



Old College Road
P.O. Box 517
Gatton Q 4343
Australia

Phone:(07) 5462 4255
Fax: (07) 5462 4077
E-Mail: Timber.Tek@
uq.net.au

SUBJECT: COPPER AZOLE TREATMENT OF TIMBER

TIMBER TREATMENT

The purpose of Copper Azole (Tanalith E) Treatment of timber is to protect the Sapwood of timber from insect attack and fungal decay.

"Sapwood" is the outer ring of young growing wood, and "Heartwood" (or "Truewood") is the middle ring of mature wood. "Heart" (or "Pith") is the dead wood at the centre of the tree. Hardwoods have a large band of Heartwood and a small band of Sapwood, whereas softwood species such as Radiata Pine, have a small band of Heartwood and a large band of Sapwood. **The different proportions of Sapwood and Heartwood in Pine and Hardwood influences the protection afforded by Copper Azole treatment.**

Sapwood and Heartwood generally are regarded as having similar strength properties. However, the Sapwood of timber has far less natural resistance to insect attack and fungal decay than the Heartwood of the same species (with the relative difference varying between species).

The treatment process involves the Sapwood being impregnated with preservative by the VPI (Vacuum Pressure Impregnation) process in specially designed treatment plants. Once the solution has penetrated the Sapwood, the elements are chemically fixed into the timber and are **highly resistant to leaching out.**

The protection achieved by this process, due to the complete penetration of the Sapwood by Copper Azole, cannot be matched by "paint on" preservatives.

The concentration of Copper Azole can be varied depending on the conditions under which the timber will be used. The conditions are categorised by "**Hazard levels**" and are described as:

Hazard Level 3 Above ground and exposed
Hazard Level 5 In ground and exposed

Timber should be branded with a number which identifies the chemical used, treatment plant, and hazard level. Wherever possible, this brand should not be cut off. Alternatively, a certificate can be supplied to certify that the

timber has been treated to the purchaser's requirements.

Copper Azole Treatment is effective in most of the common Hardwood species and many of the common Pine species.

Pine which is supplied for landscaping (principally Radiata and Slash) is normally plantation thinnings, and being young growth, is almost **wholly Sapwood**. Hence, when treated, it is resistant to insect attack and fungal decay, but will still exhibit normal pine properties .

"**Peeler Cores**", the centre of large pine logs used for plywood manufacture, are almost **wholly Heartwood** and although resembling "constant diameter" posts, **they cannot be treated**, and will decay very quickly when in contact with the ground or in moist conditions.

Copper Azole Treatment is also not effective in Cypress Pine, Oregon (Douglas Fir) and Bunya Pine, (amongst others).

It is illegal to attempt to treat species for which the process is not effective.

Attempting to treat such species gives the impression, by the green stain on the outside, that the timber has been effectively treated and will be durable (which is not the case).

Even in treatable species, **Copper Azole will only penetrate (and treat) the Sapwood, but will not penetrate, or improve the properties of, Heartwood.** Hence:

1. Cutting the end off treated timber has no effect on its durability.
2. Treated sawn pine (which is mainly Sapwood) will retain its green colour longer than treated sawn Hardwood (which is mainly Heartwood). The outer surface of the Heartwood will be stained a green colour, but will inevitably "grey" when exposed to the weather.

If left unprotected, Copper Azole treated timber will, in the long term, deteriorate due to the effects of the weather (water, ultra-violet light, heat and cold). Weathering results in a slow breaking down and wearing away of surface fibres, a change in colour and roughening of the surface. The extent of weathering will vary with timber species, and the loss of

approximately 6mm of timber per 100 years can be expected.

For satisfactory long term performance, it is still necessary to protect Copper Azole treated timber against weathering, with a suitable paint, stain, or oil system. Surface chemical should be washed and brushed off, (as is good practice with any dusty surface), so as not to affect paint adhesion or stain penetration.

The mechanisms of premature deterioration of Sapwood that can be prevented by Copper Azole treatment are:-

INSECT ATTACK

When treated, the Sapwood is protected from insect attack, due mainly to the copper component of Copper Azole.

Timber can be attacked by a wide variety of insects. One of the most common is the Subterranean Termite, and protection is focused mainly on physical and chemical barriers to prevent access to the structural timber.

The Sapwood of treated timber is protected against attack by termites. However the **Heartwood is no more resistant to termite attack after treatment than before.** Once the surface of the Heartwood (which may contain a small amount of Copper Azole) has been penetrated, the termites are free to attack the timber as they normally would.

Copper Azole in this case may **discourage** termites, and if there is other edible material nearby, eg. mouldings, their presence may become apparent before structural damage is done.

Copper Azole treatment does not make timber "termite proof" as is commonly believed (particularly with regard to sawn posts).

Another common and destructive insect is the Lyctus Borer (or powder post beetle). The larvae of this insect attacks only the Sapwood of some Hardwoods, particularly Spotted Gum, (feeding on the starch) and leaves tunnels packed with "frass" (waste product). Attack on untreated "Lyctus susceptible" Sapwood will continue until it is destroyed.

It is required, by law, that timber containing "Lyctus susceptible" Sapwood be treated before supply, unless it has been requested, in writing, that such timber be supplied untreated.

It is not required that timber from a Lyctus Susceptible species be treated if there is no Sapwood present, i.e. it has been cut "clean".

FUNGAL DECAY

When treated, the sapwood is protected from fungal attack, due to the copper and the tebuconazole component of Copper Azole.

Fungi need moisture, oxygen, warm temperatures, and nutrients such as the sugars and carbohydrates found in sapwood, to grow and break down the cell walls. This is generally referred to as rotting. **Timber containing Heartwood only, or with Sapwood, which is dry and kept dry, e.g. floor joists and bearers in well ventilated floor spaces, will not deteriorate due to fungal decay.**

Timber subjected to periodic wetting and drying, eg. verandah joists and bearers, will experience faster decay in the sapwood than the heartwood, It is advisable to treat any timber containing (non Lyctus susceptible) Sapwood where dry conditions cannot be guaranteed, and longer life is required than would be expected from untreated timber.

The use of Copper Azole Treatment has been very effective in producing more durable timber (particularly in "wet and dry" situations) and in improving the recovery of useable timber from Lyctus susceptible species. This has aided the efficient utilisation of an important natural resource.

(The above information includes material which has been drawn from TRADAC and NAFI publications.)

COPPER AZOLE vs CCA

	Copper Azole	CCA
Formulation:	Waterborne solution containing copper, tebuconazole and boric acid	Waterborne solution containing copper, chromium and arsenic
Timber appearance:	initially pale green ageing to green/brown. Weathers to grey over time	initially pale yellow ageing to pale green. Weathers to grey over time
Environmental	low metals content in timber and waste	high metals content in timber and waste
Disposal of treated timber:	Burial in landfill or incineration where approved	Burial in landfill only