Guide to Pressure Treated Wood

Characteristics

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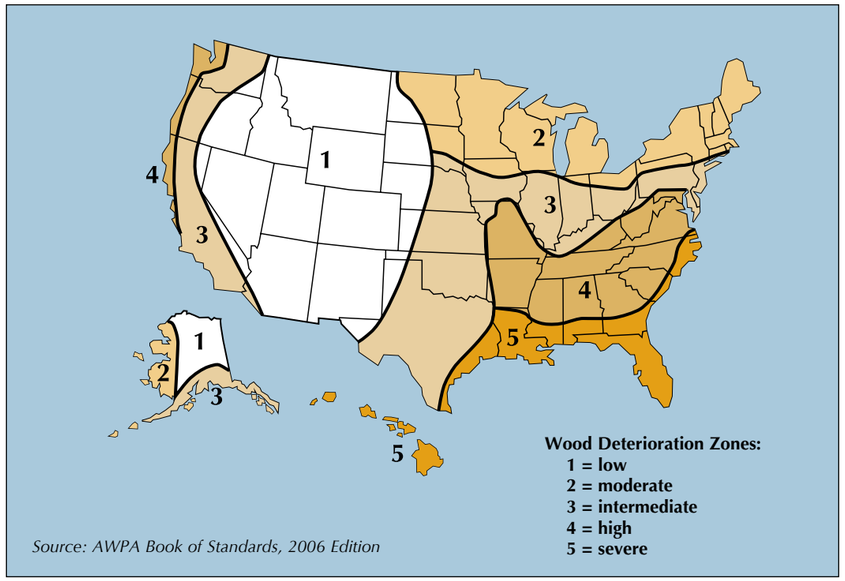
Introduction

Most untreated wood will decompose when four conditions required for decay and insect attack occur: high moisture, a favorable temperature, oxygen, and a food source (wood fiber). If any one of these conditions is removed, infestation and decomposition cannot occur. Eliminating wood fiber as a food source by using pressure-treated wood products is an easy and practical solution. Research has shown that wood can be expected to last for many decades when properly treated and installed for its intended use.

The map below indicates, by region, the level of wood deterioration throughout the United States. Because deterioration zones range from moderate to severe across most of the country, today's design/build professionals realize the importance of specifying and building with treated wood. The International Building Codes recognize the problems as well in certain applications and the effectiveness of properly treated wood in enduring those situations. For those building applications, the codes require the use of pressure treated wood.

Today's science has developed preservative treatments that are odorless and colorless, and leave the wood paintable and dry to the touch. Treatment with preservatives protects wood that is exposed to the elements, in contact with the ground, or subjected to high humidity.



Source: AWPA Book of Standards, 2006 Edition

The Pressure-Treating Process

Pressure-treated wood is the end result of a highly controlled process where chemical preservatives are forced into the wood's cells within a closed pressure-cylinder. The chemical preservatives react with the wood fiber to form a treated wood product resistant to attack by insects, decay, fungus and marine borers.

Reaction of the chemical preservative within the wood's fiber begins during the treating cycle. The time needed to maximize fixation or stabilization of the preservative can range from several hours to several days, depending on surrounding temperatures and humidity that vary greatly with locale and seasonal conditions.

Treated wood must meet minimum preservative penetration and retention requirements for use in a particular service condition. Penetration refers to the depth a preservative must permeate into the wood fiber. The amount of preservative that remains in the wood after the pressure-treating process is complete is called retention. Retention levels are expressed in pounds of preservative per cubic foot (pcf) of wood fiber and the higher the retention, the harsher the service condition the wood may be exposed to.

Types of Wood Preservatives

There are three broad classes of preservatives used for the pressure treatment of wood products:

- Waterborne preservatives, where water is the carrier for the preservative chemicals, serve a wide variety of uses. These include residential, commercial, marine, agricultural, recreational and industrial applications.
- Oil-type preservatives are used primarily for industrial applications including utility poles, piling, posts, glulam beams and timbers.
- Creosote preservatives, including creosote/coal-tar mixtures, protect railroad ties, marine pilings and utility poles.

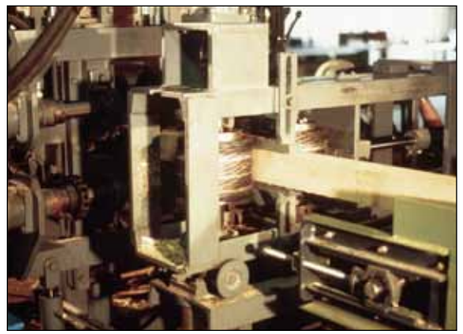
Waterborne preservatives are commonly specified for most residential, commercial and marine building applications. Waterborne treatments are clean in appearance, odorless and paintable. They are also EPA-registered for both interior and exterior use without a sealer.

Code Acceptance & Standards

Preservative treated wood products are accepted for building code compliance either by reference to the American Wood Protection Association (AWPA) Standards or through the product evaluation process of the International Code Council Evaluation Service (ICC-ES).

The AWPA is the principal standards-writing body for wood preservation in the United States. Their Book of Standards establishes what preservatives and chemical formulations are appropriate for common applications; sets treating procedures; establishes wood species requirements and testing procedures, and provides guidance on quality control and inspection. AWPA Standards ensure that properly treated wood products perform satisfactorily for their intended service condition. For code acceptance, products treated in accordance with AWPA Standards must reference the Standard and quality mark of a code-approved inspection agency.

National Evaluation Report (NER) or Evaluation Service Reports (ESR) issued by the International Code Council-Evaluation Service (ICC-ES) also provide assurance that treated wood products produced under report acceptance criteria and quality monitored by an American Lumber Standard Committee (ALSC) or equivalent third party agency meet code performance standards. Preservative treated wood manufactured and monitored quality-marked under ICC-ES criteria must reference the report number on the product and identify the code-approved inspection agency.



The incisor punctures the lateral surfaces on all four sides of the lumber.

Incising is an aid in securing deeper and more uniform penetration of preservatives in western softwood species such as Douglas-fir, Hem-Fir and Spruce-Pine-Fir.

Incising

Species and commodities that are difficult to consistently and uniformly penetrate with preservatives are required to be incised prior to treatment. The exact attributes of incising are not defined in AWPA Standards but material must be adequately incised so it will meet the preservative penetration and retention requirements in the appropriate Use Category Commodity Specification. Incising is a mechanical process wherein numerous longitudinal incisions are made with chisel-type or knife-type teeth into the wood surfaces, parallel to the grain direction. Incising increases preservative retention and penetration during the treating process by increasing the amount of exposed, easily penetrated end-grain and by increasing the side-grain surface area.

While preservative treatment increases durability, the incising process is known to reduce certain strength values of structural lumber. The type and amount of strength reduction is dependant on the depth and density of the incisions and the resultant wood damage caused by the crushing of wood fibers. National Design Specification offer fundamental guidelines for accessing potential strength losses in incised wood.

Allowable Stress Design Adjustment Factor

The National Design Specification for Wood Construction (NDS) (ANSI/AF&PA 2005) recommends an allowable stress design adjustment factor Ci for treated and incised lumber. This factor imposes a 5% reduction in MOE and 20% reduction in allowable design stress in bending, tensile, and compressive strength for both dry and green material. To qualify for the reduction, incising must be limited to the depth, density and length specified in the NDS.

Effects of Species, Grades, Incising and Treatment on Strength and Stiffness

In 1998 and again in 2003, Forest Product Laboratory tested three populations of nominal 2 by 4, machine-stress-rated Hem-Fir, Douglas-fir and Spruce-Pine-Fir, kiln-dried to ≤ 19% and incised to 0.2 in. or 0.4 in. at densities of 660 or 800 incisions/ft^2. Selected specimens were then full-cell treated with ACZA (Douglas-fir), ACZA or CCA-C (Hem-Fir) or ACQ-B or CCA-C (SPF).

The results showed no practically important species-related differences, few gross differences related to grade within species, and few significant differences among the preservatives.

However, the tests did find that depth of incision is the critical factor on determining the reduction of mechanical properties. The bending strength and stiffness adjustments are dependent on the incision dimensions (i.e., reduced cross section) and lumber size. Incising reduces section modulus and therefore reduces bending strength and stiffness. When incising exceeds the allowances in the NDS, users must evaluate the impact on strength for their application.

AWPA Use Category System

The AWPA Use Category System (UCS) specifies the wood treatment required based on many variables including the product, desired wood species and the environment or hazard exposure of the intended end use. There are six Use Categories, including fire retardant applications, which describe the exposure conditions that wood may be subject to in service. Each exposure has a different degree of biodegradation hazard and/or product service-life expectation. The easy-to-use system helps specifiers and product users locate the appropriate AWPA Standards that provide recommendations for a specific combination of product and use environment.

All treated wood commodities can be placed into one of the Use Categories, based on exposures and expected product performance. The user of the UCS should first find the appropriate Use Category for the expected service conditions and planned applications in the Specification Guide to Treated Wood End Uses.

Generally, as the Use Category number rises, there is a consequent increase in the required preservative retention or limitation of preservative types. The dimensions of the treated product may also influence the depth-of-penetration requirement. The lower the Use Category number, the least amount of protection is required as it relates to the level of protection necessary for decay or insect attack. Conversely, the highest Use Category number provides the highest degree of protection to wood used in the most severe service conditions.

Use Category Selection Guide

Wood and wood-based materials used in interior construction not in contact with the ground or foundations. Such products are protected from weather and interior sources of water such as leaking plumbing, condensate, pools and spas.

SERVICE CONDITIONS:
Interior construction, dry, above ground

USE ENVIRONMENT:
Continuously protected from weather or other sources of moisture

COMMON AGENTS OF DETERIORATION:
Insects only

TYPICAL APPLICATIONS:
Interior construction

UC2

Wood and wood-based materials used for interior construction that are not in contact with ground, but may be subject to dampness. These products are continuously protected from the weather, but may be exposed to occasional sources of moisture.

SERVICE CONDITIONS:
Interior construction, damp above ground

USE ENVIRONMENT:
Protected from weather, but subject to sources of moisture

COMMON AGENTS OF DETERIORATION:
Decay fungi and insects

TYPICAL APPLICATIONS:
Interior construction –
beams, timbers, flooring, framing, millwork, sill plate

Wood and wood-based materials used in exterior construction that are coated and not in contact with the ground. Such products may be exposed to the full effects of weather, such as vertical exterior walls or other types of construction that allows water to quickly drain from the surface.

SERVICE CONDITIONS:
Exterior construction, coated, rapid water runoff, above ground

USE ENVIRONMENT:
Coated
Exposed to all weather cycles, but not exposed to prolonged wetting

COMMON AGENTS OF DETERIORATION:
Decay fungi and insects

TYPICAL APPLICATIONS:
Coated millwork, siding and trim

UC3B

Wood and wood-based materials used in exterior construction and not in contact with the ground. Materials do not require an exterior coating, but may be finished to achieve a desired aesthetic appearance.

SERVICE CONDITIONS:
Exterior construction, above ground, uncoated, poor water runoff

USE ENVIRONMENT:
Exposed to all weather cycles, and prolonged wetting

COMMON AGENTS OF DETERIORATION:
Decay fungi and insects

TYPICAL APPLICATIONS:
Decking, deck joists, sill, walkways, railings and fence pickets

UC4A

Wood and wood-based materials used in contact with the ground, fresh water, or other situations favorable to deterioration.

SERVICE CONDITIONS:
Ground contact or fresh water, non-critical components

USE ENVIRONMENT:
For normal ground contact or fresh water contact
Exposed to all weather cycles

COMMON AGENTS OF DETERIORATION:
Decay fungi and insects

TYPICAL APPLICATIONS:
Fence posts, deck posts, structural lumber & timbers, guardrail posts, utility poles in regions of low decay potential

UC4B

Wood and wood-based materials used in contact with the ground either in severe environments, such as horticultural sites, in climates with a high potential for deterioration, in critically important components.

SERVICE CONDITIONS:
Ground contact, fresh water, important construction components, or in salt water splash zones

USE ENVIRONMENT:
Severe ground contact or salt water splash, difficult replacement
Exposed to all weather cycles

COMMON AGENTS OF DETERIORATION:
Decay fungi and insects with increased potential for biodeterioration

TYPICAL APPLICATIONS:
Permanent wood foundations, building poles, horticultural posts, utility poles, decking on or above tidal zone, structural components in piers or docks
In regions of high potential for decay

UC4C

Wood and wood-based materials used in contact with the ground either in severe environments or climates demonstrated to have extremely high potential for deterioration and in critical structural components.

SERVICE CONDITIONS:
Ground contact, fresh water, critical structural components

USE ENVIRONMENT:
Very severe ground contact, exposed to all weather cycles
Extreme decay potential

COMMON AGENTS OF DETERIORATION:
Decay fungi and insects with increased potential for biodeterioration

TYPICAL APPLICATIONS:
Land or fresh water piling, foundation piling, utility poles with a severe potential for decay

UC5A

Wood and wood-based materials exposed to salt and brackish water generally from New Jersey and north on the East Coast and north of San Francisco on the West Coast to the extent that the marine borers can attack them.

SERVICE CONDITIONS:
Salt or brackish water and adjacent mud zone

USE ENVIRONMENT:
Continuous marine (salt water) exposure

COMMON AGENTS OF DETERIORATION:
Salt water organisms: *Teredo, Limnoria quadripunctata*

TYPICAL APPLICATIONS:
Piling, bulkhead, bracing

UC5B

Wood and wood-based materials exposed to salt and brackish water generally between New Jersey and Georgia on the East Coast and south of San Francisco on the West Coast to the extent that the marine borers can attack them.

SERVICE CONDITIONS:
Salt or brackish water and adjacent mud zone

USE ENVIRONMENT:
Continuous marine (salt water) exposure

COMMON AGENTS OF DETERIORATION:
Salt water organisms: *Teredo, Limnoria tripunctata*

TYPICAL APPLICATIONS:
Piling, bulkhead, bracing

UC5C

Wood and wood-based materials exposed to salt and brackish water south of Georgia and along the Gulf Coasts in the Eastern U.S. to the extent that the marine borers can attack them.

SERVICE CONDITIONS:
Salt or brackish water and adjacent mud zone

USE ENVIRONMENT:
Continuous marine (salt water) exposure

COMMON AGENTS OF DETERIORATION:
Salt water organisms: *Teredo, Martesia, Sphaeroma*

TYPICAL APPLICATIONS:
Piling, bulkhead, bracing

UCFA

Wood and wood-based materials intended for fire protection and used in interior construction where wood material is not in contact with the ground and is protected from exterior weather.

SERVICE CONDITIONS:
Fire protection as required by codes
Above ground interior construction

USE ENVIRONMENT:
Continuously protected from weather or other sources of moisture

COMMON AGENTS OF DETERIORATION:
Fire

TYPICAL APPLICATIONS:
Roof sheathing, roof trusses, studs, joists, paneling

UCFB

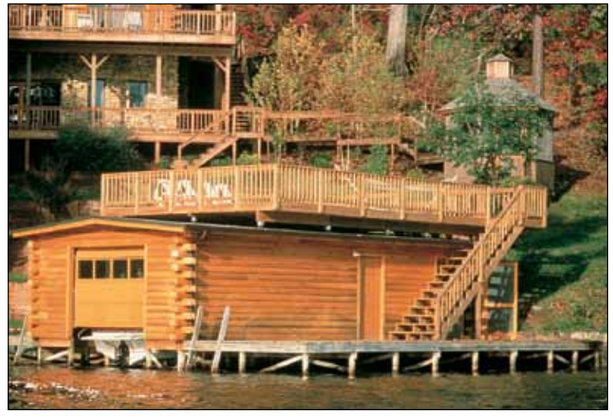
Wood and wood based-materials intended for fire protection and used in exterior construction that is not in contact with the ground or with foundations, but may be exposed to full effects of weather such as intermittent rain, dew, sunlight and wind.

SERVICE CONDITIONS:
Fire protection as required by codes
Above ground exterior construction.

USE ENVIRONMENT:
Wetting

COMMON AGENTS OF DETERIORATION:
Fire

TYPICAL APPLICATIONS:
Vertical exterior walls, inclined roof surfaces or other types of construction that allow water to quickly drain from surface



Service Conditions for Use Category Selection Guide
(Source: AWPA 2006 Book of Standards)

Use Category	Service Conditions	Use Environment	Common Agents of Deterioration	Typical Applications
UC1	Interior construction Above ground Dry	Continuously protected from weather or other sources of moisture	Insects only	Interior construction and furnishings
UC2	Interior construction Above ground Damp	Protected from weather, but may be subject to sources of moisture	Decay fungi and insects	Interior construction
UC3A	Exterior construction Above ground Coated & rapid water runoff	Exposed to all weather cycles, not exposed to prolonged wetting	Decay fungi and insects	Coated millwork, siding and trim
UC3B	Exterior construction Above ground Coated & or poor water runoff	Exposed to all weather cycles, including prolonged wetting	Decay fungi and insects	Decking, deck joists, railings, fence pickets, uncoated millwork
UC4A	Ground contact or fresh water Non-critical components	Exposed to all weather cycles, normal exposure conditions	Decay fungi and insects	Fence, deck, and guardrail posts, crossties & utility poles (low decay areas)
UC4B	Ground contact or fresh water Critical components or difficult replacement	Exposed to all weather cycles, high decay potential including salt water splash	Decay fungi and insects with increased potential for biodeterioration	Permanent wood foundations, building poles, horticultural posts, crossties & utility poles (high decay areas)
UC4C	Ground contact or fresh water Critical structural components	Exposed to all weather cycles, severe environments, extreme decay potential	Decay fungi and insects with extreme potential for bio-deterioration	Land & freshwater piling, foundation piling, crossties & utility poles (severe decay areas)
UC5A	Salt or brackish water and adjacent mud zone Northern waters	Continuous marine exposure (salt water)	Salt water organisms	Piling, bulkheads, bracing
UC5B	Salt or brackish water and adjacent mud zone NJ to GA, south of San Fran	Continuous marine exposure (salt water)	Salt water organisms including creosote tolerant *Limnoria tripunctata*	Piling, bulkheads, bracing
UC5C	Salt or brackish water and adjacent mud zone South of GA & Gulf Coast	Continuous marine exposure (salt water)	Salt water organisms including creosote tolerant *Martesia, Sphaeroma*	Piling, bulkheads, bracing
UCFA	Fire protection as required by codes Above ground Interior construction	Continuously protected from weather or other sources of moisture	Fire	Roof sheathing, roof trusses, studs, joists, paneling
UCFB	Fire protection as required by codes Above ground Exterior construction	Subject to wetting	Fire	Vertical exterior walls, inclined roof surfaces or other construction which allows water to quickly drain

Quality Assurance

To comply with the International Building Codes, pressure-treated wood shall bear the quality mark of an inspection agency that maintains the continuing supervision, testing and inspection over the quality of the treated wood. Inspection agencies for treated wood shall be listed by an accreditation body* that complies with the requirements of the American Lumber Standards Committee (ALSC) Treated Wood Program, or equivalent. The quality mark shall be on a stamp or label affixed to the treated wood, and shall include the following information:

1. Identification of treating manufacturer
2. Type of preservative used
3. Minimum preservative retention (pcf)
4. End use for which the product is treated
5. Identity of the accredited inspection agency
6. Standard to which the product is treated

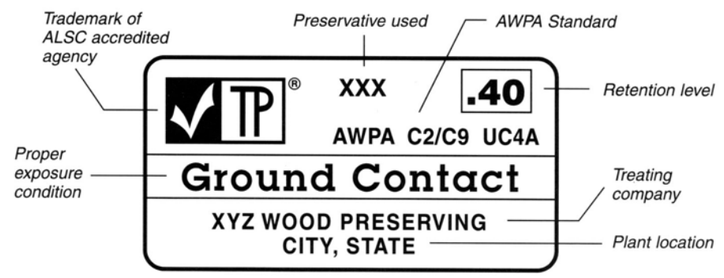
These quality marks for treated wood may be sometimes confusing because they often include additional product information, proprietary brands, warranties, etc. To help clarify the situation, Western Wood Preservers Institute created the CheckMark Identification Program to easily locate and recognize the various ALSC-accredited agency's trademarks. Look for the CheckMark on the stamp or end tag to quickly find the ALSC third party agency's logo.

The treating industry also manufactures products that do not require ALSC oversight; such products include landscape timbers for non-structural applications and decking products which carry their own manufacturer's warranty.

"Third-party" agencies verify that pressure-treated wood was properly treated in accordance with AWPA Standards or NER-ESR Criteria. Third-party inspection is not always mandated by law, but is necessary to comply with the International Building Codes. To be certain of receiving the treated wood that was specified, only accept or approve treated wood with a quality stamp or end tag of an accredited ALSC agency.

* Accreditation Body. An approved, third-party organization that is independent of the grading and inspection agencies, and the lumber mills, and that initially accredits and subsequently monitors, on a continuing basis, the competency and performance of a grading or inspection agency related to carrying out specific tasks.

INTERPRETING A QUALITY MARK



Fasteners & Connectors

The metal products that come in contact with pressure-treated wood must be of types that are code accepted for the particular product, application and exposure. Examples include fasteners (e.g. nails, screws and bolts), and all connecting hardware (e.g. joist hangers, straps, hinges, post anchors and truss plates).

Fasteners and connectors for preservative-treated wood shall be hot-dipped galvanized in accordance with ASTM A-153, silicon bronze, copper or 304 or 316 stainless steel. Stainless steel fasteners should be used below grade in Permanent Wood Foundations and are recommended for use with treated wood in other corrosive exposures such as in or near salt water. Building codes dealing with fasteners and connectors reference preserved wood as one product, regardless of the formulation used for treatment. There are differences among corrosion properties of different treated wood, so clarification of the preservative type used may be needed. Some code evaluation reports may permit the use of other types of fasteners.

Copper-Based Preservatives

Hot-dipped galvanized or stainless steel fasteners and connectors are recommended for use when lumber is treated with a copper-based preservative. Copper-based formulations include CCA, ACZA, ACQ or CA-C and may be used in interior or exterior applications.

Hot-dipped galvanized fasteners and connectors are generally acceptable for above-grade applications and should meet ASTM A-153. Hot-dipped galvanized connectors should meet ASTM A-653, Class G185 sheet with 1.85 ounces of zinc coating per square foot minimum. Fasteners and connectors used together must be of the same metallic composition to avoid galvanic corrosion (e.g. use hot-dipped nails with hot-dipped joist hangers).

Type 304 or 316 stainless steel is recommended for maximum corrosion resistance in more severe exterior applications including swimming pools, salt-water exposure and below-grade applications such as Permanent Wood Foundations. Stainless steel is also a recommended option for use with CCA, ACZA, ACQ or CA-C treated wood at retention levels greater than required for Ground Contact.

Standard carbon-steel or aluminum products should never be used in direct contact when lumber is treated with a copper-based preservative. Electroplated galvanized metal products generally have a thinner layer of protection compared to hot-dipped galvanized and are typically not accepted by the building codes for use in exterior applications. When aluminum or electroplated products such as flashing or termite shields are used, spacers or other physical barriers are necessary to prevent direct contact from copper-based treated wood. These barriers should provide complete separation and remain intact for the intended service life of the metal.

Fasteners and connectors coated with proprietary anti-corrosion technologies are also available for use with copper-based preservatives. Consult individual hardware manufacturers for specifics regarding their performance and acceptance by building codes.

Borate-Based Preservatives

Borate-treated wood (Inorganic Boron – SBX) is limited to Above Ground interior use in dry or damp applications, continually protected from liquid water. According to information provided by preservative manufacturers and suppliers, borate-treated wood is not corrosive.*

* Fastener guidance on borate treated wood from Arch Wood Protection, Inc. (SillBor®); Viance LLC. (TimberSaver® PT); U.S. Borax and Osmose, Inc. (Advance Guard®) per International Code Council, NER 648.

Best Management Practices for the Use of Treated Wood in Aquatic and Other Sensitive Environments

Best Management Practices

Protecting the lakes, streams, bays, estuaries and wetlands of North America is a responsibility shared by everyone. The pressure-treated wood industry is committed to ensuring that its products are manufactured and installed in a manner which minimizes any potential for adverse impacts to these environments. To achieve this objective, the industry developed and encouraged the use of the **Best Management Practices** or **BMPs**. BMPs are in addition to other treating specifications and contain treating process guidelines specific to each preservative system. These include technical guidance on the handling and use of the treating preservative, wood preparation and treating procedures, post-treatment processes and inspection. BMPs are designed to:

- Optimize the minimal retention of preservative placed into the wood while assuring compliance with specifications
- Maximize stabilization in waterborne systems
- Minimize surface residues and bleeding from oil-type, preservative-treated products

The specification for treated wood products used in aquatic and wetland applications should contain language to the effect: *These products are to be produced in accordance with the Best Management Practices for Treated Wood in Aquatic and Other Sensitive Environments issued by the Western Wood Preservers Institute, Wood Preservation Canada, and the Timber Piling Council*. By using such a reference, the specific requirements of the BMPs are not required.

In summary, the treating industry believes the potential for any adverse environmental impact is reduced when certain conditions are met:

- Materials are specified with the minimum retention needed for their application
- Best Management Practices (BMPs) are mandated with certification of inspection
- Proper field installation guidelines are followed

For detailed coverage of BMPs, refer to the publication *Best Management Practices for the Use of Treated Wood in Aquatic and Other Sensitive Environments*, ©WWPI 2006 or later edition.

Use and Handling Recommendations and Field Treatments

The following requirements and recommendations are according to AWPA Standard M4 as they apply to job site care, handling, and field treatment of pressure-treated wood products.

Fabrication

Whenever practical, all fabrication (boring, ripping, planning, sanding and trimming) shall be specified and accomplished prior to pressure treating.

Job Site Care and Storage

All wood products, including pressure-treated products, will continue to lose or gain moisture until they adjust to the conditions of their end-use environment. Treated lumber should be properly stacked and stored in the same manner as untreated wood. Storage areas shall be free of debris, weeds and dry vegetation and shall have drainage to prevent treated material from being subjected to standing water. Material shall be stored off the ground on solid timbers of size and so arranged as to support treated materials without producing noticeable distortion. Treated lumber having a specified moisture content shall be stored under shelter.

Field Treating Methods

Copper Naphthenate-based solutions may be used for field treatment of materials originally treated with Pentachlorophenol, Creosote or waterborne preservatives as specified in AWPA Standard M4. The preservatives concentration shall contain no less than 2 percent copper metal.

Application of Field Preservatives

Newly exposed surfaces resulting from field fabrication and/or handling abuse shall be field treated by brushing, dipping or soaking. Protective clothing and hand protection shall be worn when applying preservatives. The application should be done in a manner that the preservative does not drip or spill into the surrounding soil.

Disposal

The preferred option for handling wood removed from service is to reuse the material in a manner consistent with the use of similar treated wood products. Material originally used for structural applications can often be used for non-structural purposes such as landscaping timbers or parking bumpers.

Treated wood should NEVER be burned in open fires of any kind, stoves, fireplaces or residential boilers.

Treated wood from commercial or industrial uses can generally be disposed of as a non-hazardous material. Individuals may dispose of treated wood by ordinary trash collection. However, all disposals should assure conformance with Federal, state and local regulations. For specific details, contact WWPI for a guide to the Disposal of Treated Wood.

Use Site Precautions

Do not use pressure-treated wood where it will be in frequent or prolonged contact with bare skin or under circumstances where preservative may become a component of food for either humans or animals. Examples include sites using mulch from recycled treated wood, cutting boards, counter tops, animal bedding and structures for storing human or animal food.

Treated wood should not be used where it may come into contact or indirect contact with public drinking water except for uses such as docks and bridges. Wood treated with Pentachlorophenol or Creosote should not be used where it may come into contact with drinking water for domestic animals or livestock. Waterborne preservatives are approved for this use.

Use only treated wood that is visibly clean and free of surface residue for patios, decks and walkways. Wood treated with waterborne preservatives may be exposed in residential interiors, provided clean up is performed after construction.

Material to be placed in or near the water should be treated in accordance with the guide, *Best Management Practices for the Use of Treated Wood in Aquatic and Other Sensitive Environments*, available from WWPI.

All scraps, sawdust and construction debris should be collected and removed for appropriate disposal.

Handling Precautions

Users should follow the instructions provided in an EPA-approved Consumer Information Sheet (CIS) or Consumer Safety Information Sheet (CSIS) or other Safe Handling Information provided by the supplier of the treated wood material. Make certain job-site employees are aware of the information in the CIS or CSIS and follow the guidelines.

When handling treated wood, wear protective clothing such as long-sleeved shirts and long pants and use gloves. After working with the treated material, wash any exposed area before eating, drinking, going to the toilet, or using tobacco products.

When sawing and machining the treated material, wear goggles to protect eyes from flying particles. Wear a dust mask and, if possible, work outdoors to avoid inhalation of sawdust.

If material or sawdust accumulates on clothing, wash thoroughly and separately from other household clothing before reuse.

These basic safety and hygiene habits are also applicable to untreated wood.

Specification Guide to Treated Wood End Uses

USE	AWPA STANDARD Use Category System	OIL-TYPE PRESERVATIVES Minimum Retentions – Pounds Per Cubic Foot Copper Naphthenate[1]	Creosote[2]	Pentachlorophenol[3]		WATERBORNE PRESERVATIVES Minimum Retentions – Pounds Per Cubic Foot ACQ[4]	ACZA[5]	CA-C[6]	CCA[7]	SBX[8]	EL2[15]	PTI[16]
ACRICULTURE, FARM USE												
Round poles and posts as structural members	4B	0.075	7.5 – 16.0	0.38 – 0.60		0.60	0.60	0.31	0.60	NL	NL	NL
Sawn poles and posts as structural members	4B	0.075	12.0	0.60		0.60	0.60	0.31	0.60	NL	NL	NL
Posts, fence												
• Round, half and quarter round	4A	0.055	8.0	0.40		0.40	0.40	0.15	0.40	NL	NL	NL
• Sawn four sides	4A	0.060	10.0	0.50		0.40	0.40	0.15	NP	NL	NL	NL
Grape stakes, sawn	4A	0.060	10.0	0.30		0.40	0.40	0.15	NP	NL	NL	NL
BEAMS & TIMBERS, glue laminated before or after treatment												
Interior, dry	1	0.04	8.0	0.30		0.15	0.25 – 0.30[9]	NL	0.25	NL	0.019	0.013
Interior, damp	2	0.04	8.0	0.30		0.15	0.25 – 0.30[9]	NL	0.25	NL	0.019	0.013
Exterior, above ground	3B	0.04	8.0	0.30		0.15	0.25 – 0.30[9]	NL	0.25	NL	0.019	0.018[17]
Exterior, ground contact	4A	0.60	10.0	0.60		0.40	0.40 – 0.60[9]	NL	0.40	NL	NL	NL
Highway construction	4B, 4C	0.080 – 0.15[13]	9.0 – 12.0	0.45 – 0.60		NL	0.40 – 0.60[9,14]	NL	0.40[14]	NL	NL	NL
BUILDING CONSTRUCTION MATERIAL												
Decks, Residential												
• Decking	3B	NL	NR	NR		0.15	0.25	0.06	NP	NL	0.019	0.018[17]
• Joists, above ground	3B	NL	NR	NR		0.15	0.25	0.06	NP	NL	0.019	0.018[17]
• Joists, ground contact	4A	NL	NR	NR		0.40	0.40	0.15	NP	NL	NL	NL
• Posts	4A	NL	NR	NR		0.40	0.40	0.15	NP	NL	NL	NL
• Railing	3B	NL	NR	NR		0.15	0.25	0.06	NP	NL	0.019	0.018[17]
Floor plate	2	NL	NR	NR		0.15	0.25	0.06	NP	NL	0.019	0.013
Flooring, above ground, interior	1, 2	NL	NR	NR		0.15	0.25	0.06	NP	0.25	0.019	0.013
Framing, interior	1,2	NL	NR	NR		0.15	0.25	0.06	NP	0.25	0.019	0.013
Lumber												
• Above ground	3B	0.04	8.0	0.40		0.15	0.25	0.06	NP	NL	0.019	0.018[17]
• Ground contact	4A	0.06	10.0	0.50		0.40	0.40	0.15	NP	NL	NL	NL
• Out of contact with ground and continously protected from liquid water	2	NL	NL	NL		0.15	NL	NL	NP	0.25	0.019	0.013
Permanent Wood Foundation												
• Lumber	4B	NL	NL	NL		0.60	0.60	0.31	0.60	NL	NL	NL
• Plywood	4B	NL	NL	NL		0.60	0.60	0.31	0.60	NL	NL	NL
Plywood												
• Sub-floor, damp, above ground	2	NL	8.0	0.40		0.15	0.25	0.06	0.25	0.25	0.019	0.013
• Exterior, above ground	3B	NL	8.0	0.40		0.15	0.25	0.06	0.25	NL	0.019	0.018[17]
• Ground contact	4A	NL	8.0	0.40		0.40	0.40	0.15	0.40	NL	NL	NL
• Out of contact with ground and continously protected from liquid water	2	NL	NL	NL		0.15	NL	NL	NL	0.25	0.019	0.013
Poles, Building												
• Round	4A, 4B	NL	7.5 – 16.0	0.38 – 0.60		0.60	0.60	0.31[10]	0.60	NL	NL	NL
• Sawn	3B	0.075	12.0	0.60		0.60	0.60	0.31	0.60	NL	NL	NL
Studs	2	NL	NR	NR		0.15	0.25	0.06	NP	0.25	0.019	0.013

FOOTNOTES:

[1] Copper Naphthenate

[2] Creosote-Coal Tar Creosote

[3] Pentachlorophenol may be dissolved with several solvents. The solvents specified in AWPA P-9 are: Type A – Oil; Type C – Light Hydrocarbon solvent with auxillary solvent; use Type C where conditions require cleanliness and ability for staining.

[4] Alkaline Copper Quaternary

[5] Ammoniacal Copper Zinc Arsenate

[6] Copper Azole

[7] Chromated Copper Arsenate

[8] Inorganic Boron (SBX), B_2O_3 (Disodium Octaborate Tetrahydrate):
- Retention of 0.25 pcf DOT is equivalent to 0.17 pcf B_2O_3 for Non-Formosan Termite exposure
- Retention of 0.42 pcf DOT is equivalent to 0.28 pcf B_2O_3 for Formosan Termite exposure

[9] Douglas Fir only

[10] Western red Ceder, Southern Pine only

[11] Douglas Fir, Western Hemlock, Southern Pine only

[12] Lodgepole Pine, Southern Pine only

[13] After gluing

[14] Before gluing

[15] DCOI-Imidacloprid-Stabilizer

[16] Propiconazole Tebuconazole Imidacloprid

[17] For certain species, use of an accepted water repellent additive allows 0.013 pef

(continued)

USE	AWPA STANDARD Use Category System	OIL-TYPE PRESERVATIVES Minimum Retentions – Pounds Per Cubic Foot				WATERBORNE PRESERVATIVES Minimum Retentions – Pounds Per Cubic Foot						
		Copper Naphthenate[1]	Creosote[2]	Pentachlorophenol[3]		ACQ[4]	ACZA[5]	CA-C[6]	CCA[7]	SBX[8]	EL2[15]	PTI[16]
FENCING												
Pickets, slats, trim	3A, 3B	0.055	8.0	0.50		0.15	0.25	0.06	NP	NL	0.019	0.018[17]
Posts, sawn	4A	NL	10.0	0.50		0.40	0.40	0.15	NP	NL	NL	NL
Posts, round	4A	0.055	8.0	0.40		0.40	0.40	0.15[12]	NP	NL	NL	NL
Rail	3A, 3B	0.055	8.0	0.50		0.15	0.25	0.06	NP	NL	0.019	0.018[17]
HIGHWAY MATERIAL												
Lumber and timbers for bridges, structural members, decking, cribbing and culverts	4B	0.075	10.0	0.50		0.60	0.60	0.31[11]	0.60	NL	NL	NL
Structural lumber and timbers:												
• In saltwater use and subject to marine borer attack	5A, 5B, 5C	NL	25.0	NL		NL	2.50	NL	2.50	NL	NL	NL
• Piles, foundation, land and fresh water use	4C	0.10 – 0.14	12.0 – 17.0	0.60 – 0.85		NL	0.80 – 1.0	NL	0.80 – 1.0	NL	NL	NL
• Piling in saltwater use and subject to marine borer attack	5A, 5B, 5C	NL	16.0 – 20.0	NL		NL	1.50 – 2.50	NL	1.50 – 2.50	NL	NL	NL
• Posts: Round, half-round, quarter-round (General const. – fence posts, sign posts, handrails)	4A	0.055	6.0 – 8.0	0.40		0.40	0.40	0.15	0.40	NL	NL	NL
• Posts: Round, half-round, quarter-round (Guardrails,spacer blocks, critical structural members)	4B	0.069	10.0	0.50		0.50	0.50	0.31	0.50	NL	NL	NL
• Posts: Sawn (General const. – fence posts, sign posts, handrails)	4A	0.06	10.0	0.40		0.40	0.40	0.15	0.40	NL	NL	NL
• Posts: Sawn (Guardrails,spacer blocks, critical structural members)	4B	0.075	10.0	0.50		0.50	0.50	0.31	0.50	NL	NL	NL
LUMBER												
Above ground	3B	0.04	8.0	0.40		0.15	0.25	0.06	NP	NL	0.019	0.018[17]
Ground contact and freshwater use	4A	0.06	10.0	0.50		0.40	0.40	0.15	NP	NL	NL	NL
MARINE LUMBER AND TIMBERS												
Members above ground and out of water but subject to saltwater splash	4B, 4C	0.06 – 0.75	10.0 – 12.0	0.50 – 0.60		0.60	0.60	0.31	0.60	NL	NL	NL
In brackish or saltwater use and subject to marine borer attack	5A, 5B, 5C	NL	25.0	NL		NL	2.50	NL	2.50	NL	NL	NL
PILES												
Foundation, land and freshwater use (round)	4C	0.10 – 0.14	12.0 – 17.0	0.65 – 0.85		0.80	0.80 – 1.0	NL	0.80 – 1.0	NL	NL	NL
Marine (round) in salt or brackish and subject to marine borer attack	5A, 5B, 5C	NL	16.0 – 20.0	NL		NL	1.50 – 2.50	NL	1.50 – 2.50	NL	NL	NL
Marine, dual treatment (round) for maximum protection	5B, 5C	NL	20.0	NL		NL	1.0	NL	1.0	NL	NL	NL
Sawn timber piles	4B, 4C	0.075	10.0 – 12.0	0.50		0.60	0.60 – 0.80	NL	0.60 – 0.80	NL	NL	NL
PLYWOOD												
Sub-floor, damp, above ground	2	0.04	8.0	0.40		0.15	0.25	0.06	0.25	0.25	0.019	0.013
Exterior, above ground	3B	NL	8.0	0.40		0.15	0.25	0.06	0.25	NL	0.019	0.018[17]
Ground contact	4A	NL	10.0	0.50		0.40	0.40	0.15	0.40	NL	NL	NL
Out of contact with ground and continously protected from liquid water	2	NL	NL	NL		0.15	NL	NL	NL	0.25	0.019	0.013
Marine	5A, 5B, 5C	NL	25.0	NL		NL	2.50	NL	2.50	NL	NL	NL

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[16] Propiconazole Tebuconazole Imidacloprid

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