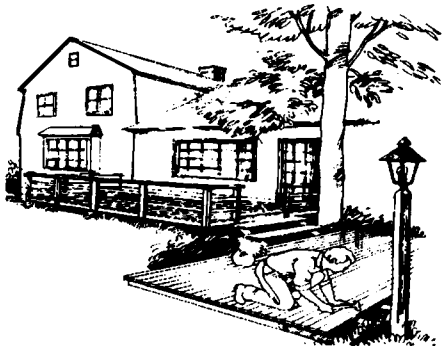
BOOKLET #3082
PRESSURE-TREATED WOOD

TOOL & MATERIAL CHECKLIST

- ❑ Safety Glasses or Goggles
- ❑ Water-repellent Sealer
- ❑ Dust Mask
- ❑ Work Gloves
- ❑ Stain or Paint
- ❑ Saw
- ❑ Hot-dipped Zinc Fasteners
- ❑ Hammer

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in the Basics Listed Above.

Fig. 1



Uses and Ratings of Pressure-Treated Lumber

The most popular application for treated lumber is for decks.

Application	Minimum Rating (lbs./cu. ft.)
Deck surfaces	.25
Landscaping	.40
Posts	.40
Wood exposed to water	.40
Wood foundations	.60
Utility poles	.60
Wood buried in ground	.60
Fresh-water piling	1.00
Salt-water piling	2.50

Pressure-treated lumber and plywood have unique advantages over non-treated wood. They can be used in contact with concrete, the ground, or even water without the normal fear of rot and decay. The preservative chemicals used in pressure-treated materials protect against wood-destroying organisms.

Untreated wood is subject to rot and decay caused by fungi. It is also susceptible to wood-eating insects such as termites. Certain strains of fungi eat wood fiber, causing the wood to decay and lose strength. Termites, the most common type of wood-eating insect, subsist on the cellulose content of wood.

Without preservative treatment, wood generally incurs rot and/or insect damage within three to five years, depending on exposure conditions. In the treatment process, however, preservative chemicals are pressure-impregnated and chemically fixed into the wood cells. They react with wood sugars to render the wood useless as a food substance for fungi, termites, and other wood destroying agents. This preservative treatment results in lumber and plywood that retains its structural integrity 10 to 20 times longer than untreated wood.

The basic treating process is simple and highly controlled. The wood to be treated is loaded onto small rail or tram cars. The trams are pushed into a large horizontal treating cylinder. The cylinder door is sealed, and a vacuum is applied to remove most of the air from the cylinder and the wood cells. Preservative solution is then pumped into the cylinder and the pressure raised to about 150 pounds per square inch, forcing the preservative chemicals into the wood. The total treating time will vary, depending on the species of wood, the commodity being treated, and the amount of preservative to be impregnated.

At the end of the process, any excess treating solution is pumped out of the cylinder and back to a storage tank for later reuse. The cylinder door is opened and the trams are pulled out. The wet wood is kept on a concrete pad until it stops dripping.

PRESSURE-TREATMENT FORMULAS

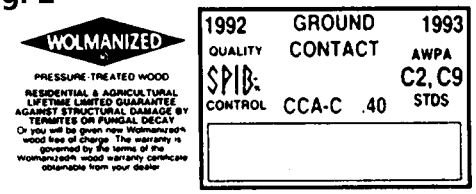
There are two basic formulas used to pressure-treat lumber, marketed under a variety of trade names. The oxide formula consists mainly of chronated copper arsenate (CCA); the salt formula uses ammoniacal copper arsenate (ACA). The pentavalent arsenic used in treating wood is a naturally occurring metal that's found in the earth's crust, not the dangerous manmade material made famous in Arsenic and Old Lace. Wood preservative's arsenate is the same natural element that's present in soil, plants, and other living organisms—including humans.

The ACA salt formula was introduced first. It includes some chemicals that react with each other without treating the wood. This causes a greenish-white powder to form on the surface when it dries.

The CCA oxide formula was introduced later and eliminated these white deposits. CCA oxide lumber is slightly cleaner to handle and more natural in appearance than ACA-treated wood.

While both treatments may cause a greenish tint to the wood, both are efficient wood treatments. Fence posts that carry electrical current may be more conductive with ACA wood than with CCA wood. This means that lightly galvanized metal may corrode a bit faster on ACA wood than on CCA wood, but hot-dipped galvanized or zinc metals should work well. CCA-treated wood is the type most commonly found in lumber yards and home centers today.

Fig. 2



Typical stamp and label found on pressure-treated wood.

PRESSURE-TREATED LUMBER RATINGS

The use of pressure-treated lumber depends upon its rating and how it was treated. Every pressure treatment is rated in terms of retention measured in pounds per cubic foot. The higher the number, the greater the treatment against decay. The wood is stamped with the correct usage information.

All pressure-treated lumber should contain a stamp mark or label which bears the trademark of the pressurized treatment and the quality mark of the recognized agency which maintains continuous supervision, testing and inspection over the quality of the product. Quality marks should include the following information:

- Identification of the inspection agency.
- Standard to which material was treated.
- Identification of the treating plant.
- Retention and end use for which product is suitable.

The mark should be permanently affixed to each piece.

While the preservative retention is very important, good preservative penetration must be obtained to ensure excellent performance. This is especially true where the material is used in ground-contact or fresh-water applications where industry standards require a .40 retention. In 4-inch and larger material this retention is measured in the zone from the surface of the wood to a depth of 1-inch. For lumber greater than 4 inches in thickness at least one manufacturer's standard is more demanding than that of the industry. In addition to the .40 required in the outer 1-inch zone, their products require a .30 rating in the 1.0 to 1.5-inch zone, ensuring greater penetration and a more effectively treated product.

EFFECTS ON THE ENVIRONMENT

Both types of pressure treatment are environmentally safe and are non-leachable—no chemicals can leave the wood or enter the ground water or your body. The reason they aren't leachable is the way the chemicals are injected into the wood. The longer the wood is exposed to the treatment, the better the retention, and permanence of the chemicals. This chemical reaction is termed fixation because the preservative compounds in the treating solution are fixed in the treated wood in a highly insoluble state. Fixation accounts for the permanency of the preservative in the treated wood, which explains the leach resistance and durability of the product.

Some types of wood are notched by machines to increase the saturation rate of the chemicals into the wood. These incisions are usually found on ground-contact lumber, with a .40 or better rating.

This pressure saturization doesn't affect the wood's ability to perform normally. The structural integrity of the wood, and its ability to swell or shrink with moisture is the same as for untreated wood.

PRESSURE-TREATED WOOD

Most pressure-treated wood is produced from plentiful, fast-growing species of a renewable resource. Nearly all trees used are grown on managed forest land; no cutting of old-growth timber in ecologically sensitive areas is necessary.

In addition, preservative treatment extends the service life of wood significantly, requiring that fewer trees be cut. In fact, Southern Forest Products Association estimates that without

pressure-treated wood, an additional 226,000,000 trees would be required annually to replace decayed or termite-infested wood products. When Canada is included, the total exceeds a quarter of a billion trees saved annually.

Similarly, the American Wood Preservers Institute estimates that one billion board feet of timber—or the equivalent of 750,000 new homes—is conserved each year through preservative treatment.

Before deciding on the species and grade of lumber to use on a given project, read Booklet #3125. The most common tree species used for pressure treatment are the southern pine group and west coast firs, pines and hemlocks. Even some woods naturally resistant to decay, like redwood and cedar, are pressure-treated.

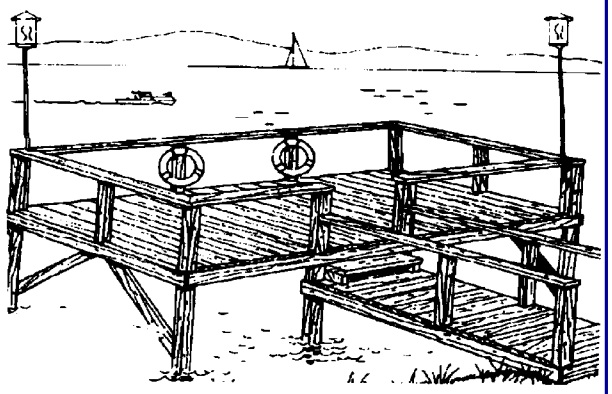
Heartwood vs. Sapwood. When specifying a particular species of wood, it's important to note that, for some applications, the portion of the tree from which the lumber is cut may be an important consideration. Typically, the heartwood—or center part of the tree—may be quite dense and less porous than the sapwood—the younger, outer portion of the tree. The heartwood is naturally more resistant to attack by pests, but it is also less accepting of preservative. Therefore, in marine conditions, for example, where wood-destroying organisms are a threat, it is wise to specify wood with a minimum of heartwood exposed (seawall grade) to be ensured of adequate preservative protection. Likewise, even with "naturally durable" species like redwood, cedar and cypress, heartwood grade must be specified for construction where decay and insect attack are likely. If sapwood grades of redwood or cedar are selected for such applications, they should be pressure-treated since the sapwood does not have the natural protection of the heartwood.

Proposed Usage. The proposed use of the wood affects what kind of wood should be used. Structural framing, for example, requires stronger wood than a cedar or redwood. Cedar and redwood are naturally resistant to decay, but weak compared to fir or hemlock. Some fir is twice as strong as cedar.

Hem-fir is a mixture of hemlock and fir lumber, used for dimensional lumber such as 2x4s. It is naturally strong but prone to decay. When pressure-treated, hem-fir will match or outlast cedar in life, and exceed cedar's performance in strength. A pressure-treated wood deck built from hem-fir will also use less wood than a comparable cedar and redwood deck.

The cost for treated lumber is about the same as the cost for cedar or redwood.

Fig. 3



Treated wood is used for salt-, and fresh-water docks.

USING PRESSURE-TREATED WOOD

Although considered safe by the EPA, there are some precautions that should be taken when handling treated wood. For example, treated wood should not be used in any direct contact application where the preservatives may become a component of human food or drinking water. However, applications with incidental water contact, such as docks and bridges, are acceptable.

Gardening. CCA pressure-treated wood is suitable for raised flower or vegetable beds, landscaping applications, mushroom trays, grape and tomato stakes, and most greenhouse uses. Some tropical plant species are very sensitive to minute amounts of copper exposure from rainwater run-off or condensation drip. They should not be hung in copper planters and pressure-treated wood should not be used where such exposure is likely to occur.

Pressure-treated wood does not emit vapors or fumes and may be used indoors for all applications (except cutting boards and countertops) where protection against termites and fungal decay is needed.

Picnic Tables. While it's true that neither treated nor untreated wood is recommended for countertops, normal food preparation activity on picnic tables is fine, since picnic tables are primarily used for serving prepared food, while a countertop is used primarily as a cutting surface. In fact, the U.S. Food and Drug Administration recommends against any wood—treated or untreated—being used as a cutting surface since food particles are likely to become embedded in it. This can lead to bacterial growth and may present an unsanitary condition. Therefore, when eating at your pressure-treated picnic table, use common sense procedures and care (i.e. tablecloths and plates) and it will provide you with years of safe and durable use.

WORKING WITH TREATED WOOD

Handling, cutting and fastening treated wood is the same as for untreated lumber. Gloves are recommended to prevent cuts, splinters and reaction to the chemicals. Other recommended precautions, for the most part, reflect common sense and good hygiene, and apply to both treated and untreated wood. For example, care should be exercised to avoid inhaling sawdust; fine dust particles generated in sawing wood are air pollutants and could cause nose and throat irritation. Therefore, when sawing and machining treated wood, wear a dust mask. Whenever possible, these operations should be performed outdoors to avoid indoor accumulations of airborne sawdust from treated wood.

Always Wear Eye Protection. Care must be exercised to avoid getting dust or wood chips in your eyes. Wear goggles or safety glasses. Eyes are extremely sensitive and any type of foreign matter can cause irritation.

Follow Personal Hygiene Practices. After working with the wood, and before eating, drinking, or using tobacco products, wash exposed areas thoroughly. If preservatives or sawdust accumulates on clothes, launder them before reuse. Wash work clothes separately from other household clothing.

Disposing of Treated Wood. Dispose of treated wood by ordinary trash collection or burial. Treated wood should not be burned in open fires or in stoves, fireplaces, or residential boilers because toxic chemicals may be produced as part of the smoke and ashes. Treated wood from commercial or industrial use (e.g., construction sites) may be burned only in commercial or industrial incinerators or boilers in accordance with state and federal regulations. These burning precautions aren't exclusive to treated wood; medical authorities also advise against burning other manufactured wood products such as plywood, particleboard, and old furniture.

Using Fasteners. Keep in mind when fastening treated wood together that the conditions which are conducive to attack by fungal decay and termites also promote metal corrosion. Therefore, fasteners should be corrosion-resistant, such as:

- Hot-dipped galvanized metal
- Copper
- Silicon bronze
- Stainless steel

Other metals having corrosion resistance equal to that of hot-dipped zinc coatings are also appropriate.

FINISHING YOUR PROJECT

Pressure-treated wood is fully paintable and stainable. Treat it the same as untreated wood that is exposed to the weather.

When installed, use a clear sealer or water repellent that retards fast drying (which can cause the wood to crack). Spray, brush or roll the sealer on all exposed wood as soon as it is installed. This also beautifies the natural look of prestained-treated wood. Read the manufacturer's directions on how long to wait before applying stain or paint on freshly sealed or treated wood.

Water- and oil-based stain or paint may be used immediately on treated lumber. Paint will retard the drying and subsequent checking of the wood. Follow all paint manufacturer's directions for surface preparation before applying.

Use caution when staining or painting over previously sealed pressure-treated wood. The sealers may repel the stain or paint you want on the wood. Be sure to read the directions on every can of sealer, stain, and paint.

Soak or brush additional preservative onto any cut ends. Any other cuts or drilled holes should be treated to ensure the wood's long life. Some brands of treated wood require cut ends to be treated to validate the manufacturer's warranty; others only recommend it.

APPLICATION OF PRESSURE-TREATED WOOD

Several typical pressure-treated wood projects are shown in this booklet. Detailed construction steps for projects using pressure-treated wood can be found in Booklets #3080, #3083, #3110, #3111, #3112, #3113, #3127, and #3133.

Fig. 4

Picnic tables can be made of pressure-treated wood.