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Phone:  
+61 4 1898 9398

PO Box 390  
Patterson Lakes, VIC  
3197 Australia

## TIMBER TREATMENT

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### TREATMENT METHODS

Long term protection of wood can only be achieved if the heartwood durability (TPAA Technical Note #5 ([/TPAA/wp-content/uploads/2015/06/4\\_2\\_5\\_0-TN-5-Durability.pdf](#))) is appropriate for the end use and the sapwood has been penetrated by wood preservative.

A number of treatment processes have been used since before the time of the Egyptians and new technologies are being developed all the time. The Australian Pesticides and Veterinary Medicines Authority approves the wood preservative chemicals that may be used in Australia, and Australian and New Zealand Standards specify the concentration of a particular preservative and how deep it has to penetrate into the wood to protect it from the expected biological hazard to which it will be exposed.

**Vacuum/pressure impregnation (VPI)** is an industrial process and involves sealing the timber in a vessel capable of withstanding high levels of vacuum and pressure. Various combinations of vacuum, pressure, time and solution concentration are used to achieve the desired level of protection (TPAA Technical Note #2 ([/TPAA/wp-content/uploads/2015/06/4\\_2\\_2\\_0-TN-2-Hazard-classes.pdf](#))).



<http://www.tpaa.com.au/wp-content/uploads/2015/06/vacuum.jpg>

VPI processes are used to apply copper-chromium-arsenate (CCA), copper quaternary (ACQ), copper azole (CuAz) and boron based preservatives.

**Double vacuum** processes, are industrial processes used with Light Organic Solvent Preservatives (LOSP). LOSPs are applied to products that are to be used out of ground contact e.g. cladding, balustrading and joinery. The timber to be treated is enclosed in a treatment vessel and subjected to different cycles designed to achieve levels

specified in the Standards. Preservatives include tebuconazole/propiconazole (teb/prop), and synthetic pyrethroids (Sp).



(<http://www.tpaa.com.au/wp-content/uploads/2015/06/double.jpg>)

**Diffusion processes** are those in which the preservative diffuses via the water in the wood cells. The wood is treated wet (green) and since the preservative does not chemically react with the wood to become insoluble, the process is used to protect against attack where the wood is not exposed to weather and wetting. The wood treated in this way is used for products such as furniture, flooring and moldings. Diffusion preservatives are also used for remedial treatment, e.g. at the ground-line in utility poles. Boron based preservatives are used in diffusion processes.

**Glueline treatment.** In this case, the preservative is added to the glueline of products such as plywood, chipboards and laminated veneer lumber during manufacture of the product. Material treated in this way is protected against insect and termite attack.

**Envelope treatments** are used to protect timber against termite attack. The treatment process is used on framing timbers and is effective because the preservative is a repellent as well as an insecticide. The processes used cause the preservative to penetrate 2 – 10 mm into the wood.

**Brush-on treatments** Wood preservatives applied in this way will only penetrate the wood to no more than 3 mm. This type of application should only be used if no other form of treatment is possible and the timber product is in its final shape or form. If the timber product treated this way is exposed to the weather, then treatment should be regularly reapplied.

According to Australian Standard AS/NZS1604 part 1, any product claiming to be preservative treated must be branded as specified in the standard. An important part of the brand is the Hazard Class, which indicates the service conditions to which the product is exposed and the level of treatment or level of protection that must be applied to the wood.

The Hazard Classes have been defined as follows:

Hazard Class	Exposure	Service condition	Hazard	Example uses
H1	Inside above ground	Completely protected from the weather, well ventilated and protected from termites	Borers	Susceptible framing, flooring, furniture, interior joinery used across Australia
H1.2 **	Inside above ground	Completely protected from the weather, but with possible exposure to moisture	Borers and decay	Wall framing
H2	Inside above ground	Protected from wetting, no leaching.	Borers and termites	Framing, flooring, furniture, interior joinery used across Australia
H2F	Inside above ground	Protected from wetting, no leaching.	Borers and termites	(Envelope treated) framing used south of the Tropic of Capricorn
H2S	Inside above ground	Protected from wetting, no leaching.	Borers and termites	Framing used South of the Tropic of Capricorn
H3	Outside above ground	Periodic moderate wetting and leaching	Moderate decay, borers and termites	Weatherboards, fascias, pergolas, framing etc.
H3A ##	Outside above ground	Periodic moderate wetting and leaching	Moderate decay, borers and termites	Weatherboards, fascias, pergolas, framing etc. – under a regularly maintained paint coat system
H3.1 **	Outside above ground	Periodic moderate wetting and leaching	Moderate decay, borers	Weatherboards, fascias, pergolas, framing etc. – under a regularly maintained paint coat system
H3.2 **	Outside above ground	Periodic moderate wetting and leaching more critical end uses	Moderate decay, borers	All H3.1 uses plus structural and decking
H4	Outside inground	Severe wetting and leaching noncritical applications	Severe decay, borers and termites	Fence posts, retaining wall less than 1 m high, landscaping timbers.

Hazard Class	Exposure	Service condition	Hazard	Example uses
H5	Outside inground with or in fresh water	Extreme wetting and leaching, critical application	Very severe decay, borers and termites	Piling, house stumps, power poles cooling tower fill, building poles, retaining walls more than 1m high
H6	Marine waters	Prolonged immersion in sea water	Decay and marine wood borers	Boat hulls, marine piles, jetty cross bracing, jetty landing steps.

## Applies to one preservative system used in Australia

\*\*Applies in New Zealand only

## Introduction

All preservative formulations used in Australia must but be approved for use by the Australian Pesticides and Veterinary Medicines Authority or APVMA. There are two important features of an APVMA approval. Firstly, the approval only applies to wood actually treated in this country. There may be preserved wood sold in Australia that has been treated with a preservative not approved by the APVMA. In this case the actual treatment process was not carried out in Australia. Secondly, the APVMA approves a label which sets out how the preservative may be used: In effect, this means that members of the public will not be able to buy the actual preservative.

Wood preservatives may be dissolved in water, oil, or a light organic solvent such as mineral turpentine. This allows a preservative to be classified into one of these three main groups. The list below covers only those preservatives that are used to preserve wood to the specifications in Australian Standard AS/NZS 1604 Preservative treated wood-based products. There are three standards in this series dealing with products and treatments, verification requirements and test methods.

**Water based preservatives** (The correct term is 'water-borne') Timber treated with this group of preservatives has a wide variety of applications, both indoors and outdoors, for residential, commercial, and industrial uses.

- Copper Chrome Arsenate, also referred to as CCA, and the treated wood is green in colour.
- Copper Quaternary or ACQ, turns the wood green but a different shade compared to CCA.
- Copper azole (CuAz) turns the wood a brown-green colour.

CCA, ACQ and CuAz react chemically with the wood, making them insoluble and so suitable for use in situations where the treated wood may be exposed to the weather (wetting and rain). This set of preservatives is effective in protecting wood from attack by borers, termites and decay.

Boron-based preservatives are water soluble and do not become insoluble after treatment. Because of this, products that are protected with boron-based preservatives can only be used in situations where the wood does not get wet. Whilst boron-based preservatives have some ability to protect against rot or decay, this sort of protection is not usually needed because the boron protected wood is used in dry situations (e.g. flooring) and rot or decay does not occur in dry wood.



















**Oil-borne preservatives** Timber treated with oil-borne preservatives is mainly used for heavy duty construction and in the marine environment. The oil-borne preservatives approved for use in Australia are creosote and pigment emulsified creosote (PEC). Oil-borne treated products include utility poles, rail sleepers and marine piles

**Light Organic Solvent Preservatives (LOSP)** LOSP systems are used for products treated in their final shape and form. This includes high value joinery such as balustrades, fascias etc. LOSP treatments are only suitable for products used out of ground contact, and treated products that are destined for outdoor use are often sold with a primer coat of paint. As copper naphthenate is the only coloured LOSP treatment (green), other LOSP treatments may contain a tracer colour. The AS/NZS 1604 specified LOSPs include:

- Copper naphthenate or CuN. This product is being increasingly used in the US, turns the wood green and is a fungicide only. This preservative must also be used with an insecticide.
- Tebuconazole/propiconazole or teb/prop. This is a colourless fungicide and must be used with an insecticide.
- The synthetic pyrethroids, permethrin, deltamethrin, bifenthrin, and cypermethrin are used for termite and insect control and have no ability to stop decay. These preservatives are colourless and often have a dye or pigment added. e.g. blue framing.

**Glue line additives** This type of preservative does not neatly fit into the three groups of preservative just described. This is because the preservative is added to the glue when products such as plywood or laminated veneer lumber or chipboard are being prepared for gluing. Preservatives in this group currently include two synthetic pyrethroids, imidacloprid and zinc borate.

Currently, wood treated to comply with a specific Hazard Class (TPAA Technical Note #2 (/TPAA/wp-content/uploads/2015/06/4\_2\_2\_0-TN-2-Hazard-classes.pdf)) may be used anywhere in Australia. Clearly the biological hazards in Mt Isa or Broken Hill or Innisfail are not the same for a nominated Hazard Class. Research is currently underway to allocate use of various preservative treatments more closely aligned to biological hazard (H class) but until this information is available, the following table may be used as a guide on how to match Hazard Class with a treated timber product. There may be other products made of treated wood and you can contact the TPAA for further advice.

Treated product	H1	H2	H2F	H3
Baluster				 (http: content/u
Battens - inside	 (http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg)	 (http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg)	 (http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg)	
Battens – outside - structural				 (http: content/u
Battens – outside – non structural				 (http: content/u
Beams laminated – inside – low risk	 (http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg)	 (http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg)		
Beams laminated – inside – high risk				 (http: content/u
Beams laminated - outside				 (http: content/u
Boat hull				
Cladding				 (http: content/u
Compost bin				
Containers - plants				
Cooling tower – fill and structure				
Decking – bridge & wharf				
Decking - jetty				
Decking - patio				 (http: content/u
Droppers - fence				 (http: content/u
Fascia boards				 (http: content/u
Fence - palings				 (http: content/u
Fence – rail				 (http: content/u
Flooring - interior	 (http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg)	 (http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg)		

Treated product	H1	H2	H2F	H3
Framing – interior – components, lintels, noggins, studs, subfloor, top and bottom plates	✓ ( <a href="http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg">http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg</a> )	✓ ( <a href="http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg">http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg</a> )	✓ ( <a href="http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg">http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg</a> )	
Furniture - inside	✓ ( <a href="http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg">http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg</a> )			
Furniture – outside (garden)				✓ ( <a href="http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg">http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg</a> )
Garden wall less than 1m high				
Garden wall more than 1m high				
Gate – outside (garden)				✓ ( <a href="http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg">http://www.tpaa.com.au/wp-content/uploads/2015/06/tick_grey.jpg</a> )
Glasshouse framing				



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