based on Normal Load Duration and Dry Service (MC≤ 19%) — See Tables A-1 thru A-4 for Adjustment Factors

Grade	Bending F_b	Tension Parallel to Grain F_t	Shear Parallel to Grain F_v[1]	Compression Perpendicular to Grain $F_{c\perp}$[1]	Compression Parallel to Grain F_c	Modulus of Elasticity E	Modulus of Elasticity E_{min}
Machine Stress Rated (MSR) Lumber							
750f – 1.4E	750	425	175	565	925	1,400,000	710,000
850f – 1.4E	850	475	175	565	975	1,400,000	710,000
975f – 1.6E	975	550	175	565	1450	1,600,000	810,000
1050f – 1.2E	1050	450	175	565	1225	1,200,000	610,000
1050f – 1.6E	1050	575	175	565	1500	1,600,000	810,000
1200f – 1.3E	1200	600	175	565	1400	1,300,000	660,000
1200f – 1.6E	1200	650	175	565	1550	1,600,000	810,000
1250f – 1.6E	1250	725	175	565	1600	1,600,000	810,000
1350f – 1.4E	1350	750	175	565	1600	1,400,000	710,000
1450f – 1.3E	1450	825	175	565	1600	1,300,000	660,000
1500f – 1.5E	1500	900	175	565	1650	1,500,000	760,000
1500f – 1.6E	1500	900	175	565	1650	1,600,000	810,000
1500f – 1.7E	1500	900	175	565	1650	1,700,000	860,000
1650f – 1.5E	1650	1020	175	565	1700	1,500,000	760,000
1650f – 1.7E	1650	1020	175	565	1750	1,700,000	860,000
1800f – 1.6E	1800	1175	175	565	1750	1,600,000	810,000
1850f – 1.7E	1850	1175	175	565	1850	1,700,000	860,000
1950f – 1.5E	1950	1375	175	565	1800	1,500,000	760,000
1950f – 1.7E	1950	1375	175	565	1800	1,700,000	860,000
2100f – 1.8E[2]	2100	1575	190	805	1875	1,800,000	910,000
2250f – 1.9E	2250	1750	190	805	1925	1,900,000	970,000
2400f – 2.0E	2400	1925	190	805	1975	2,000,000	1,020,000
2550f – 1.8E[2]	2550	1400	190	805	2000	1,800,000	910,000
2550f – 2.1E	2550	2050	190	805	2025	2,100,000	1,070,000
2700f – 2.2E	2700	2150	190	805	2100	2,200,000	1,120,000
2850f – 1.8E[2]	2850	1600	190	805	2100	1,800,000	910,000
2850f – 2.3E	2850	2300	190	805	2150	2,300,000	1,170,000
3000f – 2.4E	3000	2400	190	805	2200	2,400,000	1,220,000

(1) When a grade is qualified by test and quality controlled for specific gravity, the shear and compression perpendicular-to-grain design values may be higher.

(2) When not qualified by test and quality controlled for specific gravity, the grademark for mechanically graded lumber grades with a 1,800,000 psi modulus of elasticity design value shall include a specific gravity of .55, a shear value of 175 psi, and a compression perpendicular-to-grain value of 565 psi.

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Table 2 (continued) Mechanically Graded Lumber – 4˝ and less in thickness, 2˝ and wider

Based on Normal Load Duration and Dry Service (MC≤ 19%) — See Tables A-1 thru A-4 for Adjustment Factors

Grade	Bending F_b	Tension Parallel to Grain F_t	Shear Parallel to Grain F_v[1]	Compression Perpendicular to Grain $F_{c\perp}$[1]	Compression Parallel to Grain F_c	Modulus of Elasticity E	Modulus of Elasticity E_{min}
Machine Evaluated Lumber (MEL)							
M-32	750	425	175	565	925	1,400,000	650,000
M-33	850	475	175	565	975	1,400,000	650,000
M-5	900	500	175	565	1050	1,100,000	510,000
M-34	975	550	175	565	1450	1,600,000	750,000
M-35	1050	575	175	565	1500	1,600,000	750,000
M-6	1100	600	175	565	1300	1,000,000	470,000
M-7	1200	650	175	565	1400	1,100,000	510,000
M-36	1200	650	175	565	1550	1,600,000	750,000
M-37	1250	725	175	565	1600	1,600,000	750,000
M-8	1300	700	175	565	1500	1,300,000	610,000
M-10	1400	800	175	565	1600	1,200,000	560,000
M-9	1400	800	175	565	1600	1,400,000	650,000
M-38	1500	900	175	565	1650	1,600,000	750,000
M-11	1550	850	175	565	1675	1,500,000	700,000
M-29	1550	850	175	565	1650	1,700,000	790,000
M-12	1600	850	175	565	1675	1,600,000	750,000
M-13	1600	950	175	565	1675	1,400,000	650,000
M-39	1650	1020	175	565	1750	1,700,000	790,000
M-15	1800	1100	175	565	1750	1,500,000	700,000
M-16	1800	1300	175	565	1750	1,500,000	700,000
M-14	1800	1000	175	565	1750	1,700,000	790,000
M-40	1850	1175	175	565	1850	1,700,000	790,000
M-17[3]	1950	1300	175	565	2050	1,700,000	790,000
M-19	2000	1300	175	565	1825	1,600,000	750,000
M-18[2]	2000	1200	190	805	1825	1,800,000	840,000
M-20[3]	2000	1600	190	805	2100	1,900,000	890,000
M-30	2050	1050	175	565	1850	1,700,000	790,000
M-28	2200	1600	175	565	1900	1,700,000	790,000
M-21	2300	1400	190	805	1950	1,900,000	890,000
M-22	2350	1500	175	565	1950	1,700,000	790,000
M-23[2]	2400	1900	190	805	1975	1,800,000	840,000
M-41[2]	2550	1400	190	805	2000	1,800,000	840,000
M-24	2700	1800	190	805	2100	1,900,000	890,000
M-25	2750	2000	190	805	2100	2,200,000	1,030,000
M-26	2800	1800	190	805	2150	2,000,000	930,000
M-42[2]	2850	1600	190	805	2100	1,800,000	840,000
M-31	2850	1600	190	805	2150	1,900,000	890,000
M-27[3]	3000	2000	190	805	2400	2,100,000	980,000

(1) When a grade is qualified by test and quality controlled for specific gravity, the shear and compression perpendicular-to-grain design values may be higher. (2) When not qualified by test and quality controlled for specific gravity, the grademark for mechanically graded lumber grades with a 1,800,000 psi modulus of elasticity design value shall include a specific gravity of .55, a shear value of 175 psi, and a compression perpendicular-to-grain value of 565 psi. (3) MEL grades requiring compression parallel-to-grain qualification and quality control.

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Table 3 Timbers – 5″ x 5″ and larger

Based on Normal Load Duration and Dry or Wet Service — See Tables A-1 and A-3 for Adjustment Factors

Size	Grade	Bending F_b[1]	Tension Parallel to Grain F_t	Shear Parallel to Grain F_v	Compression Perpendicular to Grain $F_{c\perp}$	Compression Parallel to Grain F_c	Modulus of Elasticity E	Modulus of Elasticity E_{min}
5″x 5″ and larger	Dense Select Structural	1750	1200	165	440	1100	1,600,000	580,000
	Select Structural	1500	1000	165	375	950	1,500,000	550,000
	No.1 Dense	1550	1050	165	440	975	1,600,000	580,000
	No.1	1350	900	165	375	825	1,500,000	550,000
	No.2 Dense	975	650	165	440	625	1,300,000	470,000
	No.2	850	550	165	375	525	1,200,000	440,000

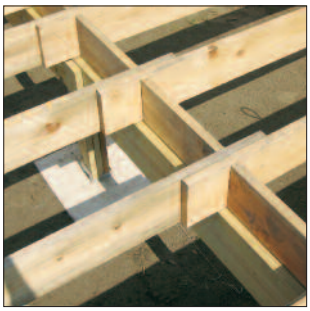
(1) When the depth, d, of a timber exceeds 12″, the tabulated bending design value, F_b, shall be multiplied by the following size factor: $C_F = \left(\frac{12}{d}\right)^{1/9}$ where **d** is the actual depth of the member.

Table 4 Scaffold Plank[1] – 2″ and 3″ thick, 8″ and wider

Size	Grade	Bending F_b Flatwise Use Only	Modulus of Elasticity E
2″ thick, 8″ and wider MC≤19%[2]	Dense Industrial 72 Scaffold Plank	2400	1,800,000
	Dense Industrial 65 Scaffold Plank	2200	1,800,000
3″ thick, 8″ and wider MC>19%	Dense Industrial 72 Scaffold Plank	1800	1,600,000
	Dense Industrial 65 Scaffold Plank	1650	1,600,000

(1) Scaffold plank design values are for flatwise use only. They were calculated using ASTM D245 and D2555 standards and modified using procedures shown in "Calculating Apparent Reliability of Wood Scaffold Planks," as published by the Journal on Structural Safety, 2 (1984) 47-57, and updated in 1993.

(2) For exposed conditions of use (where the moisture content in service may exceed 19%) the values shall be multiplied by: 0.85 for F_b and 0.90 for E.



Southern Pine Adjustment Factors

Based on SPIB Grading Rules and AWC National Design Specification®

Reference design values are for normal load duration under the moisture service conditions specified. Because the strength of wood varies with conditions under which it is used, reference design values should only be applied in conjunction with appropriate design and service recommendations from the *National Design Specification® (NDS®) for Wood Construction* published by the American Wood Council. The latest connection design information is also provided in the *NDS*.

Reference design values **(F_b F_t F_v $F_{c\perp}$ F_c E E_{min})** in Tables 1 thru 3 shall be multiplied by all applicable adjustment factors to determine adjusted design values **(F_b' F_t' F_v' $F_{c\perp}'$ F_c' E' E_{min}')**.

Table A-1 is excerpted from the *NDS* and summarizes the applicability of adjustment factors for solid-sawn lumber.

Table A-1 Applicability of Adjustment Factors for Sawn Lumber

		ASD only	ASD and LRFD											LRFD only		
Adjusted Design Value	Reference Design Value	Load Duration Factor	Wet Service Factor	Temperature Factor	Beam Stability Factor	Size Factor	Flat Use Factor	Incising Factor	Repetitive Member Factor	Column Stability Factor	Buckling Stiffness Factor	Bearing Area Factor	Format Conversion Factor	Resistance Factor	Time Effect Factor
													K_F	ϕ	
F_b' =	F_b *	C_D *	C_M *	C_t *	C_L *	C_F *	C_{fu} *	C_i *	C_r *				2.54 *	0.85 *	λ
F_t' =	F_t *	C_D *	C_M *	C_t *		C_F *		C_i *					2.70 *	0.80 *	λ
F_v' =	F_v *	C_D *	C_M *	C_t *				C_i *					2.88 *	0.75 *	λ
F_c' =	F_c *	C_D *	C_M *	C_t *		C_F *		C_i *		C_P *			2.40 *	0.90 *	λ
$F_{c\perp}'$ =	$F_{c\perp}$ *		C_M *	C_t *				C_i *				C_b *	1.67 *	0.90	
E' =	E *		C_M *	C_t *				C_i							
E_{min}' =	E_{min} *		C_M *	C_t *				C_i *			C_T *		1.76 *	0.85	

ASD – Allowable Stress Design; **LRFD** – Load and Resistance Factor Design

Tables A-2 thru A-4 highlight the most common adjustment factors as they apply to Southern Pine. In addition, Table 1 and 3 footnotes provide information about the Size Factor, C_F. For complete information on adjustment factors, see the *NDS*.

Table A-2 Wet Service Factor, C_M

For lumber 2″ to 4″ thick

Applies to all values

When dimension lumber is used under conditions where the moisture content of the wood in service will exceed 19% for an extended time period, reference design values shall be multiplied by the appropriate wet service factors to the right.

F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}
0.85 [1]	1.0	0.97	0.67	0.8 [2]	0.9	0.9

(1) When $F_b \le 1150$ psi, $C_M = 1.0$

(2) When $F_c \le 750$ psi, $C_M = 1.0$

Table A-3 Load Duration Factor, C_D

For all solid wood products – Allowable Stress Design Only

Applies to F_b, F_t, F_v, and F_c values
Does not apply to $F_{c\perp}$, E, and E_{min} values

Wood has the property of carrying substantially greater maximum loads for short durations than for long durations of loading. Reference design values apply to normal load duration, meaning a load that fully stresses a member to its allowable design value by the application of the full design load for a cumulative duration of approximately ten years. When the cumulative duration of the full maximum load does not exceed the specified time period, all reference design values (except $F_{c\perp}$, E, and E_{min}) shall be multiplied by the appropriate load duration factor. Frequently used load duration factors are provided to the right.

Load Duration *(Typical Design Loads)*	C_D
Permanent *(dead load)*	0.9
Ten years *(occupancy live load)*	1.0
Two months *(snow load)*	1.15
Seven days *(construction load)*	1.25
Ten minutes *(wind/earthquake load)*	1.6
Impact [1] *(impact load)*	2.0

(1) Load duration factors greater than 1.6 shall not apply to structural members pressure treated with waterborne preservatives, or fire-retardant chemicals. The impact load duration factor shall not apply to connections.

Table A-4 Flat Use Factor, C_{fu}

For lumber 2″ to 4″ thick

Applies to F_b values only

Reference bending design values, F_b, are based on edgewise use (load applied to narrow face). When dimension lumber is used flatwise (load applied to wide face), F_b shall also be multiplied by the flat use factors to the right.

	Flat Use Factors, C_{fu}	
Width (depth)	*Thickness* (breadth)	
	2″ & 3″	4″
2″ & 3″	1.0	–
4″	1.1	1.0
5″	1.1	1.05
6″	1.15	1.05
8″	1.15	1.05
10″ & wider	1.2	1.1

Specialty Products & Applications

Due to its inherent strength, treatability and beauty, Southern Pine is the ideal choice for a wide range of specialty products and construction applications. For more information about these topics, visit the Specialty Products and Applications sections of SouthernPine.com, or refer to the specific SFPA publications referenced below. For sources of supply for Southern Pine lumber products, refer to the *Product Locator* at SouthernPine.com.

Flooring

Properly installed and maintained, Southern Pine flooring meets the challenges of the most demanding applications. Available in a wide variety of sizes and grades, Southern Pine flooring is an attractive and durable addition to homes, schools, churches, sports venues, and commercial buildings. Pressure-treated Southern Pine porch flooring provides decades of termite and decay-resistant service. Refer to *Southern Pine Flooring*.

Interior Patterns

Many designers choose Southern Pine to lend warmth and charm to the interior environment. Southern Pine beaded ceiling, paneling, wainscoting, and partition is widely available. Refer to *Southern Pine Patterns*.

Siding

Nothing beats the look of real wood siding. Southern Pine siding is available in a variety of patterns and can be pressure treated for even greater resistance to termites and decay.

Millwork Stock and Furniture

Southern Pine has superior qualities for machining, fastener-holding and finishing that makes it suitable for use in a wide range of trim and industrial applications. Many manufacturers of mouldings, stepping, ladder stock, and door and window components rely on Southern Pine finish-grade material. Its strength and density makes it a premium choice for solid and upholstered furniture.

Material Handling

Kiln-dried Southern Pine, heat treated and marked "HT", exceeds international phytosanitary requirements for wood packaging. HT Southern Pine is ideal for pallets, crates, skids, boxes, cable reels, and specialty packaging.

Finger-Jointed Studs

Finger-jointed studs are ideal for single- and multi-family homes, as well as commercial construction. Southern Pine finger-jointed studs are straight and dimensionally stable because they are manufactured from short pieces of kiln-dried lumber. They are accepted for use by the building codes and are considered as interchangeable with solid-sawn dimension lumber of the same size, grade, and species. Finger-jointed studs are grademarked as "HRA" (Heat Resistant Adhesives) or "Non-HRA". HRA grademarked finger-jointed studs should be used for wall assemblies that require a fire resistance rating under the building codes. Typical examples include separations between living units in multi-story or multi-family structures, and common walls in commercial buildings.

Trusses

The open web configuration of metal plate connected wood trusses leaves plenty of room for plumbing, electrical, and mechanical runs. Other truss advantages include design flexibility, long spans, and speed of construction. Southern Pine's high density and range of strength and stiffness properties make it the preferred lumber species for structural building components, including trusses. Component manufacturers have the option to choose strong Southern Pine grades that can reduce the amount of raw materials used in each truss.

Raised Floor Systems

American homes have been built on raised wood floor systems since Colonial times. Depending on the geographic region, a raised floor system may also be called a crawlspace, raised wood platform floor, or raised floor foundation. Regardless of the name, the aesthetic, economic, and practical reasons for building a raised home still apply today. By design, a raised floor system elevates the living space off the ground, isolating it from moisture and pests. Elevating a structure reduces flood insurance premiums and can even prevent flood damage. Visit RaisedFloorLiving.com.

Outdoor Decks

Decks extend the living space of the home and offer many different design choices from simple, compact structures to elaborate multi-level decks with benches, planters, and railings. Southern Pine is the preferred species of choice for decks because of its inherent strength and ease of treatability, along with its visual appeal. Visit SouthernPineDecks.com or refer to *Southern Pine Decks and Porches*.

Marine, Bridge, and Highway Construction

Southern Pine is available in large sizes and heavy treatments, making it ideal for marine, bridge, and highway construction. American Wood Protection Association standards require different retention levels for treated material intended for freshwater, saltwater, or saltwater splash exposures. Refer to *Marine Construction Guide*.

Post-Frame Construction

Post-frame buildings are economical, easy to construct, and code-complying. They also offer excellent performance under high-wind and seismic loads. These advantages explain their continued popularity in rural buildings and their expansion into commercial and residential markets. Southern Pine's superior treatability and dependable strength makes it a popular choice for post-frame builders.

Permanent Wood Foundations

The Permanent Wood Foundation (PWF) is an innovative building system for crawlspace, split-level, or full-basement foundations. Refer to *Permanent Wood Foundations: Design & Construction Guide*.

Pressure-Treated Lumber

Pressure treatment with preservatives protects wood exposed to high-moisture conditions and potential deterioration. Treated wood must meet minimum requirements for preservative penetration and retention for use in a particular service condition.

Southern Pine's ease of treatability has made it the preferred species when pressure treatment with wood preservatives is required. The unique cellular structure of Southern Pine permits deep, uniform penetration of preservatives, rendering the wood useless as a food source for fungi, termites and micro-organisms. Pressure-treated Southern Pine lumber products are available in a range of treatment options under three broad classes of wood preservatives – waterborne, oilborne and creosote preservatives.

Pressure-treated Southern Pine is recognized by building codes and regulatory agencies for use in construction. Wood preservatives are accepted for building code compliance either by reference to American Wood Protection Association (AWPA) standards or through the product evaluation process of the International Code Council (ICC) Evaluation Service. Acceptance of a preservative into the AWPA Book of Standards, or by ICC evaluation, ensures that properly treated wood products perform satisfactorily for their intended service condition. All treated Southern Pine should be identified with a treated quality mark – either plastic end tag or ink stamp – conforming to building code standards.

Reference design values for untreated lumber also apply to lumber pressure treated by an approved process and preservative. As a result, the new design values for visually graded Southern Pine dimension lumber also apply to those products when pressure treated. Adjustment factors for untreated lumber also apply to pressure-treated lumber with one exception – in Allowable Stress Design applications allowing an increase with the Load Duration Factor, C_D, that factor cannot exceed 1.6 for structural members pressure-treated with waterborne preservatives. Common adjustment factors to consider when sizing pressure-treated joists for outdoor decks as an example include: the Wet Service Factor, C_M; the Repetitive Member Factor, C_r; and, the Incising Factor, C_i. The incising factor provides a reduction for difficult-to-treat species that must be incised to meet treating standards, and does not apply to Southern Pine because of its ease of treatability.

Pressure-treated wood products will last for many decades when properly treated and installed for their intended use, so the use of proper fasteners and connectors is very important. Fasteners and connectors should be specified in compliance with the hardware manufacturer's recommendations and the building codes for their intended use.

Refer to *Pressure-Treated Southern Pine* for more information on types of wood preservatives, retention levels required for various products and applications, and recommendations for fasteners and connectors.

Span Tables

The Southern Forest Products Association provides simplified span tables for selected grades of Southern Pine lumber under a variety of load conditions. Refer to *Maximum Spans for Southern Pine Joists & Rafters* and *Southern Pine Headers & Beams: Size Selection and Allowable Load Tables for Southern Pine Lumber and Glued Laminated Timber*.

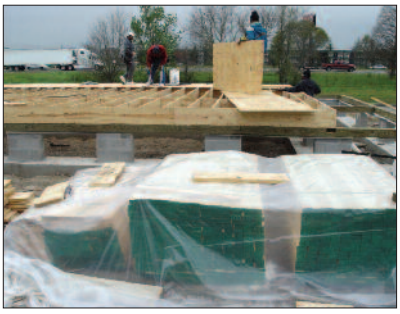
Proper Lumber Storage

Proper seasoning and storage provide optimal dimensional stability of lumber in service. To minimize shrinkage, *SPIB Grading Rules* require dimension lumber 2" or less in thickness be kiln-dried or seasoned to a moisture content not to exceed 19%. This will result in an average moisture content of about 15% at the time of manufacture. Additional conditioning will take place when lumber is stored and used as it adjusts to the moisture content of its end-use environment. For interior items, such as flooring, millwork and furniture, the end-use moisture content will average between 6% in the dry Southwestern U.S. and 11% in the humid U.S. Gulf South. For exterior items, such as framing, siding and sheathing, the end-use moisture content will average 12% in most areas of the U.S., with a range from 7% to 14%.

Proper receiving, unloading, storage, handling, installation and bracing of lumber after delivery will help maintain material quality during construction and service life. Follow these simple rules to help ensure proper storage and product performance at the job site:

- *Inspect lumber upon delivery for proper grade-marking and moisture content, plus other conditions that may require attention, such as mold.*
- *Unload lumber in a dry place – not in wet or muddy areas.*
- *Elevate lumber on stringers to prevent absorption of ground moisture and to allow air circulation. Do not store lumber in direct contact with the ground.*
- *Cover lumber stored in an open area with a material that will give protection from the elements. Polyethylene or similar non-porous materials act as a vapor barrier, so it is important to allow ventilation around the material to prevent condensation on the underside of the covering.*
- *Enclose framing lumber under roof as soon as possible.*
- *Store exterior patterns (e.g. siding, porch flooring) in a covered outdoor area.*
- *Store interior items such as flooring, millwork and cabinets in the enclosed conditioned area where installation will occur.*

There is additional protection when lumber comes in paper-wrapped packages or has been treated with a weather-protective coating. However, availability is limited and weather-protective coatings are generally effective for only about three to six months. Damage to the paper during transportation can reduce its effectiveness, and protection is lost when paper wrappings are removed. For additional information, refer to *Managing Moisture and Mold*.



Pressure-treated wood is safe and environmentally friendly when properly treated, handled, and installed. Many of the same safety rules for using untreated wood also apply to the safe use of treated wood. Treated lumber should be stacked and stored in the same manner as untreated wood. Refer to *Pressure-Treated Southern Pine*.

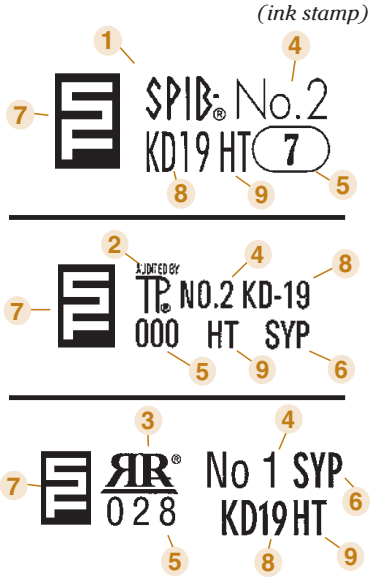
Specification Guidelines

These guidelines are intended to assist in specifying the most economical and efficient use of Southern Pine lumber products. They should also help minimize misunderstandings between specifier and supplier. Product availability and economy varies by market area. Becoming familiar with the products available in your area will allow you to more easily obtain materials to satisfy your demands. For information on Southern Pine products, applications, and suppliers, visit SouthernPine.com.

Identification and Quality Control — Each piece of lumber should be grademarked by an agency accredited by the American Lumber Standard Committee (ALSC), and manufactured in accordance with *Product Standard PS 20* published by the U.S. Department of Commerce.

Typical Southern Pine Lumber Grade Marks

(ink stamp)



Quality Southern Pine lumber is graded in accordance with the grading rules of the Southern Pine Inspection Bureau (SPIB). SPIB, Timber Products Inspection, Inc., Renewable Resource Associates, Inc. (RRA) and other organizations are accredited to inspect and grade mark Southern Pine lumber in accordance with SPIB grading rules.*

1. Inspection Service: Southern Pine Inspection Bureau (SPIB)
2. Inspection Service: Timber Products Inspection, Inc. (TP)
3. Inspection Service: Renewable Resource Associates, Inc. (RRA)
4. Lumber Grade
5. Mill Identification Number
6. Lumber Species
7. (optional) Logo denoting a member mill of Southern Forest Products Association (SFPA)
8. Moisture Content (MC): Kiln-dried (KD) to a maximum of 19%
9. Heat Treated

**Note:* Other agencies are accredited by ALSC to inspect and grade all or selected Southern Pine products according to SPIB Grading Rules, including: California Lumber Inspection Service (CLIS); Northeastern Lumber Manufacturers Association (NELMA); West Coast Lumber Inspection Bureau (WCLIB); and Western Wood Products Association (WWPA).

Product Classification — Products should be identified by manufactured categories such as Dimension, Structural Light Framing, Decking, Boards, Timbers, etc. Products in categories such as Finish, Flooring, Ceiling, and Siding, etc., should include the pattern name and number assigned by the ruleswriting agency. This will correctly identify the product and ensure that it conforms to standard. Select from the product and grade descriptions on pages 3-6.

Size and Length of Pieces — Products included in lumber standards, such as Dimension Lumber, should be specified by nominal sizes for thickness and width, and by standard lengths which are 8' to 20' in two-foot increments. Products with patterns and special orders should include the desired net, dry size, plus the dimensioned profile pattern for less common items. Standard sizes are listed on page 8.

Grade and Strength of Material — Standard grades for each product class should be specified after considering all grades appropriate for the intended use and strength requirements. For structural applications, include the required reference design values along with the grade that represents those design values. Grades and reference design values are listed on pages 9-12.

Moisture Content — Specify desired moisture content (percent) based on requirements for the product, grade and intended use. Most product classes and grades of Southern Pine have specific moisture requirements. Seasoning requirements and options are listed on page 7.

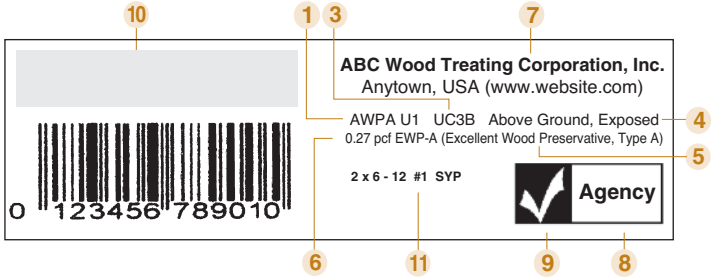
Surface Texture — Surfacing requirements should be specified. Lumber is commonly ordered S4S (smooth surfaced on all four sides), or rough sawn. Other examples include: S1S2E (surfaced one side and two edges); or S2S&CM (surfaced two sides and center matched on edges with centered tongue and groove). Variances from S4S will cause a change from the standard dressed size, so the effect on desired net dry size should be considered. Refer to the *SPIB Standard Grading Rules for Southern Pine Lumber* for more information on surfacing designations and net product sizes.

Transportation and Storage — All lumber in transit, storage and handling areas should be protected from moisture, weather and contaminants. Coatings, wrappings or coverings should allow circulation and not trap moisture. Proper storage methods are explained on page 15.

Preservative Treatment — When pressure-treated lumber is required, it should be treated according to appropriate American Wood Protection Association (AWPA) Standards or through the product evaluation process of the International Code Council (ICC) Evaluation Service. Quality control for treating should be done by an approved inspection agency. Each piece of lumber should be identified with a quality mark or end tag bearing the name of the inspection agency, applicable end use application, use exposure, preservative used, retention level, treating company and location. Jobsite fabrication cuts and borings should be field treated with copper naphthenate having a minimum 2% metallic solution in accordance with *AWPA Standard M4*. Pressure-treated Southern Pine is discussed on page 15.

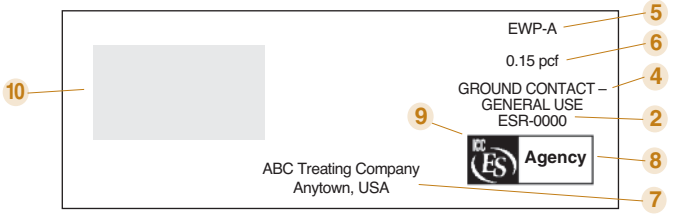
Typical Treated Lumber Quality Marks – *plastic end tag or ink stamp*

AWPA Standardized Preservative



1. AWPA Standard Reference for AWPA Standardized Preservative System
2. ICC-ES Evaluation Report (ESR) Number for ICC-ES Evaluated Preservative System
3. AWPA Use Category
4. Exposure Category or End-use Condition
5. Preservative System
6. Preservative Retention in pounds per cubic foot (pcf) – optional for ICC-ES preservatives
7. Treating Company & Location
8. Accredited Inspection Agency
9. Checkmark of Quality (AWPA) or ICC-ES Logo (ESR)
10. (optional) Trade Name or Company Logo
11. (optional) Size, Length, Grade, Species

ICC-ES Evaluated Preservative



LUMBER SPECIFICATION EXAMPLES [1]

Based on SPIB Grading Rules and AWPA Standards or ICC-ES Label

Use	Product Classification	Size inches – nominal	Length feet	Species	Grade	Moisture Content	Surface Texture	End Use	Treatment & Retention
Sill Plate [2]	Dimension Lbr or Structural Light Framing	2 x 4	x 12, 14, 16	SP	No.3	KD19	S4S	Above Ground, Interior	ACQ-D 0.15 pcf KDAT [4]
Sill Beam [2]	Timbers	6 x 8	x 16	SP	No.2		S4S	Above Ground, Interior	µCA-C 0.05 pcf [5]
Solid-Sawn Stud	Dimension Lbr or Studs	2 x 4	x 92-5/8″	SP PET	Stud	KD19	S4S	Above Ground, Interior	SBX .17 pcf KDAT [4]
Finger-Jointed Stud	Glued Lumber (Stud Use Only) HRA	2 x 4	x 104-5/8″ PET	SP	No.2	KD19	S4S		
PWF [2] Stud	Dimension Lbr or Structural Joists & Planks	2 x 6	x 10	SP	No.2	KD19	S4S	Ground Contact, Critical	MCA 0.23 pcf [5]
Roof Rafter	Dimension Lbr or Structural Joists & Planks	2 x 6	x 18	SP	MSR 2400f-2.0E	KD19	S4S	Above Ground, Interior	CA-C 0.60 pcf KDAT [4]
Floor Joist	Dimension Lbr or Structural Joists & Planks	2 x 10	x 16	SP	MEL M-29	KD19	S4S	Above Ground, Interior	SBX .28 pcf KDAT [4] (Formosan Termites)
Outdoor Deck Joist [3]	Dimension Lbr or Structural Joists & Planks	2 x 8	x 12	SP	No.2		S4S	Above Ground, Exterior	µCA-C 0.05 pcf [5]
Outdoor Deck Decking [3]	Radius Edge Decking	5/4 x 6	x 12	SP	Premium R.E.D.		S4S Eased Edges	Above Ground, Exterior	MCA 0.06 pcf [5]
Post-Frame Building Post [2]	Timbers	6 x 6	x 16	SP	No.1	S-GRN (25%)	S4S	Ground Contact, Critical	µCA-C 0.23 pc [5]
Highway Guardrail Post [2]	Timbers	6 x 8	x 16	SP	No.2		S4S	Ground Contact, Critical	CCA .50 pcf [4]
Fence Post [2]	Dimension Lbr or Structural Light Framing	4 x 4	x 8	SP	No.2		S4S	Ground Contact, Non-critical	MCA 0.15 pcf [5]
Heavy Timber Decking	Decking	3 x 6	R/L	SP	Select Decking	KD15	S2S&CM -EV1S	Above Ground, Interior	SBX .17 pcf KDAT [4]
Marine Bulkhead [2]	Heavy Dimension Lbr or Structural Joists & Planks	3 x 6	x 12	SP	No.1 Seawall		S4S	Salt Water, Gulf Coast	CCA 2.5 pcf [4]
Flooring	Flooring	1 x 3-1/8 (Net Dry)	x 8, 10, 12	SP	D	KD (12%)	S2S&SM (Flat Grain)		
Porch Flooring [3]	Flooring	1 x 4	x 12	SP	D	Dry (15%)	S2S&SM	Above Ground, Exterior	µCA-C 0.05 pcf [5]
Siding	Drop Siding	1 x 6	x 10	SP	No.2	KD15	Pattern #116	Above Ground, Exterior, Coated	MCA 0.06 pcf [5]
Fascia	Finish	1 x 6	x 12	SP	C&Btr	KD 15	S4S	Above Ground, Exterior, Coated	µCA-C 0.05 pcf [5]
Ceiling	Ceiling and Partition	5/8 x 4	x 8	SP	D	KD (12%)	S2S&CM -EV1S		
Paneling	Paneling	1 x 5-1/8 (Net Dry)	x 10	SP	C&Btr	KD (12%)	Pattern #SPP 62	Above Ground, Interior	Fire Retartant for Fire Protection Flame Spread Class A
Trim	Moulding	1 x 4	x 8	SP	D	KD (12%)	S4S		

[1] **Abbreviations:** ACQ-D – Alkaline Copper Quat Type-D; AWPA – American Wood Protection Association; C&Btr – grade C and better; CA-C – Copper Azole Type-C; CCA – Chromated Copper Arsenate; HRA – Heat Resistant Adhesive; ICC-ES – International Code Council Evaluation Service; KD – Kiln-Dried; KDAT – Kiln-Dried After Treatment; Lbr – Lumber; MCA – Micronized Copper Azole; µCA-C – Dispersed Copper Azole; MEL – Machine Evaluated Lumber; MSR – Machine Stress Rated; PET – Precision End Trim; PWF – Permanent Wood Foundation; R/L – Random Lengths; R.E.D. – Radius Edge Decking; S-GRN – surface green; S2S&CM-EV1S – surfaced two sides and center matched with edge V on one side; S2S&SM – surfaced two sides and standard matched; S4S – surfaced four sides; SBX – Inorganic Boron; SP – Southern Pine (could also be SYP for Southern Yellow Pine); SPIB – Southern Pine Inspection Bureau; SPP – Standard Patterns of Paneling; [2] Preservative treatment required by building code; [3] Preservative treatment recommended; [4] AWPA standard; [5] ICC-ES label

WHY wood?

Wood products are the most environmentally responsible building material available, making them the GREEN choice.

Life cycle of wood building products

sustainable resources
Wood products are produced from trees, a naturally renewable resource. More wood is grown each year in the U.S. than is harvested.

responsible manufacturing
Waste is virtually eliminated when trees are used to make wood products. Bark, trims and sawdust are used as an energy source to help power wood production facilities. It takes far less energy and fossil fuels to produce wood products than to manufacture concrete and steel.

quality construction
As a building material, wood offers a unique combination of benefits, including strength, affordability, ease-of-use and environmental superiority.

long service life
The durability of wood products contributes to the long life of a home. Wood products also store carbon, reducing the amount of carbon in the atmosphere.

renovation upgrade
The flexibility of wood makes renovating a home easy and affordable. Wood is builder-friendly, as well as environmentally friendly. Wood also enhances the aesthetic value of a home when used as flooring, cabinetry, furniture and molding.

recycle renew
At the end of their initial service life, wood products are easily recycled for other uses. Wood contributes fewer greenhouse gas emissions than non-renewable steel and concrete.

How Does Wood Reduce Carbon?

Wood products require less energy to manufacture – meaning fewer greenhouse gases, like CO_2. And trees use CO_2 to grow, changing greenhouse gases into the building blocks we know as wood. That's why wood products are increasingly being recognized as tools to combat climate change.

Additional Resources

The Southern Forest Products Association offers a wide variety of helpful publications for design-build professionals. The titles listed below are available online in PDF. Visit SouthernPine.com to download.

Southern Pine Maximum Spans for Joists & Rafters
span tables, design criteria

Southern Pine Headers & Beams
size selection and allowable load tables for Southern Pine lumber and glued laminated timber

Managing Moisture & Mold
basic facts, tips for moisture control, cleaning instructions

Pressure-Treated Southern Pine
preservative types, standards, specifications, applications

Southern Pine Decks & Porches
product selection, construction guidelines, maintenance

Marine Construction Guide
product selection, design details for marine, walkways and light vehicular bridge construction

Southern Pine Flooring
product description, installation, finishing, maintenance

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