

## SPAN COMPARISONS BY SPECIES\*

Maximum Spans  
given in feet and inches

Size	Grade	Southern Pine	Douglas Fir-Larch	Hem-Fir	Spruce-Pine-Fir	Spruce-Pine-Fir South
2 x 10s 16" o.c.	No. 1	16-9	16-5	16-0	15-4	14-11
	No. 2	16-1	15-4	15-2	15-4	14-3
	No. 3	12-2	11-8	11-8	11-8	10-9
2 x 12s 16" o.c.	No. 1	20-4	19-1	18-7	17-10	17-7
	No. 2	18-10	17-10	17-7	17-10	16-7
	No. 3	14-5	13-6	13-6	13-6	12-5

\*Based on a 40 psf live load, 10 psf dead load and  $L/360$  deflection limitation. These spans were calculated using published design values and are for comparison purposes only. They include the repetitive member factor,  $C_r = 1.15$ , but do not include composite action of adhesive and sheathing. Spans may be slightly different than other published spans due to rounding.

### PROPER LUMBER STORAGE

Using proper storage techniques is essential to the efficient and economical use of lumber. Proper storage also:

- Protects lumber from fungi and insects.
- Prevents defects that may result from alternate wetting and drying.
- Helps maintain appearance and dimensional stability.
- Helps to safeguard against costly callbacks for builders.

### Dimensional Stability

Proper seasoning and storage helps provide optimal dimensional stability of lumber in service. The cellular structure of wood has a sponge-like effect. The material absorbs or loses moisture depending on the humidity and temperature of the surrounding air.

To minimize shrinkage, Southern Pine grading rules require that dimension lumber 2" or less in thickness be kiln-dried or seasoned to a moisture content not exceeding 19%. This will result in an average moisture content of 15%. Additional conditioning will take place as lumber is stored, or used where it will reach equilibrium moisture content. For interior items such as flooring, millwork and furniture, the moisture content will average between 6% and 11%. (See U.S. map.) For exterior items such as framing, siding and sheathing, the moisture content will average 12% in most areas of the U.S., with a range of 7% to 14%.

Proper storage helps maintain dimensional stability before and after delivery to the job site. It is a safeguard against costly and unsightly problems such as:

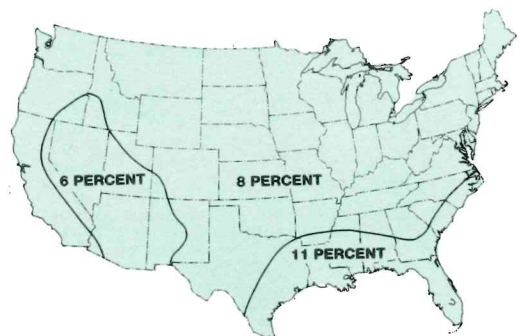
- **Warp, etc.** – it reduces warp, twist, stain and crook.
- **Nail Popping** – which results when wood shrinks, causing the heads of nails to protrude. Spiral shank and annularly grooved nails also help to prevent this problem.
- **Baseboard Pull-Away** – which occurs when floor or ceiling joists are installed with excessive moisture content. As the lumber shrinks, the floor or ceiling is pulled away from mouldings.

### Job Site Storage

Regardless of where lumber is stored at the job site, a few simple precautions should be observed:

- Lumber should be unloaded in a dry place – not in water or muddy areas.
- Lumber should not be in direct contact with the ground. It should be elevated on stringers to allow air circulation.
- Lumber stored in an open area should be covered with a material that will give protection from the elements but be porous enough to allow moisture to escape. Polyethylene or similar covers may not allow the passage of moisture.
- Framing lumber should be enclosed and under roof as soon as possible for protection from the elements.
- Exterior siding and finish should be stored in a closed unheated area.
- Interior items such as millwork, flooring, and cabinet work should be stored in a closed area where heat can be applied during damp weather to maintain the desired moisture content.
- Stock rotation is important when dealing with large deliveries. Lumber should be used in the order in which it is received.

The builder, building contractor, licensed contractor, erector or erection contractor is responsible for the proper unloading, receiving, storage, handling, installation and bracing of lumber at the job site.



Average moisture content for interior wood products

## PRESSURE-TREATED LUMBER

Southern Pine has long been a preferred species when pressure treatment with preservatives is required, because of its ease of treatability. 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 microorganisms.

Most wood species do not readily accept preservatives, and must first be "incised", or perforated with a series of small slits along the grain of the wood's surface. Southern Pine is one of the few wood species that does not require incising to meet American Wood Preservers' Association (AWPA) standards.

Waterborne preservatives are preferred for most framing applications. These treatments are clean, odorless and paintable, plus they are approved by the Environmental Protection Agency (EPA) for both interior and exterior use without a sealer. The most commonly used waterborne preservative is known as CCA, or Chromated Copper Arsenate.

Generally, building codes require pressure-treated or naturally durable wood for the following applications:

- Wood joists or the bottom of structural floors without joists closer than 18 inches to exposed soil.
- Wood girders closer than 12 inches to exposed soil.
- Plates, sills and sleepers on concrete or masonry which is in direct contact with soil.
- Wood in permanent structures closer than 6 inches to soil.
- Wood supporting moisture-permeable roofs and floors exposed to weather unless separated by an impervious moisture barrier.
- Wood framing members including sheathing which rest on foundation walls and are less than 8 inches from soil.

*Note:* When used in enclosed locations, wood moisture content shall be 19% or less at time of permanent enclosure.

Observing the following points will aid in the successful use of CCA-treated Southern Pine.

Retentions (lbs./cu. ft.)	Uses/ Exposure
.25	Above ground
.40	Ground contact and fresh water
.60	Wood foundation and sawn timber building posts
2.50	Salt water

- Published design values apply to treated lumber, but must be multiplied by the appropriate wet service factor,  $C_M$ , when the moisture content will exceed 19% for an extended period of time.
- Hot-dipped galvanized or stainless steel 304 or 316 nails and fasteners should be used to resist corrosion.

- Treated lumber should be stacked and stored in the same manner as untreated wood. Treating does not prevent normal shrinking and swelling of wood.
- Where possible, all cuts and holes should be completed before treatment. However, when on-site fabrication is necessary, all cuts and holes should be liberally brushed with a solution of copper naphthenate.

### Special Applications

**PWF** – The Permanent Wood Foundation, or PWF, is a load-bearing lumber-framed foundation wall sheathed with plywood. All lumber and plywood used in the PWF is specially pressure treated to withstand decay from moisture and termite attack. Southern Pine lumber used in a PWF is CCA-treated to a retention level of .60 lbs./cu.ft., in accordance with AWPA Standard C22. Pressure treated lumber to be used for PWF's should be stamped "FDN," or "PWF Foundation."

Once the foundation walls are in place, standard framing construction practices are followed for the structure above. Typically, floor joists are installed on the top plate of the foundation wall. Subflooring and wall framing follow.

Construction of the PWF involves special fastener requirements. Refer to the *PWF Design Manual*, available from SPMC, for details.

**Plen-Wood** – The Plen-Wood system utilizes a sealed, insulated cavity to create an underfloor plenum. This system provides uniform, efficient distribution of warm or cool air from a centrally located HVAC unit. Plen-Wood walls are basically crawl space versions of the PWF.

**PIRF** – The Perimeter-Insulated Raised Floor, or PIRF, is another engineered foundation floor system for crawl space construction. Insulation is applied only to the inside of the perimeter foundation wall, eliminating the need for under-floor insulation. This configuration allows the thermal mass of the earth to assist in heating and cooling.

**High Moisture Areas** – Although not required by code, treated Southern Pine is ideal for bath, kitchen and utility areas where the possibility of decay due to water leakage exists. Using treated wood in these areas will provide a framing system that meets or exceeds the buyer's expectations for long-term, solid performance. Treated Southern Pine also provides extra protection for high-moisture exterior applications, such as soffits and fascia.

Southern Pine lumber properly treated with CCA in accordance with AWPA standards and used within the guidelines of the EPA is safe to use and poses no threat to people or pets.

For more detailed pressure-treated information, see *Pressure Treated Southern Pine*.